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Report No. 19501

PERFORMANCE AUDIT REPORT

CHINA

AGRICULTURE COMPONENT

of the

GANSU PROVINCIAL DEVELOPMENT PROJECT

(LOAN 2812-CHA AND CREDIT 1793-CHA)

June 23, 1999

*Sector and Thematic Evaluations Group
Operations Evaluation Department*

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Currency Equivalents (annual averages)

Currency Unit = Chinese Yuan (Y)

Year	Official ^a	Market ^b
1987	3.71	4.0
1988	3.71	5.5
1989	3,71	5.5
1990	4.72	5.5
1991	5.22	5.5
1992	5.38	6.3
1993	5.45	7.5
1994	8.7	9.0
1995	8.7	8.3
1996	8.3	8.3
1997	8.3	8.3
1998	8.3	8.3
1999	8.3	8.3

a. International Financial Statistics, IMF.

b. Shadow Exchange Rate: Estimated in ICR.

Abbreviations and Acronyms

ABC	Agricultural Bank of China
cms	cubic meters per second
CNTIC	China National Technical Import Corporation
DPPIO	Dingxi Prefecture Project Implementation Office
GDP	Gross Domestic Product
GOC	Government of China
GPIO	Gansu Project Implementation Office
GWRB	Gansu Water Resource Bureau
ICB	International competitive bidding
ICR	Implementation Completion Report
IS	International shopping
kW	kilowatt
LCB	Local competitive bidding
LS	Local shopping
mcm	million cubic meters
M&E	Monitoring and evaluation
OED	Operations Evaluation Department
O&M	Operations and management
PAR	Project Audit Report
SAR	Staff Appraisal Report
YLAMB	Yindaruqin Irrigation Area Management Bureau

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Office of the Director-General
Operations Evaluation

June 23, 1999

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

**SUBJECT: Performance Audit Report on China
Gansu Provincial Development Project (Agricultural Component)
(Loan 2812-CHA and Credit 1793-CHA)**

Attached is an Operations Evaluation Department Performance Audit Report (PAR) on the *Agricultural Component* of the Gansu Provincial Development Project, for which US\$130.0 million was allocated from Credit 1793-CHA (which was approved by the Board on May 12, 1987).

The project as a whole was targeted towards poverty alleviation in supporting three basic concerns of Chinese policy: to enhance growth in poorer regions, to make the best use of scarce land and water resources and to reduce out-migration. In the early 1980s Gansu's average rural per capita income was the lowest in the nation and was falling further behind. To combat extreme poverty the government provided subsidized food to the poorest households, 80 percent of which were in the project area.

The main objective of the agricultural component was to raise the living standards of about 111,000 poor households by increasing incomes from agriculture, particularly by relieving the main constraint of low and erratic rainfall. A three-pronged strategy of developing irrigation, resettling the poorest people on irrigated areas, and developing rain-fed agriculture was to be achieved by two components: (a) predominantly irrigation works and resettlement in the Yindaruqin project area (89 percent of costs); and (b) land development and improved practices in the Guanchuan River basin. The irrigation scheme required complex and innovative civil works to construct, in very difficult terrain, a 90 kilometer feeder canal with many long tunnels and aqueducts.

The project was of poor quality at entry since rapid approval of a poverty alleviation operation for Gansu took priority over project preparation. Main deficiencies were that engineering investigations and land settlement planning were incomplete; risk analysis was neglected (in an inherently risky engineering proposal); and optimistic assumptions were made on the availability of local funds and the capability of local contractors and managers. Consequently, although the project's physical achievements were eventually substantial and are a credit to those involved, serious implementation difficulties caused long delays on irrigation development and settlement, there were large cost overruns, and the irrigation scheme is incomplete. The works are expected to be completed by the end of 1999, some six-and-a-half-years behind schedule, when the last quarter of the settlement program can be finished. However, the extensive works in the Guanchuan rainfed area were completed on schedule and some physical targets were exceeded.

Despite implementation delays and cost increases, the economic rate of return estimated by the audit is satisfactory at 12 percent (compared with 13 percent at appraisal and 15 percent in the ICR). This is largely because of higher than predicted irrigated crop yields and cropping pattern shifts towards

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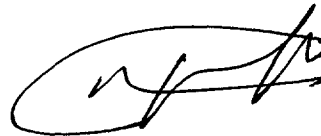
high value crops. The project is having a major poverty impact with the incomes of the poorer households doubling already, and food deficits being eliminated. There are also large secondary benefits such as potable water supplies; access to all-weather roads; electricity supply for all households; improved soil fertility and water conservation practices, and the transfer of modern tunneling technology to other projects throughout China.

Given that part of the irrigation component is incomplete, and that implementation was long, difficult and expensive, with high cost overruns, the audit rates the overall outcome as *marginally satisfactory* (satisfactory in the ICR). Sustainability is rated *likely* (as in the ICR) and institutional development is rated as *modest* (also as in the ICR). The performance of the Bank is rated *unsatisfactory* (satisfactory in the ICR), given that the haste to proceed before the project was properly prepared proved to be a costly decision which could not be overcome fully during a much extended implementation period.

The following are the main lessons of this experience:

- When complex engineering components are involved, careful evaluation of all aspects of the **engineering design** by a third party—preferably a reputable international engineering firm—should be a prerequisite of project approval. Operational Manual Statement 2.28, on the state of project preparation at approval, remains valid, and it is unfortunate that it has been dropped from the staff directives.
- Use of **local consultants**, with suitable qualifications and experience, can provide savings to the borrower, but this policy should take full account of quality and capacity considerations.
- Understandings on **counterpart funds** should clearly specify which government—central, provincial, or local—is responsible for providing funds and should include a schedule.
- There is a **high potential for reducing poverty, even in semi-arid areas**, with carefully designed schemes for land development and improvement—such as terracing, bunding, and contouring— together with efficient use of scarce water resources.

Attachment

A handwritten signature in black ink, consisting of several fluid, overlapping strokes that form a stylized, somewhat abstract shape.

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IBRD Nos. 19786 and 20182

This report was prepared by Mr. Keith Pitman (Task Manager) and Mr. I.J. Singh (Consultant), who audited the agricultural component of the project in November 1998. Mr. William Hurlbut edited the report, and Ms. Pilar Barquero provided administrative support.

Principal Ratings

	<i>ICR</i>	<i>Audit</i>
Outcome	Satisfactory	Marginally Satisfactory
Sustainability	Likely	Likely
Institutional Development	Modest	Modest
Borrower Performance	Satisfactory	Unsatisfactory
Bank Performance	Satisfactory	Unsatisfactory

Key Staff Responsible

	<i>Task Manager</i>	<i>Division Chief</i>	<i>Country Director</i>
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Preface

This is a Performance Audit Report (PAR) on the *Agricultural Component* of the Gansu Provincial Development Project, for which US\$130.0 million was allocated from Credit 1793-CHA (approved on May 12, 1987 for SDR 119.1 million, equivalent to US\$150.5 million). The original closing date of June 30, 1994, was extended twice to June 30, 1996. A total of US\$109,367 (SDR 86,543 equivalent) was cancelled from the allocated amount.

The report is based on the Implementation Completion Report (ICR) prepared by the East Asia and Pacific Region (issued March 31, 1997), the Staff Appraisal Report, loan documents, project files, and discussions with Bank staff. An Operation Evaluation Department (OED) mission visited China and the project areas in Gansu Province in November 1998 to assess project completion and discuss the effectiveness of the Bank's assistance with the government and various provincial project implementing agencies. The cooperation and assistance of government officials and the implementing agencies, their management and staff, are gratefully acknowledged. In particular we acknowledge the assistance of the monitoring and evaluation (M&E) units attached to the project, which made extensive data available on short notice for the audit mission.

This PAR contains a more critical review of the project than the ICR, particularly regarding the project's engineering design, quality at entry, the institutional problems inherent in implementing large-scale, complex projects of this nature, and the implementation difficulties that arose during this period of rapid reforms in China.

Following standard OED procedures, the draft PAR was sent to the borrower for comments before it was finalized. All comments were taken into account in the final version and the borrower's comments are included as Annex C.

1. Background

1.1 Agriculture (crops, livestock, forestry and fisheries) remains the main source of employment in China and accounts for 35 percent of GDP. Despite its large land mass, China has very little arable land to spare—only 10.41 percent of its total area is arable; only half of that land is irrigated, and over 70 percent of the cropped area is devoted to food crops. The government views as a high priority anything that enhances China's capacity to feed itself, especially in the hinterlands of the West and Northwest, where poor transportation and high costs make it difficult to import food.

1.2 With the start of reforms in the early 1980s China experienced very rapid rates of growth. Between 1980 and 1985 GDP grew at over 9 percent and agricultural production increased 10 percent per year (compared to an average of 3 percent per year over preceding 23 years). As per capita rural incomes rose almost fourfold, production shifted from grains to livestock and higher-value crops. The industrial sector also grew very rapidly.

1.3 This growth was very uneven, however, and led to large inequalities in per capita incomes between the fast-growing coastal provinces, which benefited from labor-intensive export-led growth and an infusion of foreign investments, and slow-growing provinces like Gansu. This, combined with the breakdown of rigid internal controls, has led to large-scale labor migration from central to coastal regions and from rural to urban areas. This has brought with it fears of social and political instability. Whatever can be done to increase growth and incomes, reduce poverty, keep the growing populations in the hinterlands gainfully employed, and prevent further out-migration has become a priority.

1.4 The Government of China (GOC) has long recognized this problem and asked the Bank to assist with regional development strategies. In particular, it asked the Bank to support development projects aimed at the backward and poorer regions of the country. The subject of this audit, the Gansu project, especially the agricultural component, is a response to this long-standing Chinese concern.

Rationale

1.5 The project supported three basic concerns of Chinese policy. First, to enhance growth in poorer regions to reduce regional inequalities. Second, to make the best use of scarce land and water resources and to maximize the agricultural potential in a backward region. Third, to raise incomes and provide employment opportunities within the poorest regions to reduce poverty and prevent further migration away from them.

1.6 The Gansu project aimed to reduce poverty in a densely populated resource-poor rural region. In the early 1980s, two-fifths of Gansu's population of 20 million lived in poverty compared with 13 percent nationally. Rural per capita incomes in Gansu were considered the

lowest in the nation. The province was not only poor, it was also falling behind—its rural income was 75 percent of the national average in 1978, but only 64 percent by 1985.¹ Poverty was so severe in parts of Gansu that the government was providing subsidized food, water, and fuel to most households. Most of the food went to food-deficit families, some 80 percent of whom were in *areas of the proposed project*.

Objectives and Components

1.7 The main objective of the agricultural component was to raise the living standard for about 111,000 poor households through increased agricultural production and incomes. The main constraint on agricultural production in Gansu is low and erratic rainfall, especially in the central and northern regions. In 1987, only about a quarter of Gansu's 3.5 million hectares (ha) of cropland (8 percent of total land area) was irrigated.² While grain output had increased by 9 percent during the 1980s (despite a fall in area due to better-than-average rainfall), provincial food grain shortfalls were severe and production met only 88 percent of local needs.

1.8 The project called for a three-pronged strategy: a) develop irrigation where economically feasible; b) resettle the poorest segments of the population on newly developed irrigated areas; and c) develop rain-fed agriculture through land development and improved practices. The project was located in Dingxi, the poorest of Gansu's three agricultural regions.

1.9 The project has two main components: massive irrigation works and settlement schemes in the Yindaruqin project area; and land development and improved practices in the arid areas of the Guanchuan River basin. The former lies in the mountains and semi-arid valleys northwest of the capital of Lanzhou, the latter lies in the arid loess hills over 200 kilometers (km) southeast of the capital. The main objectives and components in each of the project areas are shown in Table 1.1.

1.10 Overall management of the project was vested in the Gansu Project Implementation Office (GPIO), while the planning, construction, and implementation of the irrigation scheme in Yindaruqin was given to the Gansu Water Resources Bureau (GWRB). Responsibility for the resettlement programs was fragmented: overall supervision rested with the Resettlement Division of the Provincial Agricultural Commission, which had managed it in the past, but implementation was the responsibility of the GWRB and the agricultural bureaus of the two counties (Yongdeng and Gaolan) the settlers came from. Land development in the arid areas of Dingxi was the responsibility of the Dingxi Prefecture Project Implementation Office (DPPIO). For all practical purposes these two projects areas were separate and self-contained and ran on parallel tracks, each with its own budget, project management, objectives, and monitoring and evaluation unit.

1. Per capita incomes in Gansu averaged around Y255 compared to a national average of Y398; in its poorest counties, incomes per capita were only Y60.

2. Crops, mostly grains, accounted for 70 percent of the agricultural production; another 20 percent came from animal husbandry (grass for sheep, goats, and draft animals); the rest came from forestry products (3.6 million ha).

Table 1.1: Project Summary

GANSU PROVINCIAL DEVELOPMENT PROJECT (AGRICULTURAL COMPONENT)

Credit No.: 1793-CHA	Project Cost (US\$ million):
Approved: May 12, 1987	Total - 349.25
Effective: January 19, 1988	IDA Credit - 132.53
Closed: June, 30 1996 (2 years behind schedule)	
Local Counterpart Funds: Provincial and Central	

Objectives:

- Reduce the risk of crop and livestock production in an area of poor and erratic rainfall by increasing the irrigated area by about 57,000 ha
- Increase agricultural production in existing rain-fed areas on some 76,000 ha through soil and water conservation, better farming practices, and land improvements
- Resettle newly irrigated land with about 15,000 poor households from surrounding resource-stricken and resource-poor areas
- Raise the living standards and income levels of about 96,000 poor households in the region through increased agricultural production
- Provide drinking water to project area residents and their livestock
- Ensure sufficient quantities of scrub fuelwood and other materials to overcome existing shortages
- Improve rural roads and power facilities

Components:

Yindarugui Irrigation Component (US\$181.3 million):

- Complete a 90-km-long feeder channel (13.5 km of open channel, 75 km of tunnels, and 1.5 km of aqueducts) to bring water from the Yellow River-Datung tributary through mountains
- Complete and enlarge the 59-km-long East Main Canal No. 1 to irrigate 20,700 ha (including 6,200 ha already irrigated) and construct a 69-km-long East Main Canal No. 2 to irrigate 33,700 ha
- Construct and improve some 690 km of 45 branch canals
- Develop service units to cover each 250 ha block, with farm ditches and land smoothing for 40,000 ha and leveling for 10,000 ha
- Ensure land rights for 57,000 households already in the project area and settle an additional 15,000 households (80,000 people) from the poorest rain-fed areas on newly irrigated land

Guanchuan Land Development and Improvement Component (US\$20.7 million):

- Bench and terrace 76,000 ha to enhance productivity
- Plant shrubs, grasses, and trees to reduce soil erosion
- Increase productivity and income for 39,000 households (205,000 people) in area

Institutional Support (US\$2.2 million):

- Provide training and consulting services to help supervise construction, management, and supervision
- Support services for farmers, including research, extension, agricultural inputs, and credit
- Establish project operation and maintenance with partial cost recovery

2. Design and Implementation Issues

2.1 The arid land development and improvement scheme in the Guanchuan River basin was completed on schedule and within appraised costs. It achieved or exceeded all its physical and economic objectives.³ All the implementation issues and problems occurred with the Yindaruqin irrigation and land settlement scheme. *This audit report therefore focuses primarily on the Yindaruqin component.*

Issues at Entry

2.2 At the preappraisal and appraisal stages, very few issues emerged concerning the project or its associated risks. This agricultural component was prepared as part of a “package” of projects for Gansu, which included two smaller industrial and education components. These three components had been identified by a preappraisal study.⁴ The only institutional risk identified was provincial inexperience with Bank procedures. To limit this risk, a “launch workshop” was organized to familiarize provincial officials with the procedures.⁵ Price contingencies of 6 percent were deemed adequate; goods in principal were to be purchased through international competitive bidding (ICB), for which qualified local bidders were given a 7.5 percent preference.⁶ Resettlement was deemed necessary to the project’s success, and adequate funding was requested for it. Local counterpart funding was assumed to be available for the entire project as agreed.⁷

2.3 Engineering and design issues were discussed only tangentially in connection with providing technical assistance to the Chinese to prepare for the bidding of the civil works. A team of foreign engineering consultants was contracted to assist in the review, design, and preparation of bid documents, but only after the Board had discussed and accepted without comment a draft proposal for the project.⁸ While qualified external consultants could have identified the engineering risks that emerged later, the terms of reference for this team did not extend to evaluating the engineering design or its technical feasibility.

2.4 Neither the Yellow Cover nor the SAR discussed the problems of local counterpart funding, institutional weaknesses, technical capability of subcontractors, project management, or

3. See ICR for details.

4. Project Brief, August 14, 1986.

5. Combined Issues Paper/Decision Memorandum, August 29, 1986. It is also worth noting that the total costs were estimated at US\$340 million, far closer to the final actual costs, than the US\$250 million in the appraisal report.

6. The items under ICB were procured through a special board set up precisely to perform this function. The items under local competitive bidding (LCB) were procured through the project management offices for the two project areas. One ICB and 13 LCBs for \$200 million in works and 16 contracts for \$11 million in goods were awarded.

7. Yellow Cover Draft of SAR: October 16, 1986 and (Telex in Files: 10/8/86 and 10/30/86).

8. The terms of reference for the Snowy Mountain Engineering Corporation of Australia, which were not finalized until the end of December 1986, included a) review of design criteria for tunnels or related studies, b) recommend tunnel construction techniques and look for scope for savings, c) review hydraulic and structural designs, and d) review geology to assess support and lining needs to provide information to bidders and to review the bids and tenders. It also provided for project staff to visit Australia. (Telex in Files, November 12, 1986).

risks associated with a rapidly changing and reforming economy. In assessing project risks, both the preappraisal and the appraisal documents concluded, “*the project faces no significant (unusual) technical or organizational risks.*”⁹

Project Delays

2.5 From the beginning the project encountered delays, particularly at Yindaruqin. The start of the project was held up for more than nine months (until the end of 1988) mainly because Gansu provincial authorities did not make adequate, timely budgetary provisions for project funds. Implementation delays were caused by i) design and implementation problems with the tunneling, ii) poor performance by local contractors on the feeder channels, iii) lack of counterpart funds to complete project components; and iv) bureaucratic delays on land settlement. Completion of the project was delayed by more than three years, and some components are still incomplete.

Technical Design Problems

2.6 The Yindaruqin irrigation component had the largest delays and cost increases. Designed on the basis of gravity flows throughout, the engineering of the component was enormously complex. Once the water is diverted at the upper reaches of the Yellow River, it is carried through a 90-km feeder system with unique engineering and construction problems.

2.7 The SAR did not even mention the possibility of geological problems or troublesome design issues even geological surveys had been carried out before the project. But during implementation, severe problems emerged. The project area was a veritable “geological zoo”: some rock strata consisted of soft shale, where tunnels had to be supported with reinforced steel jackets to prevent collapse, and other strata had rock so hard that special bits and tunneling equipment had to be imported to complete the work. There were also problems both with the sites selected and with the designs of feeders, siphons, and channels.

2.8 The consultants hired to oversee the bidding process were engaged to assist the Project Office supervise the construction of two ICB contracts for the tunneling work on the feeder channel. They found many problems with the quality of the work undertaken by contractors and some design deficiencies. The Project Office submitted several reports recommending measures for improvement. They found the original engineering specifications and design were inadequate, especially for the tunnels. The construction work, especially by the local ICB contractors, was often inadequate and so poorly done that there was a danger of cave-ins in the excavated sections of the tunnel. The Project Office submitted detailed photos and maps—in confidence—to show where the walls were in danger of collapse.

2.9 Drastic measures were taken by the Project Office. A major local contractor was dismissed (upon recommendation by a bank mission) and was replaced by another contractor who was closely supervised by the consultants. Major design improvements were needed and included: full lining of tunnel sections for those previously designed as unlined; improved blasting techniques to achieve smoother, uniform surfaces; and stronger primary supports. These redesigns led to increased civil works, delays, and additional cost for the feeder channel. The

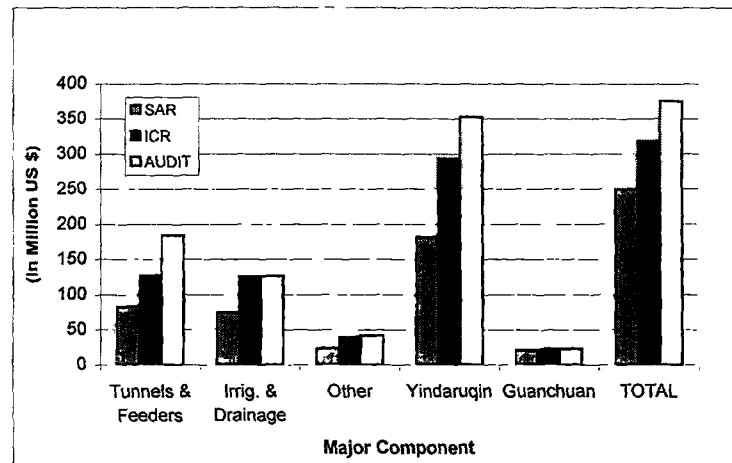
9. Yellow Cover Draft, p. 14, and SAR, p. 26.

completed irrigation system will have 78 tunnels—45 more than originally planned and some of them more than 10 km long—two inverted siphons over steep cliffs, 33 aqueducts to cross valley floors, and 900 km of open and covered canals. The system passes mountainous terrain with varying and probably poorly understood geological conditions, that eventually lead into on-farm works. The irrigation distribution system carries water over several hundred kilometers.

2.10 The costly consequences of poor planning and design of the engineering components during preparation are clear. It is probable that these problems could have been greatly reduced had better surveys been done or with the intervention of expert engineers from outside *before* the project was approved for financing.

Cost Overruns

Figure 2.1: Project Costs



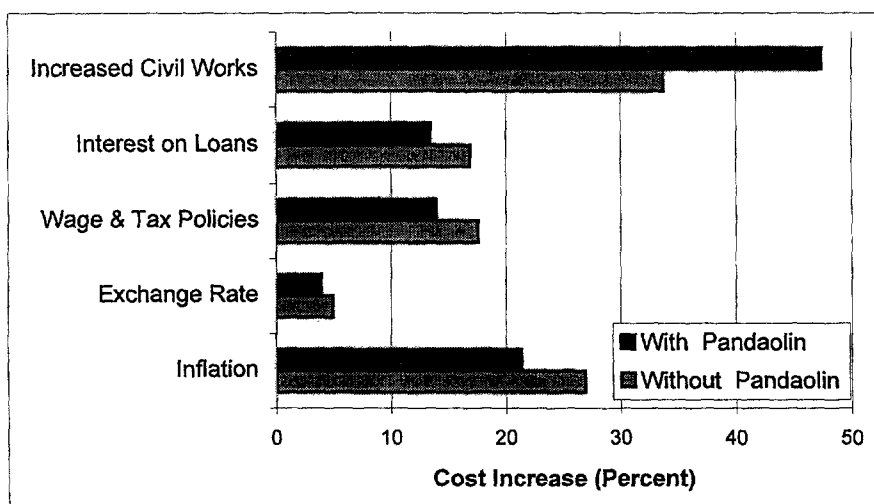
2.11 The original costs of US\$250 million at appraisal were expected to rise to US\$395.6 million through 1999 (Figure 2.1),¹⁰ a cost overrun of 93 percent of base costs and 58 percent of total costs (including physical and price after contingencies). The cost increases between the SAR and the audit estimates can be attributed to six factors: inflation, exchange rate changes, design changes, changes in national policies, interest charges, and excluded costs of the Pandaolin tunnel.¹¹

10. This includes the costs associated with the construction of the Pandaolin tunnel. These costs were incorrectly excluded as "sunk costs" in both the SAR and the ICR and were borne by the Chinese. But without this tunnel, the feeder system is incomplete and no project benefits would accrue from irrigation. In any event, the tunnel construction occurred at the same time as the rest of the civil works.

11. The project did not make adequate allowance for price contingencies because prices had been relatively stable before reform. The SAR allowed a price contingency of 8.6 percent for 1985–90 and 4.5 percent 1991–93. The actual average inflation rate in the first three years of construction, 1987–89, was over 13 percent per annum. After abating to 6 percent for three years, it again averaged 21 percent per annum during 1993–95. There have been five devaluations during the project period with the yuan rate falling from a high of 3.71 per US\$ in 1987 to 8.3 per US\$ by 1996, which increased costs of all foreign components of the project, including the import of fertilizers. Some cost increases are associated with increased civil works due to design problems. Some costs are due to changes in national policies

2.12 All of the major cost overruns were in the Yindaruqin irrigation component.¹² Analysis shows that while inflation and other factors increased costs, if the costs of the Pandaolin tunnel are included—as they should be—then more than half of the total cost increases are due to increased civil works and construction problems during implementation (Figure 2.2).

Figure 2.2: Factors Affecting Cost Increases



Institutional Problems

2.13 The project also faced numerous institutional problems and shortcomings, among them lack of timely counterpart funds, poor subcontractor performance, delayed disbursements, and inadequate planning and design of land settlements.

2.14 *The lack of timely availability of local counterpart funds* was a major cause of delay and cost overruns at Yindaruqin. While funds for most large capital projects come from several sources (local, provincial, and central) the loan agreements did not spell out exact sharing arrangements—this was left to the borrower. This issue was constantly flagged during supervision, but the problem was never satisfactorily resolved. When central planning was the norm, this did not matter, for large capital projects, once authorized in the central budget, received their funding without problems. But as fiscal reforms increased decentralization in China during the 1980s, the center lost a large share of its revenues and its ability to finance many projects diminished.¹³ Consequently, local and provincial authorities were increasingly expected to pay for projects out of their own revenues.

requiring increases in the wage rates paid in projects and tax rates to be paid on materials and equipment. Interest charges paid on bank loans taken by project authorities increased when counterpart funds were late.

12. These include a 123 percent increase in the cost of constructing the tunnels and feeder canals, a 70 percent increase in the cost of irrigation and drainage works, and a 965 percent increase in the cost of engineering supervision (see Annex B, Table 1).

13. During the early years of project implementation, the share of central to total government revenues fell from a high of around 38 percent in 1985 to 22 percent by 1993. (China Statistical Yearbook, 1998, p. 281).

2.15 With double-digit inflation increasing costs, the exact shares of funds due from each source became a matter of prolonged negotiations between the province and the center. While richer coastal provinces were able to finance projects from their growing revenues, poorer interior provinces like Gansu were more strapped for funds.

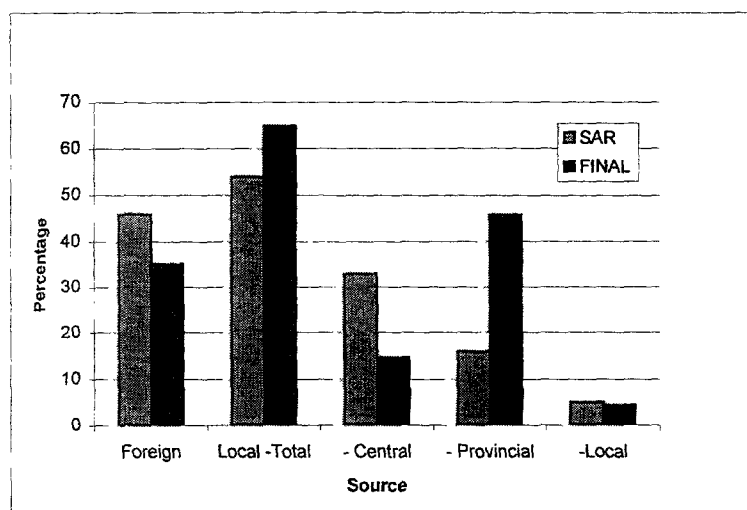
2.16 Lack of timely funding also sometimes prevented subcontractors, who faced inflationary pressures of their own, from executing their contracts on time. As costs rose, work stoppages due to a lack of funding became more frequent. To keep some of the construction going, project authorities were forced to borrow funds from local banks, adding to the fiscal costs of the project. In the end, the provincial government, itself strapped for funds throughout, assumed most of the increased project costs. The share of local funds that went into the project, estimated at 48 percent of total project costs at SAR, eventually rose to over 65 percent of the total project financing, most of it paid by the provincial government (Figure 2.3). Both the Bank and the project authorities underestimated the requirements for local counterpart funding.

2.17 *The poor performance of local contractors* also caused delays and cost overruns. According to the ICR, local contractors were not always prequalified and, once given contracts, did not always perform to standards. Some delays in the completion of the tunnels, main canals, siphon works, and channels occurred because local contractors did not have the necessary skills or because they were not being paid on time. They often worked with inadequate equipment and used obsolete construction methods. This was aggravated by lack of adequate and competent supervision by the project authorities.

2.18 To obtain contracts, both ICB and LCB contractors underbid. Then, with unexpected inflation, they had to bear the extra costs, but because they had a limited ability to mobilize funds and equipment, only a few contractors made money. This too led to delays.

2.19 *Disbursement was also slowed* due to delays in implementing the project. This twice

Figure 2.3: Project Financing in Yindaruqin



resulted in a reallocation of the proceeds from the credit and an increase—from 42 percent to 59 percent—in the share allocated to major works. In general, however, Bank disbursement procedures were followed.

2.20 The project *lacked an adequate plan for resettlement* at appraisal and did not establish a clear assignment of responsibilities among the various agencies charged with this task. Responsibility for funding the resettlement was also unclear. Supervision missions eventually overcome problems and a detailed settlement plan was prepared. While the Gansu authorities have made a firm commitment to complete this plan, there is no doubt that at the SAR stage this component was neglected. Further problems may have been caused by changes in project management. Initially, the Gansu Provincial Bureau of Water Resources was in charge, but later, a Yindaruqin Command was established. This new leadership proved more effective in accelerating the project.

3. Project Impacts

3.1 As previously noted, all works in the Guanchuan project area were completed on schedule and some physical targets were exceeded, but some of the civil works in the Yindaruqin component remain incomplete. Of particular concern is the completion of one of the main branch canals and the tunnels, aqueducts, pumping stations, and on-farm works associated with it (see Annex B, Table 2). The completion of the canal system has been delayed by the imposition of a new GOC water conservancy policy, which requires that water-saving technologies, such as drip irrigation systems, be introduced. These works are expected to be completed by the end of 1999. Assuming that this happens, it would still be *a six-and-a-half-year delay to full development* in the major component of the project.¹⁴

3.2 The uncompleted main branch canal has in turn delayed land settlements. Of 80,000 persons slated for settlement in Yindaruqin (there was no resettlement in Guanchuan) only about 66,000 (74 percent) had been settled by the end of 1998. The remaining 14,000 persons will be settled when the final 6,733 ha of land are brought under irrigation.

Production, Income, and Poverty Outcomes

3.3 In Guanchuan, while the areas terraced and developed have exceeded SAR estimates, average yields fall short for most crops, but given a shift to higher-value crops (potatoes and oilseeds) the total value of output exceeds SAR estimates at 1995 prices. Similarly, in Yindaruqin, realized yields have already exceeded the SAR estimates at full development for some crops (grain legumes, potatoes, vegetables, melons, and fodder) but fall short for others. Here too, the shift to higher-value crops has increased the value of output, but full development yields are unlikely to be achieved before 2003 (compared to 1998 in the SAR). Extensive double

14. The Regional Office has commented: construction of the main branch canal was postponed for one year so that water-saving technologies could be incorporated into the design. This action was taken on the direction of the Ministry of Water Resources of GOC so that the conserved water resources could be used to irrigate additional areas. China is facing an increasing water deficit. Huge efforts are being made throughout the country to conserve water through water-saving technologies. Hence, government directives have been sent to all areas where new irrigation facilities are under construction, directing them to incorporate these water-saving technologies. It is unfortunate that such action has delayed some projects, but the Bank should support plans and actions which aim to provide larger and more sustainable long-term benefits.

cropping, especially of legumes and vegetables, has allowed rapid increases in cropping intensity, and further increases are likely. Current intensities are around 110 percent (see Annex B, Table 3). Most of the targets for the production of livestock and animal products have also been achieved. Consequently, as cited by the ICR and the borrower, the project helped the introduction of modern tunneling technology to China, including other projects. Finally, increased food production has eliminated food deficits in project areas.

3.4 Financial data from annual surveys of farm families in the project areas show that *the project has had a major poverty impact*.¹⁵ Per capita incomes (farm and off-farm) have more than doubled for some 111,000 poor households in the project areas. In Yindaruqin, the largest increases have been for the lower-income households. These gains are likely to increase further as the irrigated areas are brought to full development, and off-farm incomes rise with associated economic expansion in the project areas.¹⁶

Other Project Benefits

3.5 The project has substantial indirect or secondary benefits resulting from improved water supplies, increased all-weather roads, and universal rural electrification of the project areas.

3.6 The project has made potable water for households and animals available throughout the year. Water previously had to be transported over an average of 8 km, requiring more than two hours of household time per day to fetch water from seasonal water reservoirs that quickly ran dry. When those sources dried up, water had to be trucked in at a very high cost (144 yuan per year per household in Yindaruqin). Now, each household in the project areas has its own cistern and has year-round access to clean, potable water. This has also reduced women's drudgery significantly as the task of fetching water fell mainly to them.

3.7 The 200 km of all new roads in each of the project areas provides easy, year-round access to nearby market towns and larger provincial townships. Previously isolated farmers are now integrated into the growing regional economy; this has helped the development of prosperous townships around and within the project areas. All-weather roads have made it easy for farmers to bring their outputs to market on time and to obtain access to inputs and medical facilities, and have increased their opportunities for earning off-farm income, which has steadily risen as a share of their total incomes.

3.8 The project has also brought electricity to all the households in the project areas. Besides providing light, it also powers electric pumps for water cisterns, radios, and even TVs in the more affluent households. This has improved the lives of farmers and their families.

3.9 Other benefits include incomes from temporary employment in project construction; experience gained in project implementation and institution building; and soil fertility management and water conservation have improved, leading to a better eco-environment. Most of these benefits are harder to quantify, but are tangible nonetheless.

15. The surveys were conducted by project M&E units.

16. The size of the sample in Yindaruqin is small (42 households) and may not be representative or statistically significant. But it is the only data available. The share of households in each income group in the sample is: high income (25 percent), middle income (50 percent), low income (25 percent).

The Economic Rates of Return

3.10 The ERRs reported at the time of the ICR were higher than those estimated at the time of the SAR—27.6 percent compared to 18.6 for Guanchuan, 12.7 percent compared to 12.2 percent at Yindaruqin, and 15.1 percent compared to 13.1 percent for the whole project. The audit estimates are lower (Table 3.1) and differ from those estimated earlier on two major counts: the full costs of the Pandaolin tunnel have been included as project investments whereas they were treated as “sunk costs” in earlier estimates and left out,¹⁷ the cropping intensity of 125 percent at full development is expected to be reached in the year 2003 instead of 1998 (in the SAR) or 1999 (in the ICR).

Table 3.1: Estimated Economic Rates of Return

	Appraisal (1987)	ICR (1995)	Audit (1998)
Yindaruqin Component	18.0	15.1	12.0
b) Without sunk costs	12.2	12.7	14.0

Note: The shaded rows are for the base case in Yindaruqin, which assumes a 125 percent cropping intensity and includes costs for the Pandaolin Tunnel. The detailed ERR audit estimates are in Annex B, Tables 4 and 5.

3.11 The ERRs, though lower, are still close to appraisal estimates. Although the project has been delayed and more costly than anticipated, the realized benefits have also been high. The base case for the audit estimate is conservative, and rates of return would increase somewhat (by 2 percent) if off-farm income benefits are included and if higher cropping intensities of around 140 percent are achieved at full development, an intensity that would be possible if intercropping of vegetables and other high-value crops is pursued. The inclusion of the costs of the Pandaolin tunnel, on the other hand, decreases the ERR by about 2 percent. The audit’s ERRs assume that remaining irrigation works will be completed as planned, but the small possibility of further conceivable delays would not greatly lower the estimates.

4. Ratings^a

Outcomes

4.1 Since the ICR, much progress has been made on the project and many incomplete components have been finished. In the final analysis, the project has turned out reasonably well and has completed most of its major objectives. At Yindaruqin, a major irrigation scheme with complex and innovative civil works has been successfully implemented, new areas have been brought under irrigation, and poor households have been settled on them. In Guanchuan, massive

17. While the SAR did include these “sunk costs” in one estimate, they were estimated at only 41 million yuan (US\$11 million), while the full cost of the Pandaolin tunnel has been closer to 215 million yuan (US\$26 million).

18. The borrower has commented “Taking into account of all necessary corrections to the draft PAR, the remaining criticism on the projects do not justify the drastic difference between the review results of the draft PAR and the ICR.”

land improvements have been undertaken in arid hills that hitherto yielded little. In both areas, incomes have been increased substantially, particularly for the poorest, and standard of living and quality of life have been improved for more than 100,000 households. Most of the physical and economic objectives including the income, non-farm benefits, and poverty outcomes in those areas *where the project has been completed*, have been achieved.

4.2 However, the route to this result has been long and difficult, and hardly the most efficient implementation experience. One main canal system, its 6 pumping stations, 8 tunnels, 6 aqueducts, and all the on-farm outlets and associated irrigated areas (11 percent of the total) and settlements (26 percent) are incomplete. While project authorities say that completion is assured, taking into account new central policy initiatives (on irrigation technology) could continue to delay the work, and benefits for a significant proportion of the targeted beneficiaries (17 percent) will be delayed. *For this reason, the audit rates project outcome as marginally satisfactory* (satisfactory in the ICR).^{19,20,21}

Sustainability

4.3 While the project has faced considerable technical difficulties, its *sustainability is rated as likely*. The physical works in Yindaruqin are very sound. In 1996, a 5.8 earthquake (Richter scale) did not damage any of the works, even though the epicenter was only 60 km away. The water supply for the system is assured of some 443 million cusecs per year from the Datung River through an agreement reached with the GOC and adjacent Qinghai province. The yields and on-farm benefits seem secure and could even increase in years to come. The operations and management (O&M) for the canal systems is well organized, water charges are being collected, and there is a surplus in the fund. Water charges will be raised to ensure coverage of future maintenance costs.²² The settlers have a good reason to stay as they are so much better off. Agricultural services—farm inputs, extension, credit, and marketing facilities—are readily available for all the farmers in nearby townships to which households have ready road access. Soil fertility and the environment are improving. There is potential risk of increasing secondary soil salinization due to rising water tables, if this is not controlled. But this situation is being carefully monitored.

4.4 In commenting on the risk of soil salinization, the borrower notes that “the water diverted to Yindaruqin is snowmelt from Qilian Mountains. The water quality is good with low alkalinity and low salinity. With the process of irrigation, and due to the relief of south part of irrigated area is lower, this part is likely to be salinized. However, from the beginning of irrigation, we have monitored the changing of groundwater level. And we have done some works on protecting salinization. Therefore, we believe this problem can be fully controlled.”

19. The ICR rated project outcome as satisfactory because it assumed that many project components in Yindaruqin that had not been completed at the time of the ICR would be completed soon thereafter. This did not prove to be possible.

20. See footnote #14.

21. In its comments, the borrower rates Outcome, Borrower Performance and Bank Performance as Satisfactory.

22. The current water charges are 0.15 Y/m³. If charges are raised to 0.3Y/m³, the full maintenance costs can be covered, but the increased charges have to be approved by the provincial Price Commission.

4.5 In Guanchuan, although the increases in incomes have been smaller, and agriculture still depends on meager rainfall, the terracing and land development, with arrangements for retaining water in catchments and in on-farm cisterns, will ensure that the benefits will be sustained. The settlements will be sustainable because opportunities outside project areas are likely to remain more bleak than they are inside. The remaining risks are few—the impact of a severe and prolonged drought in Guanchuan, the possible rise of water tables and alkalinity in Yindaruqin and a major earthquake—but they could emerge before the project reaches full development.

4.6 An important aspect of project risks is the uncertainty introduced by reforms, which have swiftly changed the economic and policy environment. Two examples are the rapid freeing of prices and several changes in exchange rates that increased project costs. Although introduced gradually and often successfully, the reform process has involved considerable experimentation and many reversals of policy. This has generated some confusion about where and with whom decisions rest, and when, where, and to what extent market incentives will be allowed to replace bureaucratic norms. The half-reformed regime in China—between plans and markets, between local initiatives and hierarchical controls, between freed prices and some controlled ones, between financial goals and continuing reliance on physical targets, between greater provincial and local autonomy and continuing directives and interference from above—was and continues to be a major source of uncertainty and increases project risks. Even so, during this period of reform, projects continued to be appraised, financed, and generally well implemented. However, the project is considered on balance to be sufficiently robust that its benefits will be sustained in a changing policy environment.²³

Borrower Performance

4.7 The large cost overruns on this project (over 40 percent) were the consequence of engineering and design problems as well as severe institutional problems, for which the borrower has prime responsibility. Also, lack of timely counterpart funds during implementation contributed to delays and to cost overruns.²⁴ The borrower is therefore primarily responsible for a delay of more than six years in the completion of the project. *Borrower performance, therefore, is rated as unsatisfactory* (satisfactory in the ICR). Even so a full measure of national pride is appropriate in that a complex and difficult engineering scheme was eventually completed, with large benefits to thousands of extremely poor rural families.

Bank Performance

4.8 Notwithstanding the overriding desire to process a provincial project to address extreme poverty, Bank appraisal of the Gansu Regional Development Project was inadequate in several areas. Most notably, the risk assessment of the project was not just poor but totally neglected, especially the geological uncertainties. The engineering and

23. The Bank's regional office has commented: The project risk resulting from uncertainty introduced by reforms seems too general and, in the absence of analytical work, is a matter of judgement. We doubt that the reforms have had significant impact on implementation of this project, other than the exchange rates changes that occurred over the project implementation period.

24. The borrower estimates components of cost overruns as follows: inflation—20.4 percent, exchange rate charges—3.7 percent, design changes—25.1 percent, interest charges—25.6 percent and additional funding costs—25.2 percent.

design by the borrower of the major civil works was poor and the Bank did not ensure that the design was carefully evaluated before going ahead.²⁵ Project costs were grossly underestimated, and inadequate allowances were made for both physical and price contingencies. The Bank also failed to ensure that the project could be completed by not obtaining explicit, detailed assurances for the timely provision of counterpart funds. The project design and engineering were carried out by the Chinese and the Bank accepted a project that was not fully developed and with engineering and other risks neither identified nor fully understood.²⁶ Consultants with expertise in tunneling and associated civil works should have been hired to assess the design and the geological risks *before* the appraisal was completed.

4.9 On the other hand, the Bank's performance during project supervision was superior. Many of the problems that arose during implementation were quickly identified, and viable solutions were found for most. That the project has been largely completed and that its economic rates of returns are close to those anticipated attests to the high quality of the Bank's supervision. Good supervision has been ameliorative at best, however, and is not a substitute for poor project preparation. Overall, therefore, *the Bank's performance is rated as unsatisfactory* (satisfactory in the ICR).

5. Conclusions and Lessons Learned

5.1 If this project was incomplete and unsatisfactory at entry why did the Bank proceed? In the mid-1980s the Bank was under pressure to develop poverty-related projects in China and to do so quickly. In its eagerness, the Bank first agreed to a lending program, then left it up to the project departments to deliver the projects. This inevitably placed a premium on getting projects to the Board. The Chinese obliged by providing a list of projects they had already prepared for funding. It was very easy for the Bank to take these up without independent scrutiny. Subsequent discussion then centered on how to meet some minimum requirements to get the project through the Board. In this process, the Bank's independent judgment was sometimes set aside in favor of sustaining a flow of projects in a large lending program. This seems to have happened in this case. Had the project been elsewhere than in China, it could have been a major disaster. As it was, the commitment and accountability at the provincial, local and project level allowed serious problems to be overcome.

5.2 The experience with this project suggests that there were borrower performance problems. These include:

- over-ambitious and over-optimistic targets and plans;

25. The Bank was clearly in serious breach of its own policy on the "State of Project Preparation Necessary for Loan Approval" (OMS 2.28), which requires that engineering work be well advanced by the time of appraisal/negotiations, and that "substantially complete final engineering" be available prior to Board approval.

26. Indeed, by the end of 1986 the Chinese had yet to complete their own internal feasibility study for submission to and approval by the State Planning Commission, while the Bank appraisal mission had already been in the field in March 1986—7 months earlier—and was to finalize the SAR in March 1997. In addition, the Chinese State Council had already approved the project in July 1986, before their own feasibility studies were available. (Telex in Files : October 7 and 20, 1986).

- a focus on physical outcomes and accomplishments—often engineering and physical outputs—with far less attention to economic feasibility and desirability;
- poor local capacity to undertake a complex project that included multiple components, especially in a poor province like Gansu;
- a policy preference for local and regional self-sufficiency—in food or project subcontracting—rather than economic costs and efficiency of providing them;
- the use of the project as a learning experience designed to contribute to increasing local capacity—but at the cost of implementation efficiency;
- lack of concern for assuring local counterpart funding and responsibility for making these funds available on time;
- highly bureaucratic organizational structures with rigid lines of authority that slowed local initiative;
- political interference with project authorities, especially since the project received political attention; and
- constant changes in central policies that impinged on project performance.²⁷

5.3 Equally clear, though, is that China is highly motivated to complete projects and meet goals. Still, completing these projects requires a lot of supervision and considerable push. High supervision costs then become a substitute for full preparation. On the positive side, China has an ability to get things done once authorities decide they want them done. This is a major reason a project as complex and problematic as this one was completed. The borrower has provided encouraging additional information in commenting as follows: “we firmly believe we can complete all remaining works and realize all project targets. Since the project audit up to June 10, 1999, we have completed the following remaining works: electricity pumping canal system and it’s 6 pumping stations, 6 aqueducts and 53% of the remaining tunnels, 52 thousand mu of land of the remaining 101 thousand mu have been leveled and it’s on-farm facilities have been finished, 14 thousand migrants will be moved to the irrigated area in the second half year of 1999. All the project targets of Yindaruqing will be definitely completed in 1999.”

5.4 The following are the main lessons of this experience:

27. In its comments the borrower disagrees with parts of the assessment in paragraph 5.2 and notes that “Yindaruqing is a complex project, meanwhile, it is the first project supported by World Bank in Gansu province. Though we have met many difficulties in construction, yet project targets are realized basically. Some outcomes have even reached advanced international standards under the supervision of World Bank mission, and by the hard works of project owner, design department, supervision department and construction department Therefore, we request that operation and evaluation department accept our above comments and make corresponding corrections in the performance audit report.”

- When complex engineering components are involved, careful evaluation of all aspects of the **engineering design** by a third party—preferably a reputable international engineering firm—should be a prerequisite of project approval. Operational Manual Statement 2.28, on the state of project preparation at approval, remains valid and it is unfortunate that it has been dropped from the staff directives.
- Use of **local consultants**, with suitable qualifications and experience, can provide savings to the borrower, but this policy should take full account of quality and capacity considerations.
- Understanding on **counterpart funds** should clearly specify which government—central, provincial, or local—is responsible for providing funds and should include a schedule.
- There is a high potential for reducing poverty, even in semi-arid areas, with carefully designed schemes for land development and improvement—such as terracing, bunding, and contouring—together with efficient use of scarce water resources. Bank and borrower enthusiasm notwithstanding, such schemes should be undertaken only after careful analysis of the **regional capacity** for carrying out such programs.

Basic Data Sheet

AGRICULTURAL COMPONENT OF THE GANSU PROVINCIAL DEVELOPMENT PROJECT (LOAN 2812-CHA/ CREDIT 1793-CHA)

Key Project Data (amounts in US\$ million)

Item	Appraisal estimate	Actual or Current estimate	Actual as % of appraisal estimate
Total project costs	250.0	245.97	98.3
Credit amount	130.0	143.34 ^a	110.3
Economic rate of return (%)	13	12	-

a. Due to the next aggregated appreciation of the SDR against the US dollar over the project implementation period, the actual total investment financed by the World Bank in US dollars has exceeded the US dollar equivalent of \$130 million estimated in the SAR.

Cumulative Estimated and Actual Disbursements

(in US\$'0000 equivalent)

	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95 ^b	FY 96 ^b
Appraisal Estimate	2.0	39.0	74.0	95.0	111.0	125.0	130.0	130.0	130.0
Actual	4.4	21.8	42.5	53.3	71.0	92.8	119.2	128.4	143.1 ^c
Actual as % Appraisal	222	56	57	50	64	68	86	99	110

b. Closing date extended.

c. Higher cumulative disbursement in US dollar terms than estimated at appraisal was due to net cumulative depreciation of the US dollar against the SDR.

Project Dates

	Original	Actual
Identification	04/85	04/85
Preparation	n.a.	n.a.
Appraisal	03/86	03/86
Negotiations	03/87	03/23/87
Board presentation	04/87	05/12/87
Signing	06/87	09/14/87
Effectiveness	08/87	01/19/88
Project completion	12/31/93	12/31/95 ^d
Loan/credit closing	06/30/94	06/30/94 ^e

d. Full project completion is expected 12/99.

e. Extended twice by one year each time.

Staff Inputs (dollars)

Stage of Project Cycle	Actual
Preparation to Appraisal	297.5
Appraisal	408.2
Negotiations to Board Approval	62.4
Supervision	561.1
Completion	24.0
Total	1,353.2

Annex A

Mission Data

	Date (month/year)	No. of persons	Staff days in field	Specializations represented ^f	Performance rating ^g Imple. status Dev. objec.		Types of problems ^h
Through app.	04/85-03/86	4	n.a.	A,E,I,IE	-	-	
Appraisal through Board	03/86-05/87	4	n.a.	A,E,I,IE			
Supervision 1	09/87	4	7	A,E,I,IE	2	1	M,EGR,F
Supervision 2	06/88	4	14	A,E,E,IE	2	1	EGR,F
Supervision 3	09/89	2	9	IE,PR	2	1	M,EGR,F
Supervision 4	09/90	4	10	A,E,IE,TS	3	1	M,EGR,F
Supervision 5	09/91	2	7	IE,TS	2	1	EGR,F
Supervision 6	04/92	1	4	IE	2	1	F
Supervision 7	04/93	2	7	IE,TS	2	1	EGR,F
Supervision 8	04/94	2	7	IE,TS	2	1	EGR,F
Supervision 9	05/95	2	7	IE,TS	S	HS	F
Supervision 10	10/95	1	4	IE	S	HS	F
Supervision 11/ICR	05/96	2	7	IE,E	S	S	F
ICR	09/96	2	5	IE,E			

f. A=Agriculturist, E=Economist, I=Institution Specialist, IE=Irrigation Engineer, PR=Public Relations Specialist, TS=Tunnel Specialist.

g. 1 = problem-free or minor problems, 2 = moderate problems, 3 = major problems; HS = highly satisfactory, S = satisfactory, US = unsatisfactory.

h. M = Management, EGR = Engineering, F = Counterpart funding.

Table B.1 Project Costs (US\$ million)

	SAR (A)	ICR (B)	Audit (C)*	Increase C / A (%)
Yindaruqin				
Tunnels & Feeders	82.3	125.4	184.25	124
Irrigation & Drainage	74.4	74.6	126.42	70
On-Farm Works	11.9	4.6	11.51	-3
Engineering Supervision	1.4	5.6	14.91	965
Machinery & Equipment	7	10.9	10.87	55
Land Settlement	4.3	0.45	2.86	-33
Subtotal	181.3	221.55	350.82	93
Guanchuan Basin				
Land Rehabilitation/Development	9.7	13	13	34
Pasture Establishment	2.6	1.7	1.7	-35
Roads & Electricity	6.9	4.5	4.5	-35
Fertilizers	1.5	2.6	2.6	73
Supervision & Management	0	0.6	0.6	-
Subtotal	20.7	22.4	22.4	8
Training & Consulting	2.2	2.3	20.4	827
Base Cost	204.20	246.25	393.62	93
Physical Contingency	28.30			
Price Contingency	17.50			
Total Project Costs	250.00	246.25	393.62	57.45
Of Which:				
Foreign (%)	52	n.a.	35	
Local (%)	48	n.a.	67	

Source: ICR, Table 8 A, and audit mission

* Audit figures include costs of Pandaolin Tunnel

Table B.2 Physical Achievements in the Civil Works at Yindaruqin

Subcomponent	SAR Target	After Design Revisions	Completed at Audit (1998)	Remaining For 1999	Percentage Remaining
Feeder Channels					
Tunnels (km)	49.5	59.4	59.4	0	0
Canals (km)	13.5	9.5	9.5	0	0
Aqueducts (km)	1.4	0.98	0.98	0	0
Siphons (set)	2	2	2	0	0
Drainage channels	10	8	8	0	0
Other Structures (set)	0	52	52	0	0
Irrigation & Drainage					
Main Canal-1 (km)	113	104	104	0	0
Main Canal 2 (km) Branch canals (km)	0	47.6	0	47.6	100
Tunnels (set)	700	852.6	770.4	82.2	10
Aqueducts (set)	39	78	70	8	10
Pumping Stations	19	33	29	4	12
	6	6	0	6	100
Other Facilities					
Main Drains (km)	100	100	60	40	40
Country Roads (km)	50	182	182 km	0	0
On-Farm Works					
Lateral canals (km)	1100	1716	1561	155	9
Sub-laterals (km)	1000	2052	1868	184	9
Branch Drains (km)	900	900	844	56	6
Field Channels & drains (km)	12,000	10,836	10,393	443	4
Land Reclamation, Leveling & Irrigation (ha)	57,000	57,333	50,683	6,733	12
Machinery & Equipment (million yuan)	26.0	86.38	86.4	0	0
Farmer Settlements(persons)	80,000	80,000	66,307	13,693	17

Source: Audit mission

Table B.3 Production, Yield, and Value of Crop Output

	SAR Estimate at Full Development				Audit Estimate (1998)			Forecast (2003)				
	Area (ha)	Yield ton/ha	Price-95 Y/ton	Value-95 (m. yuan)	Area (ha)	Yield ton/ha	Value-95 (m. yuan)	(Likely)			(Possible)	
								Yield ton/ha	Area (ha)	Value-95 (m. yuan)	Area (ha)	Value-95 (m. yuan)
YINDARUQIN												
Wheat	21800	4.5	2000	196.2	40990	4.2	344.32	5.5	28443	312.87	31856	350.42
Legumes	3400	3.0	2600	26.52	5550	3.2	46.18	5	6000	78.00	7000	91.00
Potatoes	0	12.0	800	0	300	16.3	3.91	27.5	2143	47.14	2500	55.00
Oilseeds	5700	2.3	3200	41.952	5290	1.4	23.70	2.3	7543	55.52	8800	64.77
Summer cereals	2300	5.5	2000	25.3	2500	3.2	16.00	4.8	2400	23.04	2800	26.88
Melons	5700	10.5	600	35.91	450	19.2	5.18	40	857	20.57	1000	24.00
Vegetables	14800	11.0	1000	162.8	5230	21.1	110.35	35	13550	474.24	15808	553.28
Fodder	14300	3.0	600	25.74	1533	7.69	7.07	9	5637	30.44	6576	35.51
Fruit	4900	10.5	2000	102.9	350	6.1	4.27	15	557	16.71	650	19.50
Roses	NA	1.8	2000		260	1.8	0.94	4	394	3.15	460	3.68
Subtotal	72900			617.322	62453		561.92		67523	1061.69	77450	1224.03
Cropping Intensity	1.27				1.096				1.25			1.4
GUANCHUAN												
Wheat	25600	2.4	2000	122.88	20749	1.97	81.75					
Grain Legumes	8900	1.7	2600	39.34	9844	0.95	24.31					
Oilseeds	23700	1.5	3200	113.76	8061	1.64	42.30					
Potatoes	1800	14	800	20.16	14528	12.55	145.86					
Summer cereals	1800	5.5	2000	19.80	8156	2.61	42.57					
Fodder	4800	3.7	600	10.66	1277	4.75	3.64					
Grasslands	56400				60420							
Shrubs & Trees	44000				45170							
TOTAL	167000			326.59	168205		340.44					

Table B.4 Gansu: Cost-Benefit Analysis
(At constant 1995 prices and in 10000 yuan)

YEAR	Net Benefits			Guanchuan Only			
	Yindaruqin	Guanchuan	Combined	Total Investment Costs	Operating Costs	Value of Outputs	Net Benefits
1987	-20817	-6743	-27560	5366	3333	1956	-6743
1988	-49202	-7893	-57095	6388	4074	2569	-7893
1989	-105850	-8054	-113904	8445	6093	6484	-8054
1990	-179492	600	-178892	7801	4903	13304	600
1991	-251640	-765	-252405	7053	4192	10480	-765
1992	-268704	660	-268044	6491	5389	12540	660
1993	-225720	8159	-217561	0	4695	12854	8159
1994	-309261	5927	-303334	0	6126	12053	5927
1995	-42235	3329	-38906	0	7834	11163	3329
1996	-93728	12532	-81196	0	9405	21937	12532
1997	-122185	9023	-113162	0	8542	17565	9023
1998	-81500	13651	-67849	0	7474	21125	13651
1999	80249	11179	91428	0	5957	17136	11179
2000	258183	9038	267221	0	5478	14516	9038
2001	366375	7775	374150	0	5042	12817	7775
2002	447110	7143	454253	0	4643	11786	7143
2003	521750	5762	527512	0	4146	9908	5762
2004	521750	5144	526894	0	3702	8846	5144
2005	521750	4593	526343	0	3305	7898	4593
2006	521750	4101	525851	0	2951	7052	4101
2007	521750	3722	525472	0	2665	6387	3722
2008	521750	2918	524668	0	2416	5334	2918
2009	521750	2503	524253	0	2124	4627	2503
2010	521750	2244	523994	0	1877	4121	2244
2011	521750	1928	523678	0	1686	3614	1928
2012	521750	1693	523443	0	1501	3194	1693
2013	521750	1535	523285	0	1335	2870	1535
2014	521750	1408	523158	0	1192	2600	1408
2015	521750	1300	523050	0	1064	2364	1300
2016	521750	1221	522971	0	950	2171	1221
2017	521750	1265	523015	0	855	2120	1265
2018	521750	1326	523076	0	772	2098	1326
2019	521750	1645	523395	0	714	2359	1645
2020	521750	1126	522876	0	617	1743	1126
2021	521750	859	522609	0	542	1401	859
Estimated ERR:			12%				17%

Table B. 5 Yindaruqin: Cost-Benefit Analysis Using Different Assumptions
 (Base case: including Pandaolin costs, max intensity = 125%, and without any off-farm benefits)
 (At constant 1995 prices and in 10000 yuan)

YEAR	Total Investment Costs	O&M Costs	Water Revenues	On-Farm Benefits	Without Project Benefits	(Case 1)	(Case 2)	(Case 3)	(Case 4)	Pandaolin Costs (1995 Prices)	Net Benefits	
						Base	Case 1 but 1.40% Int.	Case 2 + Off-Farm Income	Case 3 w/o Pandaolin			
						Net Benefits	On-Farm Benefits	Net Benefits	On + Off- Farm Benefits	Net Benefits		
1987	20817	0	0	0		-20817	-20817	-20817	-20817	14401.8	-6415.2	
1988	49202	0	0	0		-49202	-49202	-49202	-49202	15818.4	-33383.6	
1989	105850	0	0	0		-105850	-105850	-105850	-105850	34582.9	-71267.1	
1990	179492	0	0	0		-179492	-179492	-179492	-179492	53377.6	-126114.4	
1991	251640	0	0	0		-251640	-251640	-251640	-251640	57384	-194256	
1992	268704	0	0	0		-268704	-268704	-268704	-268704	30794.4	-237909.6	
1993	225720	0	0	0		-225720	-225720	-225720	-225720	12276	-213444	
1994	407721	1150	2070	176461	78921	-309261	176461	-309261	182487	-303235	129685.5	-173549.5
1995	222800	5000	8600	255886	78921	-42235	255886	-42235	265226	-32895	11950	-20945
1996	214148	11500	11040	199801	78921	-93728	199801	-93728	212065	-81464	5050.8	-76413.2
1997	214038	12267	16560	166481	78921	-122185	166481	-122185	186236	-102430		-102430
1998	181925	18696	23940	174102	78921	-81500	174102	-81500	203742	-51860		-51860
1999	84075	22895	28120	238020	78921	80249	238020	80249	269369	111598		111598
2000	0	27455	30780	333779	78921	258183	333779	258183	371779	296183		296183
2001	0	32775	44175	433896	78921	366375	459739	392218	498689	431168		431168
2002	0	41610	55860	511781	78921	447110	575172	510501	617922	553251		553251
2003-31	0	49875	66975	583571	78921	521750	691652	629831	739152	677331		677331
Estimated ERR						12%	13%	14%	15%			
Change in ERR due to Change in Assumptions:							1%	1%		2%		

中华人民共和国财政部
MINISTRY OF FINANCE, P. R. CHINA

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日期 DATE	June 18, 1999	总页数(含此扉页) Total Pages (Incl. this cover sheet)	5
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事项 RE	Comment on draft PAR: China - Gansu Agriculture (Ln.2812/Cr.1793-CHA)		
抄送 CC	Lang S. Tay, Task Team Manager, Resident Mission in China (fax: 6554-1686)		

Message 正文

Dear Mr. Ingram,

Reference is made of your letter dated 6/4/99 to Mr. Zhu Guangyao inviting comments on a draft Performance Audit Report on Gansu Provincial Development Project/Agricultural Component (Loan 2812/Credit 1793-CHA). Attached please also find a copy of comments from Gansu Province regarding the PAR.

Our observations on the above mentioned draft PAR are:

1. MoF shares and supports all comments made by Gansu regarding the PAR result.
2. Taking into account of all necessary corrections to the draft PAR, the remaining criticism on the projects do not justify the drastic difference between the review results of the draft PAR and the ICR."
3. *Par 5.2* appears to assume that the "borrower performance problems" if any, as listed by the OED, are of "systematic" nature. We do not think it appropriate to exaggerate these problems to that extent and suggest that OED give further consideration so as to arrive at the right judgement.

Please kindly review the related parts of the PAR and make due corrections in time.

Yours sincerely,

Comments on OED Performance Audit Report of Gansu Provincial Development Project Office (Loan 2812 and Credit 1793-CHA)

Dear OED officer,

We have received the draft performance audit report of the above project on April 19, 1999. By carefully reviewing, our comments on the draft report are as follows:

1. Our comments on ratings are the following:

	Audit	Borrower
Outcome	Marginally satisfactory	Satisfactory
Borrower Performance	Unsatisfactory	Satisfactory
Bank Performance	Unsatisfactory	Satisfactory

2. **On Sustainability**

We want to make further explanation on para. 4.3 “there is potential risk of increasing secondary soil salinization due to rising water tables, if this is not controlled.” The water diverted to Yindaruqin is snowmelt from Qilian Mountains. The water quality is good with low alkalinity and low salinity. With the process of irrigation, and due to the relief of south part of irrigated area is lower, this part is likely to be salinized. However, from the beginning of irrigation, we have monitored the changing of groundwater level. And we have done some works on protecting salinization. Therefore, we believe this problem can be fully controlled.

3. On Borrower Performance para. 4.6: “One of the largest contributors to the overruns was the lack of timely counterpart funds during implementation. Borrower performance therefore, is rated as unsatisfactory” is not objective. As what performance audit report mentions, there are six aspects of project cost overruns (in ICR): inflation, changing of foreign exchange rate, changing of design, changing of state policy, adjustment of bank interests and the cost of Pandaoling tunnel (which is not included in ICR). Among which: the overruns of 226640 thousand yuan due to inflation account for 20.4% of the total overruns, 40770 thousand yuan due to changing of foreign exchange rate account for 3.7% of the total overruns, 279230 thousand yuan due to changing of design account for 25.1% of the total overruns, 285380 thousand yuan due to policy changing and bank interests adjustments etc. account for 25.6% of the total overruns, 280000 thousand yuan due to the cost of Pandaoling tunnel account for 25.2% of the total overruns. From the above, the overruns due to Pandaoling and changing of design account for 51.7% of the total overruns which are the largest contributors of project cost overruns. In the initial period of construction, lacking of counterpart funds is certainly one of the reasons for construction delay and project cost overruns but not the largest contributor of project cost overruns.

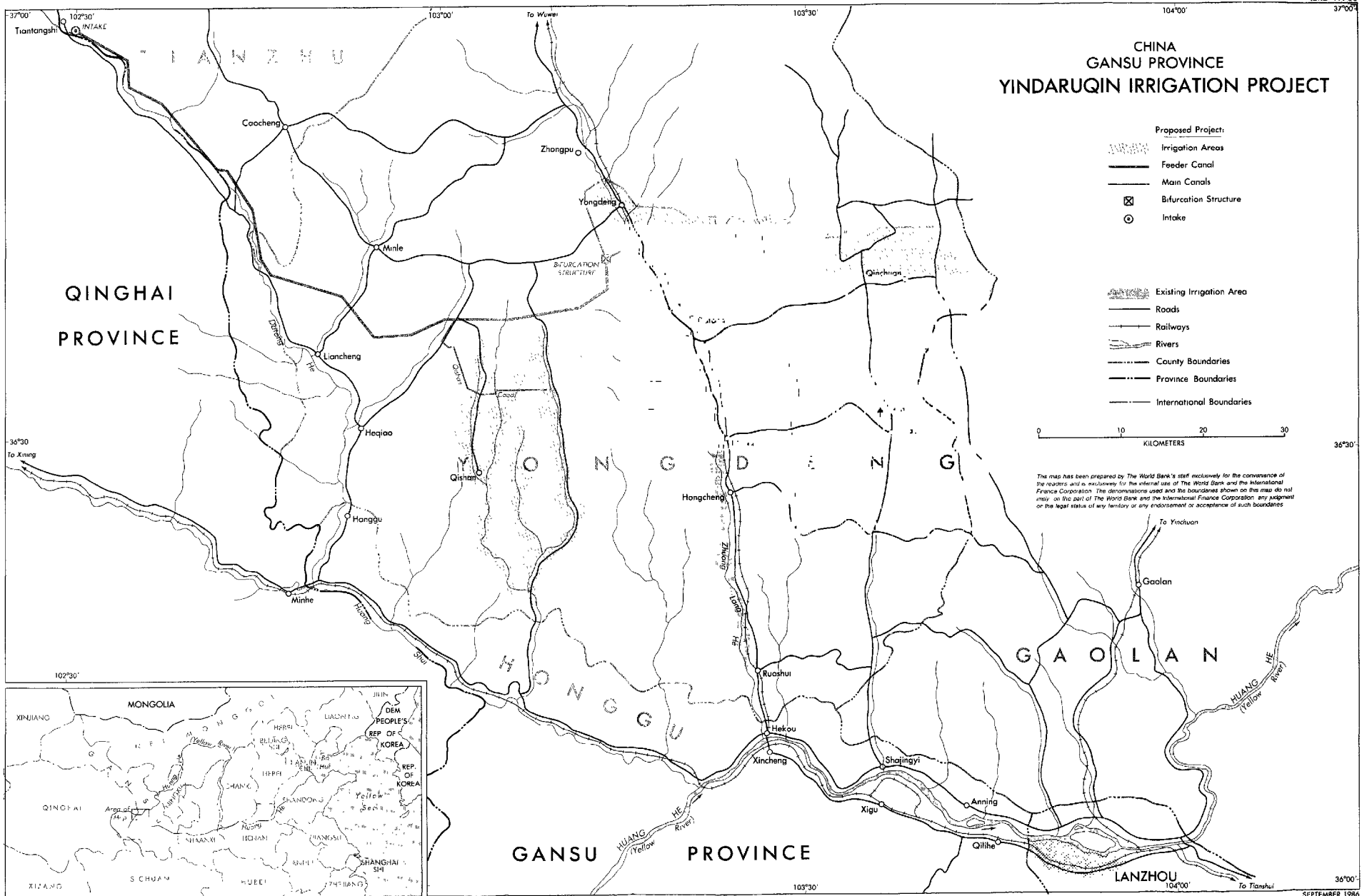
4. On Conclusions and Lessons Learned para. 5.2: “there were systemic, borrower performance problems,” “poor local capacity to undertake complex projects that include multiple components, especially in a poor province like Gansu”, “highly bureaucratic organizational structures with rigid lines of authority that slow local initiative,” and “political interference with project authorities” are rather contentious sentences and they are not proper. Yindaruqin is a complex project, meanwhile, it is the first

project supported by World Bank in Gansu province. Though we have met many difficulties in construction, yet project targets are realized basically. Some outcomes have even reached advanced international standards under the supervision of World Bank mission, and by the hard works of project owner, design department, supervision department and construction department. Therefore, we request that operation and evaluation department accept our above comments and make corresponding corrections in the performance audit report.

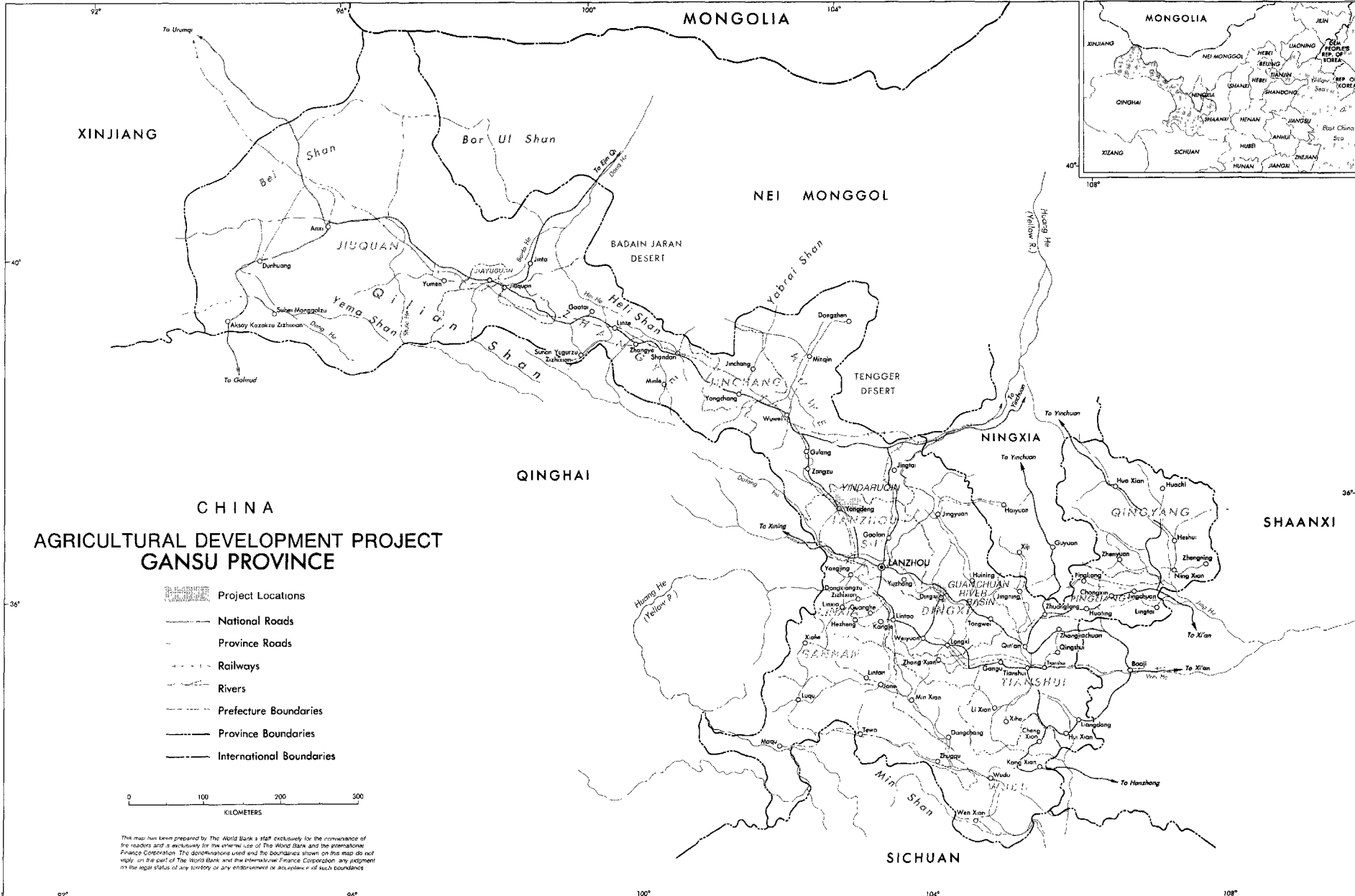
As you mentioned in the performance audit report, you worried whether we have the ability to complete the remaining works and realize the project targets. However, we firmly believe we can complete all remaining works and realize all project targets. Since the project audit up to June 10, 1999, we have completed the following remaining works: electricity pumping canal system and it's 6 pumping stations, 6 aqueducts and 53% of the remaining tunnels, 52 thousand mu of land of the remaining 101 thousand mu have been leveled arid it's on-farm facilities have been finished, 14 thousand migrants will be moved to the irrigated area in the second half year of 1999. All the *project* targets of Yindaruqing will be definitely completed in 1999.

June 17, 1999

CHINA GANSU PROVINCE YINDARUQIN IRRIGATION PROJECT



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CHINA
AGRICULTURAL DEVELOPMENT PROJECT
GANSU PROVINCE

Legend

- Project Locations
- National Roads
- Province Roads
- Railways
- Rivers
- Prefecture Boundaries
- Province Boundaries
- International Boundaries

Scale

0 100 200 300
 KILOMETERS

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