

Document of
The World Bank

Report No: ICR0000500

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IBRD-48030)

ON A

LOAN

IN THE AMOUNT OF USD 200.0 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR

THE IRRIGATED AGRICULTURE INTENSIFICATION III PROJECT

AND

ON A

GRANT FROM THE GEF SPECIAL CLIMATE CHANGE FUND (SCCF)

IN THE AMOUNT OF USD 5.0 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR

A MAINSTREAMING CLIMATE CHANGE ADAPTATION IN IRRIGATED
AGRICULTURE PROJECT

December 12, 2012

China and Mongolia Sustainable Development Unit
Sustainable Development Department
East Asia and Pacific Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective June 30, 2012)
Currency Unit = Renminbi (RMB)
RMB1.0 = US\$0.159
US\$1.0 = RMB6.3

FISCAL YEAR
July 1 – June 30

ABBREVIATIONS AND ACRONYMS

AB	Agricultural Bureau
CAD	Comprehensive Agriculture Development
CAS	Country Assistance Strategy
COCAD	County Office of Comprehensive Agriculture Development
CPMO	Central Project Management Office
ERR	Economic Rate of Return
EMP	Environmental Management Plan
ET	Evapo-transpiration
FA	Farmer Association
FB	Finance Bureau
FC	Farmer Cooperative
FRB	Forestry Bureau
IPM	Integrated Pest Management
MTR	Mid-term Review
MIS	Management Information System
MOF	Ministry of Finance
MWR	Ministry of Water Resources
O&M	Operation and Maintenance
OFD/OFW	On-farm Development/On-farm Works
PAD	Project Appraisal Document
PIP	Project Implementation Plan
PMO	Project Management Office
PLG	Project Leading Group
POCAD	Provincial Office of Comprehensive Agricultural Development
PPMO	Provincial Project Management Office
PPC	Provincial Planning Commission
PPRWRP	Pro-Poor Rural Water Reform Project (DFID-financed)
SOCAD	State Office of Comprehensive Agricultural Development
WRB	Water Resources Bureau
WUA	Water User Association
3-H Basin	Huang-Huai-Hai Rivers Basin

Vice President:	Pamela Cox, EAPVP
Country Director:	Klaus Rohland, EACCF
Sector Manager:	Mark Lundell, EASCS
Project Team Leader:	Qun Li, EASER
ICR Team Leader:	Qun Li, MNSWA

CHINA
IRRIGATED AGRICULTURE INTENSIFICATION III PROJECT

And

**MAINSTREAMING CLIMATE CHANGE ADAPTATION IN IRRIGATED
AGRICULTURE PROJECT**

Contents

DATA SHEET	i
A. Basic Information.....	i
B. Key Dates	i
C. Ratings Summary	i
D. Sector and Theme Codes	ii
E. Bank Staff.....	iii
F. Results Framework Analysis	iii
G. Ratings of Project Performance in ISRs	xiv
H. Restructuring (if any)	xiv
I. Disbursement Profile	xv
1. Project Context, Development and Global Environment Objectives Design	1
2. Key Factors Affecting Implementation and Outcomes	7
3. Assessment of Outcomes	11
4. Assessment of Risk to Development Outcome and Global Environment Outcome	21
5. Assessment of Bank and Borrower Performance	21
6. Lessons Learned	25
7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners	26
Annex 1 (a). Project Costs and Financing – IAIL3 Project	27
Annex 1 (b). Project Costs and Financing – GEF-SCCF Project	28
Annex 2 (a). Outputs by Component – IAIL3 Project.....	29
Annex 2 (b). Outputs by Component – GEF-SCCF Project.....	33
Annex 3. Economic and Financial Analysis	33
Annex 4. Bank Lending and Implementation Support/Supervision Processes	39
Annex 5. Beneficiary Survey Results	41
Annex 6. Stakeholder Workshop Report and Results.....	42
Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR	43
Annex 8. Comments of Co-financiers and Other Partners/Stakeholders.....	51
Annex 9. List of Supporting Documents	52
Map IBRD34174.....	53

DATA SHEET

A. Basic Information

Country:	China	Project Name:	Irrigated Agriculture Intensification III Project
Project ID:	P084742,P105229	L/C/TF Number(s):	IBRD-48030,TF-92393
ICR Date:	12/13/2012	ICR Type:	Core ICR
Lending Instrument:	SIL,SIL	Borrower:	GOVERNMENT OF CHINA
Original Total Commitment:	USD 200.00M,USD 5.00M	Disbursed Amount:	USD 200.00M,USD 5.00M
Environmental Category: B,C		Focal Area: C	
Implementing Agencies: State Office for Comprehensive Agricultural Development (SOCAD)			
Cofinanciers and Other External Partners:			

B. Key Dates

Irrigated Agriculture Intensification III Project - P084742				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	03/16/2004	Effectiveness:	02/17/2006	02/17/2006
Appraisal:	04/05/2005	Restructuring(s):		12/18/2008
Approval:	10/11/2005	Mid-term Review:	06/30/2008	09/08/2008
		Closing:	12/31/2010	12/31/2010

Mainstreaming Climate Change Adaptation in Irrigated Agriculture Project - P105229				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	03/29/2007	Effectiveness:	10/15/2008	11/13/2008
Appraisal:	09/17/2007	Restructuring(s):		11/07/2011
Approval:	04/17/2008	Mid-term Review:		
		Closing:	06/30/2012	06/30/2012

C. Ratings Summary

C.1 Performance Rating by ICR

Outcomes	Highly Satisfactory
GEO Outcomes	Highly Satisfactory
Risk to Development Outcome	Low or Negligible
Risk to GEO Outcome	Low or Negligible
Bank Performance	Satisfactory
Borrower Performance	Highly Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)			
Bank	Ratings	Borrower	Ratings
Quality at Entry	Satisfactory	Government:	Highly Satisfactory
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Highly Satisfactory
Overall Bank Performance	Satisfactory	Overall Borrower Performance	Highly Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Irrigated Agriculture Intensification III Project - P084742			
Implementation Performance	Indicators	QAG Assessments (if any)	Rating:
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA)	None
DO rating before Closing/Inactive status	Highly Satisfactory		

Mainstreaming Climate Change Adaptation in Irrigated Agriculture Project - P105229			
Implementation Performance	Indicators	QAG Assessments (if any)	Rating:
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA)	None
GEO rating before Closing/Inactive Status	Satisfactory		

D. Sector and Theme Codes		
Irrigated Agriculture Intensification III Project - P084742		
	Original	Actual
Sector Code (as % of total Bank financing)		
Agricultural extension and research	12	12
Forestry	5	5
General agriculture, fishing and forestry sector	4	4
General public administration sector	11	11
Irrigation and drainage	68	68
Theme Code (as % of total Bank financing)		
Environmental policies and institutions	17	17
Other rural development	33	33
Rural policies and institutions	17	17
Rural services and infrastructure	33	33

Mainstreaming Climate Change Adaptation in Irrigated Agriculture Project - P105229		
	Original	Actual
Sector Code (as % of total Bank financing)		
Agricultural extension and research	16	16
Forestry	6	6
General public administration sector	13	13
Irrigation and drainage	65	65
Theme Code (as % of total Bank financing)		
Climate change	23	23
Environmental policies and institutions	22	22
Natural disaster management	22	22
Rural services and infrastructure	11	11
Water resource management	22	22

E. Bank Staff

Irrigated Agriculture Intensification III Project - P084742

Positions	At ICR	At Approval
Vice President:	Pamela Cox	James W. Adams
Country Director:	Klaus Rohland	David R. Dollar
Sector Manager:	Mark R. Lundell	Mark D. Wilson
Project Team Leader:	Qun Li	Qun Li
ICR Team Leader:	Qun Li	
ICR Primary Author:	Harideep Singh	
	Usaid I. El-Hanbali	
	Richard B. Reidinger	

Mainstreaming Climate Change Adaptation in Irrigated Agriculture Project - P105229		
Positions	At ICR	At Approval
Vice President:	Pamela Cox	James W. Adams
Country Director:	Klaus Rohland	David R. Dollar
Sector Manager:	Mark R. Lundell	Rahul Raturi
Project Team Leader:	Qun Li	Qun Li
ICR Team Leader:	Qun Li	
ICR Primary Author:	Harideep Singh	

F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document)

The project development objective was to increase water and agricultural productivity in low and medium yield farm land areas; raise farmers' income and strengthen their competitive capacity under post-WTO conditions; and demonstrate and promote

sustainable participatory rural water resources management and agro-ecological environmental management in the 3-H Basin.

Although its objectives are similar to those of IAIL2, IAIL3 would focus more on raising productivity of land and water, rather than only production; and on enhancing the farmer income and the farmers' share of higher market values, rather than raising income solely through higher production. And IAIL3 would add important innovations to modernize agriculture and enhance farmer competitive capacity. The competitive challenges resulting from China's entry into the WTO are driving these changes.

Revised Project Development Objectives (as approved by original approving authority)

Global Environment Objectives (from Project Appraisal Document)

The project development objective is to enhance adaptation to climate change in agriculture and irrigation water management practices through awareness raising, institutional and capacity strengthening and demonstration activities in the 3H Basin. This would assist in mainstreaming climate change adaptation measures, techniques and activities into the national Comprehensive Agricultural Development (CAD) Program which is China's largest national investment program in irrigated agriculture.

Revised Global Environment Objectives (as approved by original approving authority)

(a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Increase per capita income of typical farm households			
Value (quantitative or Qualitative)	Y 1,099.6	Y1,505.0	Y2,207	Y3,290
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	The original target was revised at MTR to reflect the actual achievement at that time, the actual target achieved at completion is 149.1% of MTR target and 218% of PAD Target.			
Indicator 2 :	Increase high quality/value and non-polluting/green crop production (million ton)			
Value (quantitative or Qualitative)	3.20	4.22	4.20	4.20
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	The achievement is about 100% of PAD and MTR targets.			
Indicator 3 :	Increase water and agricultural productivity (kg/m3)			
Value (quantitative or Qualitative)	1.06	1.39	1.45	1.55

Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	The indicator was revised at the MTR to reflect the actual achievement at that time. At the ICR, the actual achievement was 107% of the MTR and 111% of the PAD target.			
Indicator 4 :	Change in the production per unit of ET (kg/ET)			
Value (quantitative or Qualitative)	The baseline value will be estimated when the remote sensing technologies are introduced in Hebei	The target value will be estimated when the remote sensing technologies are introduced in Hebei	This indicator was shifted to CC adaptation project agreed at MTR	See GEO indicator 6 in section (b)
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	At the MTR, this indicator was decided to be shifted from IAIL3 to CC Adaptation Project to monitor the ET demonstration impacts in selected pilots. Indicator 3 would be used to show the overall water saving impacts under the IAIL3 project.			
Indicator 5 :	New established No. of WUAs and area coverage (No./ha)			
Value (quantitative or Qualitative)	0	494/95,424	1,014/221,500	1022/221,500
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	At the MTR, the PAD target was modified to reflect the increased establishment of WUAs in the additional 5 participating provinces/autonomous regions. The final target achievements were 207% of PAD and 101% of MTR target.			
Indicator 6 :	New established No. of FAs and member coverage (No./ha)			
Value (quantitative or Qualitative)	N.A.	166/70,400	193/70400 (membership target was not revised)	207/95,400
Date achieved	01/31/2005	12/31/2005	12/18/2008	12/31/2010
Comments (incl. % achievement)	The new established FAs at the ICR were 125% of PAD and 107% of the MTR target, while the member coverage was 136% of the PAD/MTR target. In addition, twenty pilot FCs had also been created with 42,000 households involved.			

(b) GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	CC adaptation awareness of farmers, technical staff, officials (percentage of people)			
Value (quantitative or Qualitative)	0	47		56
Date achieved	12/31/2007	06/29/2012		06/29/2012
Comments	Percentage of PAD: 119.2%			

(incl. % achievement)				
Indicator 2 :	Documents issued by SOCAD/POCAD/COCAD on adaptation policies, measures, and activities (through Policy briefs, government reports, implementation and/or replication plans)			
Value (quantitative or Qualitative)	0	170		173
Date achieved	12/31/2007	06/29/2012		06/29/2012
Comments (incl. % achievement)	Percentage of PAD: 101.8%			
Indicator 3 :	Relevant CC adaptation measures implemented in selected demonstrated areas (ha) by participatory stakeholders (number of households)			
Value (quantitative or Qualitative)	0	186424 ha/ 264365 hh		208152 ha/ 298732 hh
Date achieved	12/31/2007	06/29/2012		06/29/2012
Comments (incl. % achievement)	Achievement: 112% of appraisal target for hectares, and 113% of appraisal target for the number of HH. The original area target has been included the IAIL3 areas to compare with the total area completed, so it is higher than the PAD target.			
Indicator 4 :	Increase per capita income of typical farm households due to adaptation measures applied			
Value (quantitative or Qualitative)	Y1100	Y1501		Y1570
Date achieved	12/31/2007	06/29/2012		06/29/2012
Comments (incl. % achievement)	Percentage of PAD: 104.6%			
Indicator 5 :	Increase water and agricultural productivity (Kg/m3)			
Value (quantitative or Qualitative)	1.1	1.39		1.39
Date achieved	12/31/2007	06/29/2012		06/29/2012
Comments (incl. % achievement)	Percentage of PAD: 100%			
Indicator 6 :	Change in the production per unit of ET (KG/ET)			
Value (quantitative or Qualitative)	55,000	114,000		114,000
Date achieved	12/31/2007	06/29/2012		06/29/2012
Comments (incl. % achievement)	Percentage of PAD: 100%			

(c) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Total improved area of low-and medium-yield farmland (ha)			
Value (quantitative or Qualitative)	0	505,487.37	505,505	505,505
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	The achieved target at completion is slightly above the original target and 100% of MTR target.			
Indicator 2 :	Water-saving irrigated area (HA)			
Value (quantitative or Qualitative)	16,380.8	380,456.0		392,525
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion is 103.2% of the PAD target.			
Indicator 3 :	Demonstration pilots for laser guided land grading (ha)			
Value (quantitative or Qualitative)	0	666.7	0	155,094
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	At MTR, pilot for laser guided land grading was cancelled as requested by SOCAD, because it is not suitable for small scale land in project areas. Instead, a total of 155,094 ha of land have been leveled under the project including demonstration areas.			
Indicator 4 :	Delivery efficiency of on farm irrigation system (%)			
Value (quantitative or Qualitative)	58	79		79
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion is 100% of the PAD target.			
Indicator 5 :	Change in irrigation quota (Weighted average) (m3/ha)			
Value (quantitative or Qualitative)	6,892.12	6,306.26		3,809
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The irrigation quota/water consumption was reduced to 60.4% of the PAD targets.			
Indicator 6 :	Number and quality WUAs established and operating (No.)			

Value (quantitative or Qualitative)	0	494	1014	1022
Date achieved	01/31/2005	12/31/2005	12/18/2008	12/31/2010
Comments (incl. % achievement)	The final achievement for the no. of WUAs is 207% of PAD and 101% of MTR target.			
Indicator 7 :	WUA covered area (ha)			
Value (quantitative or Qualitative)	0	95,424.51	203,809	224,679
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	The area covered by the WUAs is 234.45% of the PAD and 110.2% of the MTR target.			
Indicator 8 :	Number of sites with water measurement facilities & volumetric water charges (No.)			
Value (quantitative or Qualitative)	0	4731	4088	4498
Date achieved	01/31/2005	12/31/2005	12/18/2008	12/31/2010
Comments (incl. % achievement)	The original target was modified based on the final technical design. The achieved target was 110% of the MTR target.			
Indicator 9 :	Quality seed coverage (%)			
Value (quantitative or Qualitative)	87.46	100		100
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 100% of the PAD target.			
Indicator 10 :	Applied rate of IPM (%)			
Value (quantitative or Qualitative)	70	93		96
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 103.2% of PAD target.			
Indicator 11 :	Machinery rate of plough (%)			
Value (quantitative or Qualitative)	79.67	89		93
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 104.7% of the PAD target.			

achievement)				
Indicator 12 :	New established number. of IPM stations (No.)			
Value (quantitative or Qualitative)	0	285	185	264
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	At the MTR, the PAD target was reduced due to reduced funds caused by the changes in exchange rate. At completion the number completed IPM station was 142.7% of the MTR target.			
Indicator 13 :	Machinery rate of sowing			
Value (quantitative or Qualitative)	56	68		74
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 108.7% of the PAD target.			
Indicator 14 :	Change in area of IPM implemented (ha)			
Value (quantitative or Qualitative)	402,622.97	503,397.57		534,961
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 106.3% of MTR and 133% of the PAD target.			
Indicator 15 :	Harvest rate using agricultural mechanization (%)			
Value (quantitative or Qualitative)	58.15	70.93	76	81
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 107% of the MTR and 114% of PAD target.			
Indicator 16 :	Improved township Agra. extent ion center (No.)			
Value (quantitative or Qualitative)	0	454	258	288
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	The PAD target was reduced at MTR, because some planned extension centers had been established and financed by local government during the implementation. At ICR, the achieved target was 112% of the MTR target.			
Indicator 17 :	Ratio of Agricultural. technicians to farmers (1:X)			
Value (quantitative or Qualitative)	1:57.1	1:20.81		20
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The target achieved at completion was about 100% of the PAD target.			

achievement)				
Indicator 18 :	Farmers training (man/month)			
Value (quantitative or Qualitative)	0	59,239.6	66,036	74,455
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 115.7% of the PAD target and 112.7% of the MTR target.			
Indicator 19 :	Area of High-quality/value Products (ha)			
Value (quantitative or Qualitative)	666	499,217		563,310
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 113.2% of the original PAD target.			
Indicator 20 :	Area of Green/organic Product (ha)			
Value (quantitative or Qualitative)	0	16,828.1		17,972
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 107% of the PAD target.			
Indicator 21 :	New/Improved farmers' association (No.)			
Value (quantitative or Qualitative)	0	166	193	207
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 124.7% of the PAD targets and 107.3% of the MTR target.			
Indicator 22 :	No.of farmers' professional cooperative organizations' demonstration pilots (No.)			
Value (quantitative or Qualitative)	0	12	19	20
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 166.7% of the PAD target and 105.3% of the MTR target.			
Indicator 23 :	Demonstration/extension area (ha)			
Value (quantitative or Qualitative)	0	135,513.4		157,624
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 116.3% of the PAD target.			

achievement)				
Indicator 24 :	Change in total output value of agricultural production (Y million)			
Value (quantitative or Qualitative)	7.87	10.54		14.09
Date achieved	12/31/2004	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 133.7% of the PAD target.			
Indicator 25 :	On-farm forest belts established (ha)			
Value (quantitative or Qualitative)	9,481.44	27,847		30,714
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 110.3% of the original targets.			
Indicator 26 :	Percentage of area with forest belt and wind break covered			
Value (quantitative or Qualitative)	13.86	17.02		19.4
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 114% of the original targets.			
Indicator 27 :	Number of counties with groundwater management plans adopt			
Value (quantitative or Qualitative)	0	19		19
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 100% of the PAD targets			
Indicator 28 :	Domestic Training (man/month)			
Value (quantitative or Qualitative)	0	17,034.5	13,586	13,638
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	The target was modified due to the actual demand based on the final technical design. The achieved target at completion was 100.4% of the MTR target.			
Indicator 29 :	Domestic Study Tours			
Value (quantitative or Qualitative)	0	4,445	4,053	3,626
Date achieved	01/31/2005	12/31/2010	12/18/2008	12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 81.5% of the original target and 89.5% of the MTR target. This was due to the restriction on study tours which the GOC			

achievement)	imposed at the time of the financial crises.			
Indicator 30 :	No. of adaptive research (No.)			
Value (quantitative or Qualitative)	0	263		277
Date achieved	01/31/2005	12/31/2010		12/31/2010
Comments (incl. % achievement)	The achieved target at completion was 105.3% of the original target.			
Indicator 31 :	The baseline, projected scenarios, and possible long term impacts of climate change identified for the project areas through analysis of relevant hydraulic and agricultural production models, and of the result of economic research and surveys.			
Value (quantitative or Qualitative)	N	Y		Y
Date achieved	01/31/2005	12/31/2010		10/31/2012
Comments (incl. % achievement)	The achieved target at completion was 100% of the original target.			
Indicator 32 :	Adaptation measures developed and implemented in the demonstration areas (HA)			
Value (quantitative or Qualitative)	0	32077		35284
Date achieved	12/31/2007	06/29/2012		06/29/2012
Comments (incl. % achievement)	The achieved target at completion was 110% of the original target.			
Indicator 33 :	Climate change adaptation concept/measures included in IAIL3 design and implementation (drainage, water saving, water-storage) (HA)			
Value (quantitative or Qualitative)	0	154347		172868
Date achieved	12/31/2007	06/29/2012		06/29/2012
Comments (incl. % achievement)	The achieved target at completion was 112% of the original target.			
Indicator 34 :	Develop WUA/FA to implement adaptation measures (No.)			
Value (quantitative or Qualitative)	0	183		183
Date achieved	12/31/2007	06/29/2012		06/29/2012
Comments (incl. % achievement)	The achieved target at completion was 100% of the original target.			
Indicator 35 :	SOCAD/POCAD/COCAD webpages, booklets, and other publications, and newspapers, TV, website, radio coverage incorporating climate change			

	adaptation knowledge and measures (No.)			
Value (quantitative or Qualitative)	0	326		331
Date achieved	12/31/2007	06/29/2012		06/29/2012
Comments (incl. % achievement)	The achieved target at completion was 101.53% of the PAD target.			
Indicator 36 :	Consultations and coordination meetings, training on adaptation to climate change issues among SOCAD, MOF, NDRC, CAS or other concerned agencies (No.)			
Value (quantitative or Qualitative)	0	32		34
Date achieved	12/31/2007	06/29/2012		06/29/2012
Comments (incl. % achievement)	The achieved target at completion was 106.25% of the PAD target.			
Indicator 37 :	Menu of possible adaptation measures developed based on scientific analysis and stakeholder participation.			
Value (quantitative or Qualitative)	N	Y		Y
Date achieved	12/31/2007	06/29/2012		06/29/2012
Comments (incl. % achievement)	The achieved target at completion was 100% of the PAD target.			
Indicator 38 :	Policy recommendation to integrate CC adaptation into CAD program has been formulated.			
Value (quantitative or Qualitative)	N	Y		Y
Date achieved	12/31/2007	06/29/2012		06/29/2012
Comments (incl. % achievement)	The achieved target at completion was 100% of the PAD target.			

G. Ratings of Project Performance in ISRs

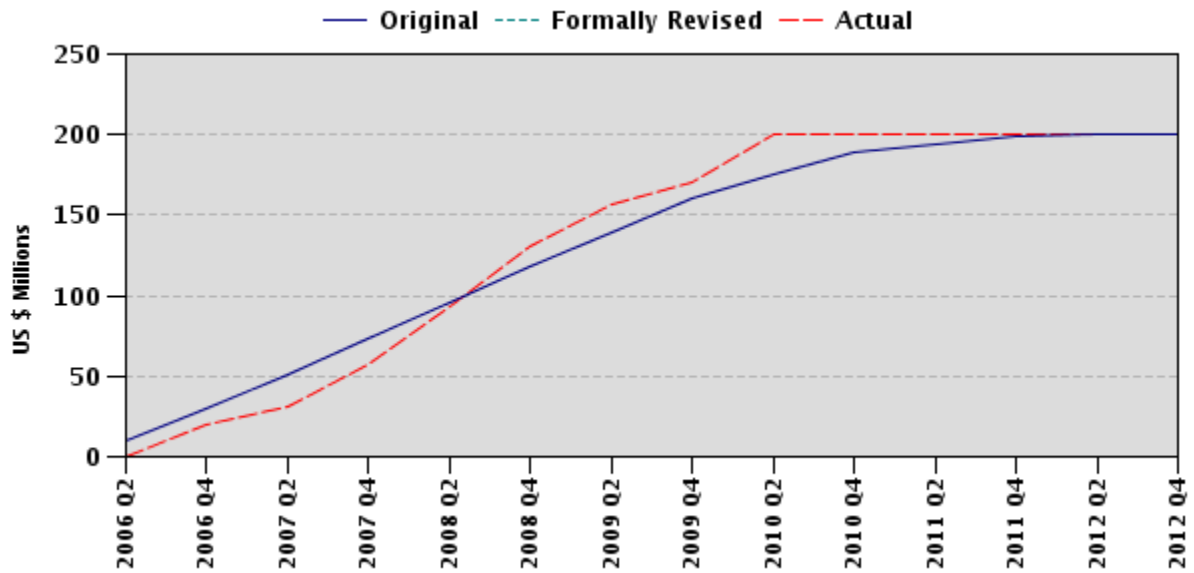
-						
No.	Date ISR Archived	DO	GEO	IP	Actual Disbursements (USD millions)	
					Project 1	Project 2
1	12/30/2005	S		S	0.00	0.00
2	12/29/2006	S		S	30.96	0.00
3	01/25/2008	S		S	93.14	0.00
4	02/05/2009	S	S	S	157.07	0.00
5	03/06/2010	HS	S	S	200.00	1.27
6	06/28/2011	HS	S	HS	200.00	3.08
7	12/28/2011	S	S	S	200.00	3.59

H. Restructuring (if any)

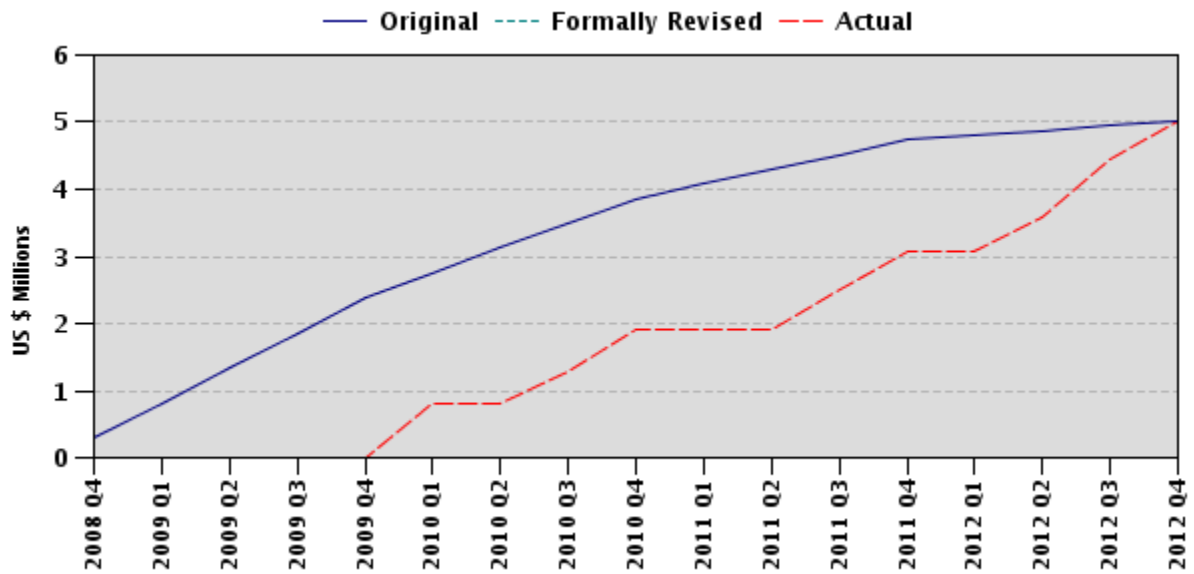
Restructuring Date(s)	Board Approved		ISR Ratings at Restructuring			Amount Disbursed at Restructuring in USD millions		Reason for Restructuring & Key Changes Made
	PDO Change	GEO Change	DO	GEO	IP	Project1	Project 2	
12/18/2008	N		S		S	157.07		Some components were downsized to accommodate the impact of the RMB appreciation against the US\$, and allocation of Government resources for some project activities.
11/07/2011				S	HS		3.08	Due to an appreciation of the RMB versus US\$, the RMB value of the GEF grant fell. Funds were re-allocated from study tours and incremental operating costs to subject matter studies and climate change adaptation measures.

I. Disbursement Profile

P084742



P105229



1. Project Context, Development and Global Environment Objectives Design

1.1 (a) Context at Appraisal (IBRD Project)

During 1993-2003, China's annual GDP growth averaged 8.6 percent. China's accession to the World Trade Organization (WTO) in 2001 had strengthened China's economic position but also opened the country to foreign competition. Despite rapid growth and significant achievements in poverty reduction, more than 200 million people still lived on expenditures of less than US\$1 per day and more than 30 million people were below the government's rural income poverty line of CNY625 (US\$77 equivalent) per annum. At the time of appraisal, food security was an important strategic issue. National grain production had peaked at 512 million tons in 1998 but had dropped to an estimated 465 million tons in 2004.

The basin of the Huang, Huai, and Hai rivers (3-H Basin), also called the North China Plain, is China's most important agricultural region. It produced 50 percent of the national grain output, accounted for about 35 percent of national industrial output, and supported a population of 425 million. Severe water shortages in the 3-H Basin threatened both rural income growth and food security and were exacerbated by high levels of water pollution. Water demand in the region was high and growing while available water resources were already allocated and overexploited. Groundwater levels were dropping in many areas, sometimes by as much as one meter per year.

While WTO membership provided new opportunities for increasing farm incomes, the agricultural sector needed to undergo substantial structural change and modernization to take advantage of those opportunities. Agricultural practices needed to improve to produce safe, high quality and high value products, which accounted for an increasingly larger share of the market. Water resources had to be used more efficiently, and agricultural pollution had to be curtailed. These issues were high on the Government's priority list, with raised productivity levels, domestic self-sufficiency, reform of food safety control, and international competitiveness included as central themes in China's Five Year Plans for National Economic and Social Development for 2001-2005 and for 2006-2010.

Improving performance of the agricultural sector in the 3-H Basin was critical to achieve these strategic objectives. Major challenges towards achieving these objectives included: the low efficiency and quality of agricultural production; low market value of farmers' production; low efficiency of irrigation facilities; and weak irrigation management. The Irrigated Agriculture Intensification Project 3 was designed with components to address these key constraints.

Bank involvement in the project was justified for the following reasons: First, within the framework of the WTO, China needed to participate and perform in internationally competitive agriculture. The Bank was in the unique position to bring lessons and experiences from the European Union as well as other WTO accession countries to China to guide the design and implementation of the proposed project. Specific experiences to be transferred to China included: crop diversification, modern cropping methods and soil

conservation, and market-orientation and strengthening of agricultural value chains. Second, the new project would build on the successful implementation experience of the preceding Irrigated Agriculture Intensification 2 Project, and would deepen the integrated program approach to irrigation investment promoted under the previous project. It would support improved Water User Associations (WUAs) which had been successfully piloted in the earlier project and were needed to improve local water management and operation and maintenance of irrigation facilities. The new project would integrate the Bank's experience and innovation relating to water saving and groundwater management, production and marketing of non-polluting or green food, Farmer Associations (FAs) for specialized crop production and marketing. It would also pilot farmer-owned Farmer Cooperatives (FCs) to improve farmers' incomes and competitive capacity. Extending these initiatives to the 3-H Basin offered a tremendous opportunity to deepen the Bank-Government cooperation towards the strategic need of more competitive and resource efficient agriculture.

1.1 (b) Context at appraisal (GEF-SCCF Project)

During the first two years of implementation of the project, the possible impact of climate variability on agricultural production in China was subject to much discussion. It was widely believed that the projected climate change could decrease water stream flows and groundwater recharge in the 3-H Basin, while concurrently increasing irrigation water demand and withdrawals due to higher temperatures and higher evapo-transpiration (ET). Also, the stagnation of grain production for a number of consecutive years in the 3-H Basin was linked to climate change. China's irrigated agriculture was expected to be negatively affected by climate change and adaptation measures needed to be designed to address possible impacts.

In 2008, around the MTR, both the Bank and the Government concluded that while the objectives of IAIL3 continued to remain fully relevant, the project components on water-saving irrigation, drainage, agro-ecological environmental protection and management needed to be viewed much more in the context of a broader strategy of climate change adaptation than originally envisaged during project design. Some of the project's interventions had an adaptation element embedded in them, but this was not the result of a calculated and systematic adaptation approach.

Based on such considerations, a GEF grant under the Special Climate Change Fund (SCCF) was sought to complement the project. Specifically, the GEF grant was to support the development of a systematic adaptation-oriented approach building on climate change impact assessments, identification of appropriate adaptation measures, and the demonstration of adaption measure in selected sites for possible uptake by farmer groups. GEF support would also be used to modify and adjust interventions for the remaining two years of implementation of the lending project, where needed. Support from the GEF was also sought to assist Government in incorporating climate adaptation as a core theme in China's National Comprehensive Agriculture Development Program (CAD).

To promote an integrated approach to adaption in irrigated agriculture, a total investment need of US\$55.5 million was identified. The GEF contribution would amount to US\$5 million, while IBRD loan funds of US\$20 million and counterpart funds of US\$30.5 million would be reallocated to adaption investments under the IAIL3 project. The GEF-financed activities and targeted outcomes were envisaged to be scaled-up under IAIL3, first with a focus on the 3-H Basin but with the potential for further scale-up to other agriculture regions.

With its global perspective, the GEF in partnership with the Bank was well positioned to bring knowledge and institutional experience gained from its programs worldwide to China. The IAIL3 project, which at that time had another 2.5 years for implementation, provided an excellent platform for demonstrating climate change adaptation measures. The project area covered the primary grain production region in China that was vulnerable to the impacts of climate change. Water saving irrigation and water saving agriculture measures proposed under the IAIL3 project were among the most likely to be affected adversely by climate change and therefore it was imperative to retrofit the program of interventions to render them more climate-smart. The project was also part of the CAD program and offered the possibility for mainstreaming innovative adaptation measures into a major national program.

1.2 Original Project Development Objectives (PDO) and Key Indicators (as approved)

The Project Development Objective was to increase water and agricultural productivity in low and medium yield farm land areas; raise farmers' income and strengthen their competitive capacity under post-WTO conditions; and demonstrate and promote sustainable participatory rural water resources management and agro-ecological environmental management in the 3-H Basin.

The main project outcomes were: (a) increased water and agricultural productivity and resource use efficiency; (b) increased per capita income for farm households; (c) increased high quality/value and non-polluting/green crop production; (d) adoption of techniques leading to 'real' water savings and mitigation of adverse environmental impacts including ET-management and Laser Controlled Land Grading; and (e) establishment of institutional mechanisms for enhanced farmer involvement and participation.

The project focused on raising productivity of land and water rather than on simply increasing production per se; and on enhancing market values and farmer incomes and their share of higher market values, rather than raising income solely through higher production. The project also added important innovations to modernize agriculture and enhance farmers' competitive capacity. The competitive challenges of China's entry into WTO and the world economy were driving these changes.

1.3 Original Global Environment Objectives (GEO) and Key Indicators (as approved)

The Global Environment Objective was to enhance adaptation to climate change in agriculture and irrigation water management practices through awareness-raising, institutional and capacity strengthening and demonstration activities in the 3H (Huang, Huai, Hai rivers) Basin. This would help mainstreaming climate change adaptation measures, techniques and activities into the Comprehensive Agricultural Development (CAD) Program, which is China's largest national investment program in irrigated agriculture.

The main expected project outcomes were: (a) increased climate change adaptation awareness of farmers, Water User Associations (WUA) and Farmer Professional Associations (FA) members, technical staff and officials; (b) relevant climate change adaptation measures implemented in selected demonstration areas and by participatory stakeholders; and (c) documents issued by state, provincial and country CADs integrating adaptation policies, measures and activities (through policy briefs, government reports, implementation and/or replication plans).

1.4 Revised PDO (as approved by original approving authority) and Key Indicators, and reasons/justification

N/A

1.5 Revised GEO (as approved by original approving authority) and Key Indicators, and reasons/justification

N/A

1.6 Main Beneficiaries

The primary target group beneficiaries were the farmers in the 107 counties of the five project provinces, including Hebei, Jiangsu, Anhui, Shandong and Henan, and project WUA member farmers in 16 counties of the five provinces, autonomous regions, and municipalities, including Inner Mongolia, Jilin, Chongqing, Yunnan, and Ningxia. Additional project beneficiaries were: (a) SOCAD, POCAD and COCAD PMO members and staff; (b) Water Resource Bureau (WRB), Agricultural Bureau (AB), Forestry Bureau (FRB) and other government staff associated with the project; (c) consumers demanding high quality and green produce; and (d) private investors associated with FAs and FCs. The project aimed to benefit 1.4 million households or a total of about 5.45 million rural people (2.77 million men and 2.68 million women).

Under the GEF-SCCF project, about 400,000 households in 10 project counties and the other extended areas under IAIL3 were to benefit either from participation in demonstrations or from the adoption of the demonstrated adaptation measures.

1.7 (a) Original Components (as approved)

The IAIL3 Project included the following four components:

Component 1: Water-saving Irrigation and Drainage (US\$316.14 million, of which US\$142 million financed by IBRD). Main activities included: (a) improvement and construction of local irrigation and drainage systems at the tertiary and on-farm level for about 500,000 ha of low-and medium-yield land; (b) implementation of engineering water-saving measures; (c) implementation of agronomic water-saving measures; (d) implementation of water-saving management measures, including WUAs in the five project provinces and in other selected provinces, and installation of water measuring facilities and equipment at all sites; and (e) preparation and implementation of groundwater management plans in water-short project counties in Hebei Province.

Component 2: Agricultural Modernization and Organization Development (US\$65.47 million, of which US\$21 million financed by IBRD). The primary activities: (a) strengthening and modernization of agricultural services and support systems; (b) high quality and specialized crops demonstration, extension and production; (c) development and support of farmers' organizations; and (d) applied technology and institutional training for farmers, agricultural technicians and farmers' professional organizations.

Component 3: Agro-ecological Environmental Protection and Management (US\$24.46 million, of which US\$11 million financed by IBRD). Main activities included: (a) establishment of shelterbelt forest networks around farmlands; (b) Integrated Pest Management for forestry development; (c) environmental monitoring and management; (d) training on environment and soil and water conservation; (e) demonstration and extension services on environment and ecology; and (f) preparation and execution of groundwater management plans in project water-short counties.

Component 4: Institutional Strengthening and Project Management Support (US\$57.11 million, of which US\$26 million financed by IBRD). This included financing of institutional strengthening and support under the project and capacity building in the state, provincial and county CAD offices, including: (a) domestic and international training; (b) domestic and international study tours; (c) use of specialized domestic and international technical assistance, including mobile expert teams; (d) scientific research and demonstrations; (e) provision of office facilities; (f) development of and maintenance support for an upgraded computerized project Management Information System (MIS); (g) survey, design and supervision work for implementation, including disbursement, procurement, and monitoring and evaluation (M&E).

Of the total project cost of US\$463.7 million, US\$50.5 million were set aside as counterpart contribution to the GEF project (to be implemented during 2008-2010 of the IAIL3 implementation period). These funds were used primarily for water-saving initiatives under Component 1 (about 78% of the amount set aside). Component 2 (improved seeds, IPM technology demonstration, and establishment of WUAs and FCs) was allocated about 5%, Component 3 (wind-breaking forest belts) about 6%, and Component 4 (training) about 8% of the total. Bio-gas facilities and greenhouses were new initiatives and received 3% of the total.

1.7 (b) Original Components (as approved)

The GEF-SCCF Project included the following three components:

Component 1: Identification and Prioritization of Adaptation Options (US\$0.50 million from GEF). Main activities included: (a) assessing the impact of climate change in 3-H Basin and project area; (b) conducting a gap analysis and study on adaptation measures to identify the needed adaptation measures and help integrate those measures more broadly into IAIL3 and the CAD program; and (c) prioritizing and selecting adaptation measures and demonstration areas, including consultations with farmers and discussions with provincial and county experts to help incorporate empirical experiences into the adaptation measures during project implementation.

Component 2: Demonstration and Implementation of Adaptation Measures (US\$48.43 million (US\$2.25 million from GEF; US\$46.18 million from IBRD). This component aimed to: (a) introduce, demonstrate, and implement specific climate change adaptation measures in selected demonstration areas under the GEF project; and (b) integrate appropriate adaptation measures into the implementation of the IAIL3 project to help reduce vulnerability to climate change in the 3-H Basin. The adaptation measures would focus mainly on agricultural production and practices, and irrigation water management and use, taking into account expected temperature increases resulting from climate change. Adaptation measures would be carried out under the on-going companion IAIL3 project, and would be expanded to cover as much of the project area as possible.

Component 3: Mainstreaming Adaptation into National CAD Program and Institutional Strengthening (US\$2.25 million from GEF; US\$4.32 million from IBRD). The component aimed to integrate and mainstream climate change adaptation into the ongoing national CAD program. Activities included a series of capacity building, technical assistance, knowledge sharing, and public awareness activities, and preparation of a National Climate Change Adaptation Plan for CAD.

1.8 Revised Components

The components were not modified in substance during implementation, either for the IAIL3 project or for the GEF-SCCF project. At the Mid-term Review of the IAIL3 project, some components were slightly downsized to accommodate the impact of the RMB appreciation against the US\$. The components were also downsized somewhat since the Government's own programs had already provided funds for some activities, such as provision of high quality seeds and agricultural mechanization. Following the MTR, the GEF-supported adaptation approach was incorporated into irrigation investments under the IAIL3.

1.9 Other significant changes

N/A

2. Key Factors Affecting Implementation and Outcomes

2.1 (a) Project Preparation, Design and Quality at Entry – IAIL3 Project

The Bank included the agenda for the preparation of IAIL3 in the last several supervision missions of IAIL2, with SOCAD and the POCADs undertaking high quality preparation work and providing their contributions based in part on the advice and guidance of the Bank missions. Due to the advanced state and high quality of preparation, the pre-appraisal mission was converted to appraisal. A challenge for the Bank was the formulation of the project legal documents, approval process, and disbursement procedures to enable the incorporation of the five additional participating provinces that had not been identified originally.

Although the project was large in terms of the projected cost, the project design was straight-forward. The three key components (water-saving measures, agriculture modernization, and agro-ecological environmental management) clearly addressed the main constraints to the realization of the new opportunities brought about by China's entry into the WTO, namely the need to become more competitive, to more effectively utilize water resources, and to move towards vertical integration in the agriculture sector.

Lessons learned from IAIL2 and other water resources projects, including the local level operation and maintenance of irrigation schemes, the "user pays" principle, participatory WUA management, institutional capacity building, and others, were adequately reflected in the design. Risks related to the functioning of the WUAs were well identified, including appropriate mitigating measures. Strong government commitment and intensive participation by the SOCAD, POCADs and COCADs during preparation improved considerably the quality and relevance of project content.

2.1(b) Project Preparation, Design and Quality at Entry – GEF-SCCF project

The Bank and SOCAD were proactive in identifying the need for a strategic approach to adaption in irrigated agriculture. The Bank and SOCAD were highly effective in the design of an innovative approach to climate change adaptation. SOCAD had commenced preparatory work with strong technical support on the climate change impact analysis provided by the Bank's expert team in late 2006. The Bank's international expert team also supported capacity building and TA to all experts and officials involved (including national scientists, local line agency experts and SOCAD/POCAD officials) at the early project preparation stage, especially on topics such as climate impact analysis/modeling studies for typical selected areas to identify and prioritize adaptation options and specific measures for each demonstration area, to improve project preparation. SOCAD had a solid proposal for review and appraisal by the Bank in late 2007. The lower level CAD Project Management Offices (PMOs) contributed significantly to the preparatory work and this ensured their buy-in at an early stage. Since the GEF grant was relatively small (US\$5 million), the preparation team rightly focused on identifying climate change-related issues in irrigated agriculture, gaps in adaptation measures, limited demonstrations in selected activities and geographical areas, capacity building, and working towards mainstreaming the adaptation concept into the overall CAD program.

2.2 Implementation

The SOCAD Central Project Management Office (CPMO) and PMOs and units implemented the project efficiently, and completed or exceeded all output targets as planned. Project investments were completed ahead of time and within the project budget (other than exchange rate changes), with strong, effective and innovative leadership from the project management team. The Bank provided quality supervision and specialized technical implementation assistance, especially on innovative topics like design of comprehensive water saving measures, sustainable WUAs, gender-based training, FAs/FCs and green and organic crop production and modernizing agriculture. Specialized technical support was also provided through the Pro-poor Rural Water Reform Project (PPRWRP), particularly on the innovative M&E components to monitor the impacts of on the improved WUAs.

The Bank and SOCAD effectively and successfully seized the opportunity to integrate the climate adaptation into the project interventions by blending it with a parallel GEF project and with counterpart funds sourced from IAIL3. This provided a new direction to the improvement in irrigated agriculture initiatives and eventually embedded this approach into the overall CAD program. The project team made full use of the restructuring options available to reallocate funds across components and address exchange rate changes under IAIL3 (2008) and GEF-SCCF (2011).

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

Project M&E consisted of three parts: (a) the project MIS; (b) the project M&E system; and (c) the specialized WUA M&E system. All parts were multilevel, computerized and internet-based, and integrated with each other. These systems together enabled the CPMO and lower PMOs to monitor and evaluate activities closely.

The MIS and WUA-M&E were based on systems developed and implemented under IAIL2 and PPRWRP. Before project start-up, they were adapted to meet IAIL3 requirements. The MIS enabled management to track procurement, physical progress, financial progress, and disbursements/reimbursements in near real-time and to closely monitor and control financial accountability. The project M&E was developed during start-up, and consisted of a very wide range of indicators on which information was to be collected at the county/farmer level.

These systems were operational early during implementation and were integrated into project implementation from the beginning, starting with the baseline surveys. The M&E and WUA-M&E enabled project management to monitor and evaluate implementation status and quality of progress almost in real time and thus take any corrective measures needed rapidly. The specialized WUA-M&E monitored many aspects of the improved WUAs under the project, ranging from economic benefits (calculated by comparison to control groups), to quality (such as availability of operational water measurement facilities, election of WUA chairmen) to their financial operation (e.g., whether water charges covered their costs of O&M). The WUA-M&E was also linked to the reimbursement section of the MIS to help ensure that improved WUA quality

requirements specified in the project legal documents were met before disbursements were made.

Overall, the M&E system was well designed and implemented. The M&E implementation units were established at SOCAD and every POCAD and COCAD PMO level with adequate staffing, training and supervision. The periodic M&E reports were produced and consolidated at provincial and state level, and the reliable information was generated and analyzed, and put to use to monitor the progress towards the achievement of PDO.

2.4 Safeguard and Fiduciary Compliance

The safeguard policies triggered under the IAIL3 project included: Involuntary Resettlement (OP4.12), Indigenous Peoples (OP4.10), Safety of Dams (OP4.37) , and Pest Management (OP4.09). Activities under the GEF-SCCF project were intended to protect vulnerable eco-systems from climate change impacts. Since the scope of activities and the physical areas of their implementation were identical with those of IAIL3, any issues relating to safeguards compliance were to be handled under the IAIL3 Resettlement Policy Framework and Ethnic Minority Development Plans.

Environmental Safeguards The project was correctly assessed as a Category “B” project. A comprehensive environmental assessment was carried out in accordance with the policies and procedures of the Government of China and the Bank. The implementing agencies established independent environmental management teams that were responsible for implementation, supervision and monitoring of the Environmental Management Plans (EMP). These were adequately funded. The EMP was implemented satisfactorily. Environmental monitoring was carried out by certified institutions and included: monitoring of groundwater level and quality; soil fertility monitoring; and water quality monitoring in the project areas. The monitoring data indicated that the groundwater extraction in most province counties was reduced, and both soil and water quality in the project areas improved compared to the baseline. The environmental impacts resulting from the project construction were also mitigated and controlled to acceptable levels.

Based on a post-evaluation of the environmental assessment and management of the project, compliance with environmental requires was satisfactory. In addition, the following measures and arrangements ensured that the project objectives was achieved in an environmental friendly and sustainable manner: (a) considering water resources conservation and management as key aspect for environmental management in project areas; (b) defining clear responsibility for environmental management in the project areas; (c) enhancing analysis, evaluation and utilization of environmental monitoring data; (d) ensuring budget allocation for environmental management and monitoring; and (e) including the key mitigation measures into the contract and enhancement of project on-site environmental supervision.

Social Safeguards The project implemented a Resettlement Policy Framework (RPF) which had been developed to guide any potential involuntary acquisition of land. The

project added 5,747 mu of cultivated land to the existing irrigated areas (instead of occupying land) through supporting measures, including the construction of culverts to replace the open canals, completion of auxiliary canal structures, and land leveling, the project. Some activities included in the component for development of agro-service system, such as construction of buildings for good quality seed production, and agro-technical service centers at township level, were all rehabilitation or expansion within the existing land and buildings. So was construction of nurseries for forestry activities. Because of the adjustment and re-distribution in the canal-farmland-tree-road systems, land adjustment occurred and involved some individual farmer households. The consultation mechanism established under the project for such land adjustment in the CAD process was satisfactorily employed. Not a single dispute occurred due to land adjustment, and the very high recognition by the farmers of the need for land adjustment facilitated project implementation. In order to avoid losses of green crops, construction of on-farm works were all scheduled for time periods after autumn harvest, before the winter sowing season, or during the winter fallow season, with full farmer consultation, mitigating the need for compensation.

Yunnan Province, Ningxia Hui Autonomous Region and Inner Mongolia Autonomous Region included some ethnic minority groups in the project areas, including Mongol, Miao, Yao, Hui. Ethnic Minorities Development Plans (EMDP) were prepared to direct project activities in these areas.

At project completion, a total of 293 WUAs had been established in these three provinces. These WUAs functioned well in irrigation management, water saving practice, and farmer participatory capacity building. More than 700,000 farmers participated in the WUA development process, of which 67,705 (of 10%) were from ethnic minorities. Ethnic women participation was a specific focus of the WUA formation as was ensuring that ethnic minorities and women were adequately represented on the WUA executive committees. The covenants of the WUA charter ensured equal rights for the ethnic minority groups. Of the 293 WUAs established, 67 had ethnic minorities acting as chairpersons, including five female ethnic minority chairpersons, and totally 141 ethnic minority women were members of the executive committee

Safety of Dams. Under the project, 36 dams serving the project area required inspection. These were inspected regularly and a Dam Safety Report was submitted to the Bank annually in compliance with Bank policy and the provisions of the legal agreements. All of the 36 dams were all in normal operation, safe and in reliable condition.

Integrated Pest Management (IPM). IPM activities were organized and carried out by county PMOs in cooperation with plant protection stations and agro-technique extension stations of the local agricultural departments. Mobile expert panels at the province and city levels provided comprehensive guidance and technical assistance to all project areas and monitored performance. Investment was made in pest observation and forecast sites, equipment, and about 26,000 person-months of IPM training were provided. The project focused on establishing demonstration areas for integrated pest and disease control and prevention for various crops. IPM activities covered 534,961 ha or 96.5% of project area.

Fiduciary Requirements. Compliance was ensured through regular supervision by the CPMO and PMOs and through the MIS. Regular Bank supervision missions reviewed project financial management and fiduciary compliance at all levels.

2.5 Post-completion Operation/Next Phase

The project was designed in part to introduce innovations into SOCAD management and the CAD program. In the course of the project, SOCAD replaced the traditional government budget allocation system and introduced the reimbursement system method followed under the project into the CAD program. This helped SOCAD to ensure that CAD construction and other field activities are carried out according to specified standards. SOCAD also issued a requirement that a portion of the investment budget for CAD land improvements program should be used to train WUA member farmers for improved agriculture and to support WUA establishment. O&M of irrigation facilities constructed under the project are being managed by WUAs. In non-WUA areas, O&M plans were prepared early in the project and implemented locally to mainstream the process. Many activities, such as strengthening of the agro-technical service centers under the ABs, are being operated through existing government programs. Windbreak and forestry plantations under the project are being maintained by local villages and farmers. The institutional arrangements for post-project operation of the facilities and organizations established under the project are adequate and functional.

The project achievements have successfully offered a clear demonstration and path to mainstream adaptation measures into the both irrigation and agriculture sectors. The SOCAD/POCADs are committed to scale up project success in their major ongoing national comprehensive agriculture development program, particularly: (a) the development of available water resources and comprehensive water-saving technologies/approach integrating the engineering, agronomic and institutional water saving management; (b) adopting application of adaptive cultivation and new anti-adversity varieties for drought-resistant, water-logging-resistant, high (or low)-temperature of-resistant and disease resistance, e.g., in response to higher frequency warm winters and increased extreme events; and (c) institutional development of WUAs, FAs and FCs, and continuous participation throughout the investment program empowered farmers, scientists and government officials. The good practices and lessons are also being scaled-up through the provincial CAD program and a Bank-financed follow-on project, notably the China-Integrated Modern Agriculture Development Project (IAIL4), which is under preparation and will be implemented by SOCAD and six provinces in the China's other grain production regions. In addition, some of the technical and institutional innovations introduced under project are being adopted in policy, planning and investment for climate change adaptation into the SOCAD's national CAD investment program.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

The objectives and design of the project continue to remain highly relevant. The need to

improve farm incomes and the environment, and enhance adaptation to climate change in agriculture and irrigation water management practices which were the primary focus of project, are both recognized as key strategic objectives for China. The PDO and project design remained highly relevant and consistent with national policy priorities and the World Bank-China Country Partnership Strategy (CPS) 2006-2011 that succeeded the Country Assistance Strategy of the preparation and design period. The Government's 11th and 12th Five Year Plans (2006-10 and 2011-15) placed high priority on a 'harmonious society' that balances economic growth with income distributional and ecological concerns. The project directly contributed to two outcomes of the CPS's "Supporting Greener Growth" strategic theme: promoting sustainable agricultural practices and demonstrating sustainable natural resources management approaches.

The project's innovations range from improved WUAs, to water savings techniques to climate change adaptation, all of which are critical for agricultural sustainability and for increasing production, saving water, ensuring food security, raising rural incomes, and reducing the long-term environmental and ecological impacts of agriculture. Consequently, design continues to remain satisfactory. Regarding implementation, all project activities were executed as designed, and implementation of IAIL3 was further bolstered by the addition of the GEF funded activities.

3.2 Achievement of Project Development Objectives and Global Environment Objectives

The project fully achieved its three development objectives. Given the attainment or surpassing of virtually all of the PDO indicators and Intermediate indicators as discussed below in detail (and presented in the Results Framework analysis in the Datasheet), the achievement of PDO and GEO is rated Highly Satisfactory.

IAIL3 PDO Indicators

Indicator 1: Increased per capita farm household incomes. The average per capita net income (including non-agricultural income) of farmers in the project area increased higher than estimated target (about 151% of the appraisal estimate) through increased high quality/value crop productions. Since the extent of increase varied across the economic status of the farmer group, an assessment was made of income increase for three distinct income groups: (a) per capita income of households with high incomes increased to 3,742 yuan¹ from 2,464 yuan at appraisal (151.9% of appraisal estimate); (b) per capita income of households with medium incomes increased to 3,067 yuan from 1,423 yuan at appraisal (155.3% of appraisal estimate); and (c) per capita income of households with low incomes increased to 2,541 yuan from 1,135 yuan at appraisal (156.5% of appraisal estimate). The increase in incomes could be broadly attributed to increased production and water productivity (Indicators 2, and 3 and 4 respectively,

¹ Yuan is the unit measure on the Chinese currency of Renminbi.

discussed below), and higher per unit sale realization. The per capita income of households involved in farmers specialized production associations increased to 4,031 yuan from 2,231 yuan (181% of appraisal estimate).

The shift from traditional low value grain production to high value cash crops, non-polluting, green and organic products contributed to dramatic increase in household incomes. For example, monitoring results indicate that per capita income of households producing green agro-products increased to 4,639 yuan by project completion. Annual area devoted to production of crops in this new group increased from virtually zero to about 100,000 hectares.

The project, through its mechanization initiatives, created an unexpected third source of income – resulting from saving of time from agricultural operations which helped generate off-farm income for the farm families. Likewise, effective irrigation management by project-established WUAs helped to reduce time and labor the households spent on irrigation. As a result, some members of the households could work as migrant workers supplementing their family income. According to results of WUA monitoring, the ratio of perennial migrant workers to the local population in the 5 provinces increased to 7% in 2010, up from 3% in the previous year. This was significantly higher than in the non-project areas control group. Increasingly, farmers in the project area are now working in businesses such as animal husbandry, fishery, fruit forestry, agro-product processing and transportation, enjoying broadened employment opportunities. The amount of additional income from these sources is not quantified but is estimated to be substantial.

Indicator 2: Increased high quality crop production, including high value, green, non-polluting and organic crops production to strengthen farmer's competitive capacity under post-WTO entry conditions. The crop production in the project areas increased as follows: (a) grain production – from 3.2 million tons to 4.2 million tons; (b) cash crops – from 4.4 million tons to 4.6 million tons; and (c) non-polluting green and organic crops – from zero to about 100,000 hectares being allocated to these crops.

This increase could be attributed to two specific groups of activities: (a) increased water availability and improved water productivity (Indicator 3 and 4, discussed below); and (b) modernization of agriculture.

Before the project implementation, most of the farmland in the project area was in poor irrigation condition and some farmland was not leveled, with undulating surface and poor water and nutrient retaining capacity, which, coupled with extensive farming and irrigation practice, resulted in poor irrigation efficiency and soil erosion. Through project implementation, on-farm water conservation initiatives were introduced and matched with auxiliary structures which enhanced the anti-disaster (drought/flood) capability of the farmland. This created a solid foundation for increased production of grain and cash crops, with the multiple planting index in the project area increasing by 4%, from 183% at appraisal to 187% at project closing.

Agricultural modernization contributed significantly to increased production too. Compared to baseline, coverage of project area for high quality seeds rose from 88% to 100%, IPM from 67% to 97%, and for mechanization 66% to 81%. Additionally, the quality of extension advice also improved, becoming more personal, with a single worker supporting 25 farmers compared to 65 at appraisal.

Along with improvement of basic agro-production conditions, the project encouraged adjustment of cropping mix by farmers, and relied on extensive demonstrations and training to promote development of modern, highly efficient agriculture. In the project areas, planting of good quality seeds and high value cash crops increased, indicating a shift from traditional low value agriculture to high yield, improved quality, high value, and high efficiency agriculture. Monitoring results in the project provinces indicate that the planting area ratio of grains to cash crops changed in favor of cash crops, increasing between 2% to 4% in the project areas (Heibei: cash crops planting area up from 36% to 38% of total production; Jiangsu: 20% to 24%; Anhui: 29% to 31%; Shandong: 25%-29%; and Henan: 26% to 29%). This compares with a maximum incremental 1% planting area being devoted to cash crops.

The environmental and price advantage of non-polluting, green and organic agro-products has spurred the farmers in the project areas to venture into this area aggressively. Monitoring indicators show that during the project period 250 agro-products produced in the project areas were certified as non-polluting agro-products, 117 agro-products were certified as green food, and 18 agro-products were in the conversion period for organic food certification. The total area covered was about 100,000 hectares (59,000 hectares for non-polluting products, 35,000 hectares for green products, and 3,000 hectares for organic products). This has not only strengthened farmer incomes but also improved food safety and agro-ecological environmental management in the project areas.

Indicator 3: Improved water productivity: Water usage at project completion dropped to 3,809 m³/ha or 60% of the appraisal target of 6,306 m³/ha, compared to baseline usage of 6,892 m³/ha. With increased production, water productivity rose from the baseline of 1.06 kg/m³ to 1.55 kg/m³ at completion, exceeding the appraisal target of 1.45kg/m³.

Most of the improvement could be attributed to comprehensive water saving measures taken to reduce the on-farm water consumption and irrigation quota, increase overall water availability, improve irrigation efficiency,, and improve overall participatory management of the resource through WUAs. Under the project, three specific groups of real water saving measures to reduce the real water consumption (ET) and increase water availability and upgrade water use efficiency were adopted: (a) engineering water saving measures such as canal lining, construction of low pressure pipelines, use of sprinkler irrigation and micro-irrigation, completion of canal system, combined use of canals and wells, and surface and groundwater to increase the irrigation efficiency and reduce the water application; (b) agronomic water saving measures such as land leveling, deep plowing, adjustment of agro-production structure based on local natural resources and economic conditions, use of crop residues to conserve moisture, and water-saving irrigation scheduling and water-saving planting methods to reduce evapo-transpiration of

crops and increase yield; and (c) managerial water saving measures such as river basin-based unified surface and underground water management, reform of water management system and maintenance, promotion of self-managed irrigation areas, and cost recovery/levying adequate water charges through WUA development and effective operations. Implementation of a combination of these measures produced water-saving benefits, resulting in increase of canal water use efficiency from 58% (pre-project) to 79% (post-project).

Indicator 4: Establishment of institutions for enhanced farmer participation and involvement: To enable, promote sustainable participatory water resources management, and support increased farmer participation, 1,022 WUAs with a membership of 490,000, and covering about 225,000 hectares for participatory irrigation management, 207 Farmers' Associations (FAs), and 20 pilot Farmers' Cooperatives (FCs) were established and operated.

As an important managerial water-saving measure, establishment of WUAs was a key initiative under the project. Results from monitoring WUAs over the project period show that yield of crops and farmers' income in the areas with WUAs tended to increase each successive year. At project completion, incremental yield of crops from the WUA-linked farmers ranged from 5 to 32 kg per mu on average, and the annual unit yields were 9 to 177 kg higher than farmers from the non-WUA control group. Per capita annual income of the households involved in the WUAs ranged from 5,318 yuan to 12,131 yuan, including 2,773 yuan to 5,366 yuan of farm income. Incremental per capita annual incomes of households in the WUA geographical areas and those in non-WUA areas ranged from 130 yuan to 1,437 yuan and from 58 to 766 yuan, respectively.

The 207 Farmers' Associations have a membership of about 153,941 household members and 331,705 households of radiation led farmers. The 20 Farmers' Cooperatives have a membership of 5,783 households and 45,077 households of radiation led farmers. These specialized farmer organizations provide information, techniques and marketing services to their members, and have become the "bridge" linking up farmers with markets. They are playing an important role in agro-production process, and are functioning in facilitating agro-production restructuring, upgrading farmers' scientific knowledge and educational quality, and assisting farmers to increase their incomes. Per capita income of households involved in specialized farmer associations increased to 4,031 yuan at project completion from 2,321 yuan at appraisal. Per capita income of households involved in pilot FCs increased to 4,160 yuan at project completion from 2,637 yuan at appraisal.

GEF-SCCF GEO Indicators

GEO Indicator 1: Increased climate change adaptation awareness of farmers, Water User Associations (WUA) and Farmer Professional Associations (FA) members, technical staff and officials: About 56% of the stakeholders appear to have become aware of the potential impacts of climate change and the adaptation measures.

Awareness among Staff of SOCAD, POCADs, COCADs and Research Groups. Special subject studies on adaptation to climate change organized by SOCAD and POCADs and

carried out by national scientists and local experts were treated as an important element for awareness raising among the project implementation and management officials and staff at all levels. Twenty-seven climate change adaptation related studies were completed with 215 scientists and experts involved from national Academy of Science and Agriculture Science, Ministry of Water resources, and provincial technical research institutes and universities, with substantial technical assistance supported by the Bank's international expert team on climate change impacts, specific adaptation options, implications for farming and water management technologies, and inputs for policy relating to CAD program. There was tremendous learning and awareness resulting from such extensive studies and participation.

Awareness among Farmers, WUA/FA members, technicians and officials. Training materials about global climate change and China's policies for coping with it were distributed to farmers in both the ten demonstration areas and the IAIL3 project areas, in order to increase awareness about adaptation. These stakeholders, in both the ten demonstration areas and the IAIL3 project areas, through their direct participation and involvement in implementation, learned about climate change adaptation. Under the GEF-SCCF project, a total of 210,659 ha of selected demonstrated areas by 298,732 participatory stakeholders were covered, and under the IAIL3 project, 172,868 ha of farmland were covered, including working through WUAs/FAs, and also establishing greenhouses and biogas tanks.

Awareness among the Broader Civil Society Members. SOCAD, POCADs and COCADs proactively disseminated climate change adaptation knowledge (331 publications, about 102% of PAD target) and measures through website, booklets, newspapers, technical magazine, TV, presentations on conferences and radio coverage at provincial, national and international level (the project was selected by WRI and GEF as the good practice dissemination project at Durban and Doha international climate change conferences). This has resulted in deepening the understanding and appreciation of climate change adaptation activities among civil society members.

Thematic Training and technical assistance. Cutting across various stakeholder groups, extensive training on CC adaptation were carried out through workshops, seminars, study tours and publications of training materials, including scientific understanding of climate change to enhance awareness of farmers, technical staff, and officials on climate change adaptation in agriculture and water sectors, and improve the institutional capacity for project implementation and management. The training program covered 37,659 persons. Reports and associated training materials (58,052 documents) were distributed to various levels of government offices, technical implementation agencies, and farm villages. Thirty four consultation and coordination meetings were held with the government leaders and officials of related agencies to strengthen their capacity and awareness of climate change adaptation and to promote the climate adaptation concepts and related technical measures and options for the field implementation in specific demonstration pilots. Climate change adaptation concepts have been widely accepted by the government officials and farmers, and are reflected in the support offered to, and in the implementation of, these initiatives in the project areas.

GEO Indicator 2: Relevant climate change adaptation measures implemented in selected demonstration areas and by participatory stakeholders: Climate change adaptation measures were implemented in a total of 208,152 ha of selected demonstrated areas (112% of PAD target) and IAIL3 project areas by 298,732 participatory stakeholders (113% of PAD target). The adaptation measures were implemented by farmers in the ten selected counties as demonstrations of integration of adaptation measures under GEF-SCCF project, and scaled-up as adapted water-saving initiatives in the IAIL3 project areas.

Adaptation in GEF-SCCF Demonstration Areas. Since implementation in 2008 in the ten pilot counties, eight types of water and agriculture adaptation measures have been demonstrated, including 314 sets of storm collection and storage facilities built, 33 adaptation agricultural technologies demonstrated, 450,000 kg of adaptive crop varieties promoted, 3,880 sets of biogas tanks and 1,237,225m² of greenhouses built, 710 ha of forestation carried out, 183 WUAs/FAs developed, and groundwater monitoring (in Hebei) enhancing water resources management and adaptation capacity carried out. In terms of actual adaptation of adaptation measures, a total of 35,284 ha of farmland and 145,005 households of participatory stakeholders in GEF-SCCF demonstration areas have accepted the climate change concepts and introduced adaptation measures in their operation.

Adaptation of IAIL3 Project Interventions. A total of 172,868 ha under IAIL3 project were supported with adaptation measures covering 13 million m³ of channel excavation and dredging, 691 sets of small water storage facilities, 1.8 million m² of anti-seepage channels, 4.5 million m² of buried low-pressure pipelines, 39,000 hectares of land leveling, 19,000 ha of mulching, introduction of 1.55 million kg of pest tolerant variety of seeds, replication of pest control and prevention in 1,825 ha, greenhouse facilities of 1.2 million m², and 1,230 sets of biogas tanks. As a result, the water and agriculture productivity had been increased from 1.1 kg/cum to 1.39 kg/cum in project areas, and the production per unit of ET had been improved from 55,000 kg to 114,000 kg.

A key indicator of the level and depth of climate change adaptation awareness is the extent to which the four groups of interventions under IAIL3 during 2008-2010 were modified to reflect the adaptation approach: (a) in terms of water resources, it was to reinforce and optimize currently used measures and realize optimal water resources utilization - upgrade the utilization efficiency of precipitation; implement combined allocation, regulation and management of multiple water sources to upgrade overall water use efficiency; develop alternative water sources; reduce non-productive or other improper agricultural water consumption through comprehensive water-saving technologies to integrate engineering water-saving, agronomic water-saving and regulation water-saving; (b) in terms of agricultural aspects, farming pattern and production systems were aligned with farmland development to expand cultivation of cash and feed crops and facilitate a transformation to a three-element structure of food, feed and cash crops. The farming pattern was adjusted to develop multi-seasonal maturity and higher re-vegetation frequency. Efforts were made to cultivate adversity resistant varieties, improve layout of crops and varieties and programmatically develop and select

drought, flood, high-temperature and pest resistant varieties, and develop greenhouses and bio-gas tanks; (c) in terms of ecological aspects, selection and cultivation of cold, drought, pest tolerant trees was strengthened to improve the adaptation capacity of forest during the course of climate change and migration periods; and (d) in terms of public awareness, the project strengthened awareness campaigns, education, study tours and training in the IAIL3 project areas on climate change adaptation and responsive measures, all of which greatly improved the public awareness about the importance and urgency of climate change adaptation.

GEO Indicator 3: Documents issued by state, provincial and country CADs integrating adaptation policies, measures and activities (through policy briefs, government reports, implementation and/or replication plans): 173 governmental official documents on climate change impacts and adaptation policies and implementation plans and technical standards were issued and published (102% of PAD target). POCADs, based on the review of the impacts of climate change, local provincial conditions, and the range of adaptation options available, proactively introduced a number of policies, which has provided policy support to the implementation of climate change concepts and greater climate change adaptation capacity in the provinces and the sector. SOCAD and all POCADs have issued “Circulations to Strengthen Climate Change Adaptation in CAD” to all CAD counties to guide their national and provincial CAD investment program. Overall, the policy recommendations to integrate CC adaptation into CAD program have been formulated to mainstream climate change adaptation activities into the national and provincial CAD program in the Twelfth Five-year plan.

3.3 Efficiency

The ***IAIL3 project*** outcomes included substantially improved agro-production conditions in the project areas, upgraded agro-productivity and marketing conditions, higher crop and water productivity, greatly strengthened competitiveness of agro-products produced in the project areas, markedly increased farmer incomes, and a clearly improved agro-ecological environment, all of which promote sustainable development of the 3-H Basin. The estimated economic rates of return (ERR) and Net Present Value (NPV) for IAIL3 at completion (see Annex 3 for the detailed economic analysis) as compared to appraisal estimates for the total project as a whole, and for each project province are provided below:

Provinces	PAD		Actual	
	ENPV (million Yuan)	ERR(%)	ENPV (million Yuan)	ERR(%)
Total	2,305.0	23.7	2,877.0	25.3
Hebei	357.0	22.7	322.0	21.2
Jiangsu	714.0	27.0	741.0	25.9
Anhui	361.0	23.9	352.0	22.5
Shandong	524.0	23.0	1,012.0	31.3
Henan	349.0	21.1	450.0	23.0

With respect to the *GEF-SCCF project*, scaling up the adaptation component under IAIL3 accounted for 90% of the GEF project cost. This investment is included in the IAIL3 project cost to calculate the revised ERRs. Other outcomes of the GEF-SCCF project were more qualitative in nature, namely, studies, awareness building, informing policy, and training and accounted for US\$2.9 million of the grant amount. Demonstration pilots were carried over 35,000 ha with a total cost of about US\$2.1 million. No separate ERR was calculated for the GEF project.

3.4 Justification of Overall Outcome and Global Environment Outcome Rating

Rating: Highly Satisfactory

The objectives of the project continue to be relevant to the current need for modernizing Chinese agriculture. At completion, the project had fully achieved or exceeded almost all PDO indicators, and the estimated ERR also exceeded the appraisal estimate. As a result, the overall outcome is rated Highly Satisfactory.

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

Poverty Impacts. Of the total of 1.4 million project beneficiary households, the lowest income groups showed a slightly higher percent gain in income as compared to medium and high income groups.

Eleven key national level poverty counties and 27 provincial level poverty counties or economically less developed counties were among the 123 project counties. The project focused on the poor and disadvantaged groups by exempting the 38 designated poverty counties from their counterpart funding responsibilities and by making arrangements for the respective provincial finance bureaus to assume counterpart funding responsibilities. Arrangements were made to convert cash contributions into labor contributions for poor farmers.

Poor households that could not afford water charges were fully or partially exempted from the payment or allowed to defer the payment to the WUAs. In the regulations of FAs or FCs, support policies were included to stimulate participation of poor households. Special attention was given to ensure equal participation, status and rights of poor households in the project. During the implementation period, the number of poor households in the project area declined from 67,692 (base year) to 39,357 (completion). The number of poor decreased from 254,718 (base year) to 143,317. Net income from farming activities of the poor households increased from 1,011 yuan (base year) to 1,987 yuan at completion.

Gender Aspects. In terms of gender, participation by women was emphasized and substantially increased in WUA development, with specialized training provided to women both in WUAs and to project staff in the provinces as well integrating this into SOCAD policies to promote participation by women in WUAs. In the process of

establishing FAs and WUAs, women were to be included as candidates for election of members to the executive committee or board of directors. This upgraded women's awareness of democracy and participation. Monitoring indicators show that in the 741 WUAs evaluated: (a) there were 87,245 female members, accounting for 25.6% of the total; (b) 837 women functioned as water user group leaders, accounting for 14.6% of the total; and (c) 805 women were members in executive committees, accounting for 17.9% of the total. This has led to upgrading women's status and role in the rural communities.

Social Development. In the process of establishing WUAs, FAs and FCs, PMOs in all project areas adopted participatory approach and carried out training and publicity activities. This enabled the farmers to understand the nature of “self-decision making, self-management, and self-service” which underpin the successful operation of these farmer organizations, and to appreciate their rights to know, to participate, to manage, and to supervise in the process of organizational operation and management. Increased farmer awareness and the level of their organization supported rural development activities.

(b) Institutional Change/Strengthening

Farmer organizations such as WUAs, FAs and FCs were established or strengthened under the project, and intensive training to farmers was provided. In addition, PMOs and CAD offices at various levels were strengthened, as well other government agency offices such as WRBs, ABs and FRBs.

(c) Other Unintended Outcomes and Impacts (positive or negative)

Ancillary Industry Development. In addition to enhancing directly the development of local farming, building and improvement of rural roads, the project has also furthered the development of the related service and ancillary industries, such as supply of agricultural materials, logistics, trade, financing, agro-processing and similar activities, not to mention increased consumer spending resulting from higher farm incomes. Most of such industries were tertiary (logistics, trade, financing, catering), which mushroomed in the private sector to support the project needs.

Private Sector Agriculture-related Investment. Completed infrastructure in the project area provided a platform for private sector agriculture-related investment. The project areas attracted funds for soil testing and formula-based fertilizer application project, problem-tackling project for high-yield wheat production, paddy quality upgrading project (Anhui province). Another example is private sector investment of 10 million yuan to contract land for modernized agro-production, which further increased agricultural benefits.

Demonstration Effects. In the project areas, the standardized and tidy farmland parcels, smooth roads, well-completed system of canals and ditches, beautiful tree-belts formed a picturesque countryside. Counties adjoining the project areas requested the CAD land improvement program to be implemented in their areas too. For instance, after project implementation in Zhuxiao Township of Changfeng County, Anhui Province, people

from the surrounding non-project townships including Taohu and Xiatang township requested the township government to extend the program to their areas.

Improved Groundwater Quality. Indiscriminate exploitation of water in the project areas was effectively controlled and the tendency of groundwater table declines was slowed so that a balance between extraction and replenishment could be realized. The introduction of science-based fertilizer application and IPM techniques reduced the amounts of fertilizer and pesticides entering into water bodies, reduced water pollution, and helped to improve water quality in lakes, reservoirs and rivers in the project area.

Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

N/A

4. Assessment of Risk to Development Outcome and Global Environment Outcome

Rating: Negligible

The IBRD loan closed in December 2010. None of the risks identified at appraisal have materialized and no risks that could threaten the project's development outcome are anticipated for the foreseeable future. The project does not face any significant technical, financial, economic, social, political or environmental uncertainties. It enjoys strong governmental ownership as well as financial and technical support at all levels. Ownership of the project among farmers, WUAs, FAs and FCs is strong.

Most project activities were designed to be integrated and mainstreamed into the ongoing CAD programs. This has been done successfully and project activities have continued to receive support as needed under CAD programs. Several important innovations, such as WUAs and FAs, are now self-managed and self-financing farmer organizations. Farmer support to WUA is also strong and this is expected to remain so. The institutional innovations have helped to support many of the technical outcomes under the project and to reduce the sustainability risks to project outcomes.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Rating: Satisfactory

IBRD Project. The Bank facilitated the identification, preparation and appraisal of the project, and this was critical to ensuring high quality at entry, given the wide scope of the project, especially the number of innovations introduced. The Bank team realigned the IAIL2 focus from mere production increase to a shift to high value, high quality crops, improved competitiveness, and enhanced water productivity. Good practice examples of participatory management and implementation arrangements from IAIL2 areas, including lessons learned, were reflected and incorporated in the project design. For example, the

initiative of farmer-created and farmer-managed WUAs and FAs to grow specialty crops, in many cases using WUA-managed water, was incorporated into the project design. Bank supervision missions also included specialists as needed to support these early, informal preparation activities, including introducing the concept of “real” water savings. In addition, the project and PPRWRP have been closely associated, and the early Bank technical assistance missions for PPRWRP provided specialized expertise and input on WUAs for project preparation. Many of the lessons from PPRWRP, such as the Five Principles for improved WUAs as developed under PPRWRP, were built into the project, including incorporating these provisions into the legal agreements and project MIS for monitoring during implementation. Similarly, to ensure that the MIS and WUA-MES for the project were compatible with PPRWRP and to enable the project MIS and WUA-MES to be operational as soon as possible, PPRWRP funded the initial costs for adaptation and transfer of the PPRWRP MIS and WUA-MES to SOCAD. During preparation, PPRWRP also provided critical training to project staff on improved WUAs and related topics such as women participation.

GEF-SCCF Project. The Bank team and SOCAD were highly proactive in seizing the opportunity to introduce climate adaptation approach into the IBRD project measures through the companion GEF-SCCF project. Extensive preparation work was done well ahead of project appraisal to ensure that the project content was realistic and doable. Given the small size of the grant, the team focused more on the intellectual integrity of the approach, including limited field demonstrations and mainstreaming climate adaptation into the overall CAD program. It used the IBRD project innovatively to provide counterpart funding to implement the identified agro-ecologically appropriate climate adaptation measures.

(b) Quality of Supervision

Rating: Satisfactory

Bank supervision missions successfully assisted SOCAD and the provinces in identifying and resolving issues that could threaten the achievement of the project development outcomes. Supervision missions included international experts for specialized topics, such as water saving techniques, WUAs, FAs/FCs, green food, climate change adaptation, and gender-based training. These experts brought fresh perspectives and new ideas to the project and, at the same time, critically reviewed implementation performance, and helped to identify and resolve any problems.

The Bank’s PPRWRP technical assistance missions provided direct support for improved WUAs. The PPRWRP also provided substantial training and technical assistance to project staff and farmers (especially women farmers) on WUAs, the project MIS and the WUA-M&E. Bank missions effectively supervised fiduciary and safeguard compliance and adjusted project’s water-saving and agricultural modernization components to incorporate climate change adaptation approaches. The Bank missions recommended, at an appropriate time, to restructure the project to address exchange rate variations, slow progress of some components, and the complementary financing of some project activities through government programs. Bank missions served as a continuous source of

positive feedback and generated a productive working relationship and close partnership between the Bank and SOCAD.

(c) Justification of Rating for Overall Bank Performance

Rating: Satisfactory

The Bank team strongly supported and facilitated project preparation which was completed early and to a high standard, allowing the pre-appraisal to be upgraded to appraisal. The Bank also strongly supported implementation through regular and high quality supervision missions which reviewed implementation performance and recommended critical actions to ensure the achievement of project development outcomes. The Bank facilitated and supported introduction of climate change adaptation activities into the project during implementation, and coordinated PPRWRP activities to provide strong support to the project on improved WUAs during preparation and implementation, as well as introducing gender-based training for both the project staff and WUAs members. No opportunity for restructuring was lost, and the two projects were brought to an orderly closure.

5.2 Borrower Performance

(a) Government Performance

Rating: Highly Satisfactory

The Government's strong support for the project and its objectives from preparation through completion was a key factor in the success of this large, complex and innovative project. The government strongly supported the project's project development outcomes during both preparation and implementation, and continuously demonstrated a strong ownership and commitment to project objectives, in relation to both the IBRD and GEF-SCCF projects. At approval of the IBRD project, the government had already provided for strong project leadership and implementation arrangements, already had staff in place, and had begun some key activities under retroactive financing. SOCAD's leadership to the preparation of the IBRD and GEF-SCCF projects, with strong participation by the POCADs, COCADs, and PMOs, was exemplary.

With government support, implementation issues were resolved quickly, often using the project MIS and MES to speed problem identification and help guide decision making and resource allocation. This support was especially clear in provision of adequate counterpart funding especially in the face of strong Yuan appreciation, and in policy support such as the recent Cooperatives Law which relates to FA and FC activities under the project and SOCAD support for MWR's guidelines on WUAs (Circular 502) under the project.. This provided a strong enabling environment for key institutional reforms under the project, which was reinforced at the field level by the many policy documents issues by local governments in support of these reforms. For many project activities, such as WUAs and FAs/FCs, a strong, effective program of stakeholder consultation was

carried out as standard practice, and stakeholders were directly involved in implementation and arrangements for O&M after completion.

SOCAD paid especially close attention to fiduciary issues, in particular ensuring effective and strong financial management, establishment and efficient operation of the project MIS at project start-up, adequate and timely flow of loan and counterpart funding, close monitoring of loan and counterpart funds use, loan reimbursements and fulfillment of covenants.

(b) Implementing Agency or Agencies Performance

Rating: Highly Satisfactory

The performance of SOCAD and lower level CAD offices and PMOs in preparing and implementing the project was outstanding. Management and leadership of the overall project by SOCAD's CPMO has been excellent, innovative and efficient, and has demonstrated a strong commitment to and good understanding of project development objectives and outcomes, while lower levels of project management have efficiently implemented project activities to secure expected project outcomes. Effective and efficient leadership and support at both levels were key factors in the project's high level of success. Throughout preparation and implementation, project management has shown a strong commitment to achieving project development outcomes and objectives, and has maintained an effective program of stakeholder consultation and involvement, especially with farmers, local officials and WRB staff as well as CAD field staff.

The high level of support and commitment for the project was evident from the beginning; preparation was efficient, and the project was fully ready for implementation at Board approval with all implementation arrangements and key staff already in place. During implementation, issues were resolved quickly and efficiently; financial management, procurement, reimbursement, compliance with covenants and other fiduciary requirements were met effectively, and effective M&E arrangements were established and used effectively to help guide project management. During implementation, close relationships with related line agencies such as the WRBs, local governments and villages/farmers were maintained. This not only facilitated efficient implementation but also helped ensure effective arrangements for continued operation of project activities after project completion.

(c) Justification of Rating for Overall Borrower Performance

Rating: Highly Satisfactory

Both the government and SOCAD performance was excellent in preparing and implementing the project, displaying a strong commitment to the project and its objectives, and providing effective leadership and policy support to ensure success in meeting project objectives.

6. Lessons Learned

- (a) The project has demonstrated that it is possible to provide a climate adaptation focus to most water and agriculture-related investments. Using small water harvesting tanks, additional extended channels, drainage lines to collect water for later use, recycling crop residues for soil moisture conservation, using pest tolerant seeds, precision application of fertilizers or pesticides, adjusting cropping pattern and crop-mix, among other measures have a huge climate adaptation impact and should indeed become an integral part of all projects focused on increasing water efficiency or agricultural modernization. Even with on-going agriculture and irrigation projects, retrofitting an already existing program to include integrated measures with a climate adaptation focus is not difficult.
- (b) The usual approach to intensification of irrigated agriculture is investment in infrastructure, in many cases, completely new. The project has demonstrated that identifying ways to improve efficiency of the water resource already available, obtaining “real” water savings, and improving water productivity should be the approach. This can be achieved with minimal investment, with huge gains to be realized.
- (c) It is eminently desirable to ensure that there are activities focused on knowledge generation, analyses, capacity building, and creation of an intellectual underpinning for an innovative operation which incorporates climate adaptation. An analysis of the impacts of climate change, nature of measures that may be required for adaptation, tailoring these to specific agro-ecological and climatic zones, and demonstrating the benefits for wider adoption is central to achieving adaptation objectives. The project used the GEF-SCCF grant for these activities and limited demonstrations. It was thus able to get a huge impact from a companion project by deploying the resources from a small grant.
- (d) It is critical to get all of the stakeholders to buy into the program. The project was able to work in a participatory mode with the provincial and county level command agriculture development program offices, with the scientific and research community, with the farmers and their associations, and with agriculture/water/forestry bureaus to develop a common and acceptable approach to climate adaptation menu of options. Dissemination of information to civil society and to government officials and political leaders to obtain their support to implement such initiatives was a key success factor.
- (e) Strengthened cooperation with research institutions and scientists and experts, and timely transformation of the latest research on climate change adaptation into practical action provided strong scientific and technical support for project design and implementation, and guided adaptation practices on the ground. The SCCF grant was used to contract top research institutions in China and the first-class international experts in the field to build up the scientific base for project design

and implementation, a new path of using scientific assessment to guide investment practices.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/implementing agencies

The Borrower indicated that a number of key factors were behind the success of the Project: strong attention paid to project implementation by the government at various levels; well-established institutions and close cooperation among concerned agencies; a well-established institutional system for management; scientific and meticulous project planning and design; active participation by the farmers; and focus on science and technology dissemination and technical training under the project. The issues associated with implementation included: exchange rate fluctuation made it difficult for project implementation; price contingencies used by the Bank was not easy to understand by the implementing agencies; and data requirements under the project demanded significant amount of manpower and effort.

(b) Co-financiers

None.

(c) Other partners and stakeholders

None.

Annex 1 (a). Project Costs and Financing – IAIL3 Project

(a) Project Cost by Component (in USD Million equivalent)

Irrigated Agriculture Intensification Loan III - P084742			
Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Water-saving Irrigation and Drainage	295.87	316.14	100.24*
Agricultural Modernization and Organization Development	61.61	65.47	99.70*
Agro-ecological Environmental Protection and Management	22.94	24.46	100.00*
Institutional Strengthening and Project Management Support	54.10	57.11	100.01*
Total Baseline Cost	434.52	463.00	
Physical Contingencies	20.41	0.00	
Price Contingencies	8.25	0.00	
Total Project Costs	463.18	463.00	
PPF	0.00	0.00	
Front-end fee IBRD	0.50	0.50	
Total Financing Required	463.68	463.50	100.00

*These costs include the amounts of physical and price contingences, and also the US\$50.5 million designated as counterpart funds for the companion GEF-SCCF Project.

(b) Financing

Irrigated Agriculture Intensification Loan III - P084742				
Source of Funds	Type of Financing	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
International Bank for Reconstruction and Development	IBRD Loan	200.00	200.00	100.00
Local Govts. (Prov., District, City) of Borrowing Country	Counterpart Contribution	136.79	137.40	100.00
Beneficiaries	Counterpart Contribution	126.89	126.10	100.00

Annex 1 (b). Project Costs and Financing – GEF-SCCF Project

(a) Project Cost by Component (in USD Million equivalent)

Mainstreaming Climate Change Adaptation in Irrigated Agriculture Project – P105229			
Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Identification and Prioritization of Adaptation Options	0.50	0.49	98.00*
Demonstration and Implementation of Adaptation	48.43	50.88	105.00*
Mainstreaming Adaptation into National CAD Program and Institutional Strengthening	6.57	6.25	95.00*
Total Baseline Cost	55.5	57.62	
Physical Contingencies	0.00	0.00	
Price Contingencies	0.00	0.00	
Total Project Costs	55.5	57.62	103.80*
PPF	0.00	0.00	
Front-end fee IBRD	0.00	0.00	
Total Financing Required	55.50	57.62	103.80*

*These costs include the amounts of physical and price contingences.

(b) Financing

Mainstreaming Climate Change Adaptation in Irrigated Agriculture Project – P105229				
Source of Funds	Type of Financing	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Recipient	Counterpart Contribution	30.50	32.62	107.00
International Bank for Reconstruction and Development (IAIL3 Project)	Counterpart Contribution	20.00	20.00	100.00
GEF-SCCF	Grant	5.00	5.00	100.00

Annex 2 (a). Outputs by Component – IAIL3 Project

Component 1. Water Saving Irrigation and Drainage

Sub-component A: Construction of Basic Infrastructure

	Unit	Appraisal	MTR	Actual	Percent of Appraisal	Percent of MTR
1. Canal Dredging						
1) Branch canals	000m3	11055	11436	11577	104.7%	101.2%
2) Lateral/sub-lateral	000m3	20343	19928	20278	99.7%	101.8%
3) Branch drainage ditch	000m3	12545	16239	16441	131.1%	101.2%
4) Lateral/Sub-lateral drainage ditch	000m3	32213	39216	39847	123.7%	101.6%
2. Building						
1) Bridge	set	25695	25788	25770	100.3%	99.9%
2) Culvert	set	40635	52178	55033	135.4%	105.5%
3) Gates	set	5549	7661	7590	136.8%	99.1%
4) Aqueduct	set	1107	1381	1378	124.5%	99.8%
5) Drops	set	1245	1269	1273	102.3%	100.3%
6) Inverted siphon	set	792	526	532	67.2%	101.1%
7) Outlets	set	32910	37587	38058	115.6%	101.3%
3. Pumping station	set	2161	2862	2832	131.1%	99.0%
4. Tube wells	set	20686	22443	22808	110.3%	101.6%
5. Rural transmission lines	set	3731	5741	5855	157.0%	102.0%
6. Small water storage dam	set	2505	1691	1717	68.6%	101.5%
7. Rural Road	Km	15307	18031	18388	120.1%	102.0%

Sub-component (B): Engineering Water-saving Measures

	Unit	Appraisal	MTR	Actual	Percent of Appraisal	Percent of MTR
1. Impervious canal	m ²	10710	9987	10028	93.6%	100.4%
2. Low-pressure pipe						
1) PVC pipe	Km	148604	108713	148528	99.9%	136.6%
2) Concrete pipe	Km	162	56	56	34.4%	100.5%
3. Sprinkle irrigation	ha	1369	1075	1075	78.5%	100.0%
4. Micro Irrigation (Including drip irrigation)	ha	230	258	285	123.9%	110.3%
5. Moving soft pipe	Km	4677	4311	4348	93.0%	100.9%

Sub-Component (C): Agronomic Water-saving Measures

	Unit	Appraisal	MTR	Actual	Percent of Appraisal	Percent of MTR
1. Soil improvement						
1) Land leveling	ha	142675	155094	155617	109.1%	100.3%
2) Deep plow	ha	177011	183669	183855	103.9%	100.1%
3) Balance fertilization	ha	105151	105638	106248	101.0%	100.6%
4) Crop residue	ha	121456	124894	125306	103.2%	100.3%
2. Training	pm	13633	10765	10163	74.5%	94.4%
3. Demonstration & extension	ha	29880	20590	20788	69.6%	101.0%

Sub-component (D): Managerial Water-saving Measures

	Unit	Appraisal	MTR	Actual	Percent of Appraisal	Percent of MTR
1. Water users association	0	993	1014	1022	102.9%	100.8%
1) Start-up						
2) Building	m2	28884	22480	25878	89.6%	115.1%
3) Training and study tour	p.m	18297	19098	22329	122.0%	116.9%
4) Water-measuring equipment	set	4731	4088	4498	95.1%	110.0%
2. Training	p.m	16923	13229	13348	78.9%	100.9%
3. Water-measuring equipment	set	6888	3449	3456	50.2%	100.2%

Of the 1022 WUAs established in the project areas, 520 were established within the 5 project provinces, serving a total irrigation area of 105,200 ha; 502 were established in the 5 participating provinces, serving a total irrigation area of 116,300 ha.

Component 2. Agricultural Standardization and Organization Development

Sub-component (A): Modernization of Agricultural Service Systems

	Unit	Appraisal	MTR	Actual	Percent of Appraisal	Percent of MTR
1. Quality Seed Production						
1) Building	m2	19433	10725	10900	56.1%	101.6%
2) Introduction of Seed	kg	1056875	648669	647711	61.3%	99.9%
3) Drying yard	m2	118074	61270	61221	51.8%	99.9%
Seed Processing Line	set	12	2	2	16.7%	100.0%
2. IPM						
1) Instrument	set	4120	2132	2180	52.9%	102.3%
2) Building	m2	6616	4034	4027	60.9%	99.8%
3) Training	p.m	22261	18643	18975	85.2%	101.8%
4) Demonstration & extension	ha	99309	83492	88564	89.2%	106.1%
5. Agro-machinery						
1) Horsepower	set	4019	2127	2123	52.8%	99.8%
2) Attachments	set	4990	857	911	18.3%	106.3%
3) Machine for stalk shredding	set	912	231	247	27.1%	106.9%
4) Seeding-machine	set	1366	428	428	31.4%	100.0%
5) Harvest Machine	set	945	966	976	103.3%	101.0%
6) Sprayer Machine	set	2733	1294	1296	47.4%	100.2%
6. Other Training	p.m	15025	11092	11099	73.9%	100.1%
7. Other Demonstration and Extension	ha	21554	17975	18678	86.7%	103.9%

Sub-component (B): Demonstration and Production of High Quality Crops

	Unit	Appraisal	MTR	Actual	Percent of Appraisal	Percent of MTR
1. Greenhouse						
1) Building	m2	1139612	2208646	2234667	196.1%	101.2%
2) Equipment	set	368	147	148	40.2%	100.7%
2. Green Crop						
2) Instrument	set	298	63	63	21.1%	100.0%
3) IPM						
Instrument	set	45611	99	98	0.2%	99.0%
Building	m2	945	50	50	5.3%	100.0%
Training	p.m	657	419	451	68.7%	107.7%
Demonstration and Extension	ha	6210	2772	3196	51.5%	115.3%
4) Training	p.m	4507	2696	2662	59.1%	98.7%
5) Demonstration and Extension	ha	10213	8977	9195	90.0%	102.4%
1) High Quality Crops Demonstration and Extension						
2) Training	p.m	22728	20546	20047	88.2%	97.6%

Sub-component (C): Development of Farmer Organizations

	Unit	Appraisal	MTR	Actual	Percent of Appraisal	Percent of MTR
1. Farmer Association development	0	166	193	207	124.7%	107.3%
1) Start-up						
2) Building	m2	5025	2673	3192	63.5%	119.4%
3) Instrument and Equipment	set	338	629	743	219.8%	118.1%
4) Training	p.m	3485	3595	3670	105.3%	102.1%
5) Demonstration and Extention	ha	3549	4131	4016	113.2%	97.2%
2. Farmers' cooperative demonstration pilot	No.	12	19	20	166.7%	105.3%
1) Building	m2	6674	23978	25946	388.8%	108.2%
2) Equipment	set	373	326	313	83.9%	96.0%
3) Training	p.m	669	814	894	133.6%	109.8%
4) Demonstration and Extention	ha	2041	4170	4602	225.5%	110.4%

Component 3. Agro-ecological Environmental Protection and Management

	Unit	Appraisal	MTR	Actual	Percent of Appraisal	Percent of MTR
a. Farmland forest belts						
1. Sapling	000No.	20107	24927	24123	120.0%	96.8%
b. Tree planting	ha	17150	19871	21235	123.8%	106.9%
c. Nursery	ha	565	386	387	68.4%	100.1%
d. IPM						
1. Instrument	set	1288	623	606	47.0%	97.3%
2. Building(Forecast stations)	m2	1816	902	881	48.5%	97.6%
3. Training	p.m	9964	6736	6545	65.7%	97.2%
4. Demonstration and Extention	ha	9707	4977	5817	59.9%	116.9%
e. Environment monitoring & management						
1. Ecology construction of rural areas	0	1081	1015	1031	95.4%	101.6%
f. Other Training	p.m	848	744	737	86.8%	99.0%

Component 4. Institutional Development and Support

After 2008, Chinese national government issued new policies to strengthen approval of overseas training study tour with stringent limits on both the number and participants of overseas training and study tours, resulting in a mere 45% of completion rate of the overseas study tours originally planned for the project.

Insitutional Strengthening	Unit	Appraisal	MTR	Actual	Percent of Appraisal	Percent of MTR
a. Training						
1. Domestic Training	p.m	17035	13586	13638	80.1%	100.4%
2. International Training	p.m	8	27	40	495.4%	146.8%
b. Study Tours						
1. Domestic Study Tours	p.m	4450	4053	3626	81.5%	89.5%
2. International Study Tours	p.m	235	235	105	44.5%	44.5%
c. Technical Assistance						
1. Domestic TA(Including Tech. Mobile)	p.m	3835	2117	2288	59.7%	108.1%
2. International Technical assistance	p.m					
d. Scientific Research and demonstration	0	263	263	277	105.3%	105.3%
e. Office facilities						
1. Vehicles	set	207	150	149	72.0%	99.3%
2. Office Equipment	set/set	2327	2339	2488	106.9%	106.4%

Annex 2 (b). Outputs by Component – GEF-SCCF Project

Project Components	Appraisal	Actual	Percent of Appraisal
Component 1: Identification and Development of Adaptation Measures			
The baseline, projected scenarios, and possible long-term impacts of climate change identified for the project areas through analysis of relevant hydraulic and agricultural production models, and of the result of economic research and surveys	Yes	Done	100
Menu of possible adaptation measures developed based on scientific analysis and stakeholder participation	Yes	Done	100
Project demonstration areas identified based on appropriate selection criteria	Yes	Done	100
Component 2: Demonstration and Implementation of Adaptation Measures			
Adaptation measures developed and implemented in demonstration area (ha)	32,077	35,284	110
Acceptance by farmers of adaptation measures (number of households)	129,469	145,005	120
Climate change adaptation concept/measures included in the design and implementation of IAIL3 (drainage, water-saving and water storage) (ha)	154,347	172,868	112
Establish WUAs/FAs to implement of adaptation measures (number)	182	183	101
Building greenhouses to adapt to climate warming (m2)	1,237,225	1,237,225	100
Build biogas digesters to adapt to climate warming (number)	3,800	3,880	102
Component 3: Mainstreaming Adaptation into National CAD Program and Institutional Strengthening			
SOCAD/POCAD/COCAD use websites, pamphlet and other publications as well as newspaper, television, websites and radio broadcast to disseminate knowledge about the adaptation to climate change and adaptation measures (number)	326	331	102
Consultations and coordination meetings, training on adaptation to climate change issues among SOCAD, MOF, NDRC, CAS and other concerned agencies (number)	16	34	213
Policy recommendation to integrate CC adaptation into CAD program formulated	Yes	Done	100
Climate Change Adaptation M&E mechanism in operation	Yes	Done	100

Annex 3. Economic and Financial Analysis

3.1 Financial and Economic Evaluation

Economic benefits of the project were mainly derived from increase in agricultural outputs after improvement of basic infrastructure, and from expansion of cultivated areas of high value-added crops and the resulted increase of the crops' yield. Financial analysis of the project was mainly based on data from annual project monitoring, while taking into account assumptions at appraisal to ensure comparability of data at appraisal and ICR. The analysis mainly applied the following assumptions:

- 1) Economic evaluation of the project was conducted in accordance with the principles and methods defined in the of the World Bank guidelines, and is based on market prediction and analysis, project construction scale, components and investment estimates;
- 2) Since this project was designed to be an irrigated agriculture project, it produced a certain amount of economic benefits through improvement of low and medium yield farmland and agro-production conditions, adjustment of cropping pattern, increase of high yield farmland and cropping area of good quality varieties. Therefore, the project was in nature a rehabilitation and expansion project, its economic benefits were analyzed by comparing the incremental benefits of the "with project" and "without project" scenarios;
- 3) Based on price tendency of agro-products in recent years, average market prices of 2008 were used for the main agro-products;
- 4) Financial benchmark yield and social discount rate were both set at 12%;
- 5) Project calculation period was 20 years, including 5 years of implementation period, and the base year was 2005;
- 6) Unit yield of each of the crops was based on results of typical investigations of the project area, representing an average level of the whole project area. Data of field surveys in 2003 were used for the "without project" scenario. The outputs consisted of main products and by-products. Inputs for each of the crops included seed, pesticide, chemical fertilizer, organic fertilizer, plastic film, machinery cost, water charge, labor, animal power, agricultural taxes, etc., as the case might be;
- 7) According to results of surveys by the provinces and actual situation with IAIL2, after completion of the project, stable yields come in starting from year 3 or year 4 for crops; for forestry, the starting year of stable yields ranges from year 6 to year 9. Since the project implementation lasted 5 years, stable yields would start from year 14 for the whole project area;
- 8) Agricultural tax: The national government had issued policy on exemption of agricultural tax. The provinces calculated their own agro-taxes based on actual situation with agro-tax exemption in their respective provinces,
- 9) Taxes and price contingencies were omitted in economic evaluation. A comprehensive tax rate of 5% was used for civil works investment, and
- 10) Financial analysis of the project was for the whole project based on cash flow analyses by the provinces.

Results from the analysis show that Financial Internal Return Rate (FIRR) is 17.3%, Financial Net Present Value (FNPV) is 2,378 million yuan, indicating financial sustainability of the project. FIRR of the project is slightly lower than that planned at appraisal and the main reason for this is great increase of labor cost in China in recent years, which well exceeds prediction at appraisal. Details of the calculation are shown in

Table 3.1 Results of Financial Analysis

Provinces	PAD		Actual	
	FNPV(milliom Yuan)	FIRR(%)	FNPV(milliom Yuan)	FIRR(%)
Total	2093.0	17.9	2378.0	17.3
Hebei	307.0	16.7	139.0	13.8
Jiangsu	593.0	18.6	670.0	17.7
Anhui	326.0	18.1	375.0	17.7
Shandong	512.0	18.0	850.0	20.0
Henan	356.0	17.6	344.0	16.0

Economic analysis of the project was based on financial analysis, with the following differences also taken into account:

- 1) Prices used in the economic analysis: After China's accession to the World Trade Organization (WTO), its prices of agro-products and agricultural means of production are gradually integrated with those in international markets. Therefore, economic analysis of the project used the same prices as they were in financial analysis;
- 2) Economic Costs of the Project: COSTAB was used to omit taxes and price contingencies from the project investment and calculate conversion factor of economic costs of the project; and
- 3) A social discount rate of 12% was used for economic analysis.

Using the above mentioned assumptions and references, the calculated Economic Internal Return Rate (EIRR) of the whole project is 25.3%, and Economic Net Present Value (ENPV) is RMB2,877 million, both of which are close to those estimated at appraisal. Such results indicate that the project is economically sound. Table 3.2 that follows contains more details.

Table 3.2 Results of Economic Analysis

Provinces	PAD		Actual	
	ENPV(milliom Yuan)	EIRR(%)	ENPV(milliom Yuan)	EIRR(%)
Total	2305.0	23.7	2877.0	25.3
Hebei	357.0	22.7	322.0	21.2
Jiangsu	714.0	27.0	741.0	25.9
Anhui	361.0	23.9	352.0	22.5
Shandong	524.0	23.0	1012.0	31.3
Henan	349.0	21.1	450.0	23.0

3.2 Greatly Improved Basic Agro-Production Conditions and Substantially Increased Yields of Agro-products

Before the project implementation, most of the farmland in the project areas was in poor irrigation condition and some farmland was not leveled, with undulating surface and poor water and nutrient retaining capacities, which, coupled with extensive farming and irrigation practice, resulted in waste of water and soil erosion. Through project implementation, on-farm water conservancy facilities in the project areas had been completed and matched with auxiliary structures, and anti-disasters (drought, floods) capacities of the farmland had been obviously strengthened, thus a foundation for increased production of grain and cash crops was established. Over the five-year project implementation, total output and unit yields of the main crops in the project areas had been enhanced to various degrees. Compared with that in base year, unit yield of grain crops reached 6,381 kg/ha, and total grain output reached 4.20 million tons, with an increase of one million tons, being 100.2% of that planned at appraisal. Total output of cash crops reached 4.578 million tons, with an increase of 220 thousand tons, being 105.1% of that planned at appraisal. Because of the improved production condition, multiple planting index in the project area increased by 4%, from 183% at appraisal to 187%.

3.3 Further Optimized Cropping Mix and Apparently Upgraded Quality of Agro-products

Along with improvement of basic agro-production conditions, the project encouraged adjustment of cropping mix by farmers, and relied on scientific advancement to promote development of modern, highly efficient agriculture. In the project areas, planting areas of good quality agro-products and high value cash crops were noticeably increased, which facilitated shift of traditional agriculture to high yield, good quality, and high efficiency agriculture. Monitoring results of the provinces indicate that, there was an apparent adjustment of cropping mix in the project areas after the project implementation, and the ratio of grain crops to cash crops in the project areas changed greatly, with planting area of cash crops increased by 2% to 4% after the project implementation, being about 3% higher than that in the “control areas” (areas selected for comparison purpose) in the non-project areas. For details see Table 3.3.

Table 3.3 Comparison of Ratios of Grain Crops to Cash Crops in the Project Areas

Provinces	Appraisal		Actual	Contrast Area
	Without	With		
Hebei	64:36	62:38	62:38	65:35
Jiangsu	80:20	79:21	76:24	79:21
Anhui	71:29	69:31	69:31	71:29
Shandong	75:25	71:29	71:29	74:26
Henan	74:26	70:30	71:29	74:26

Because of their environmental and price advantages of non-polluting, green and organic agro-products, production and development of such agro-products has been well accepted by the local governments and the vast number of farmers in the project areas as an important aspect for agricultural restructuring. Statistics show that, in the recent 5 years, totally 250 agro-products produced in the project areas were certified as non-polluting agro-products, 117 agro-products were certified as green food, and 18 agro-products were in the conversion period for organic food certification, all of which indicate that the project effectively promoted development of good quality, high efficient agriculture. Among them, certification of 99 green products was supported by IAIL-3, covering a total area of 17,972 ha. See Table 3.4 for more details.

Table 3.4 Statistics of Non-polluting, Green and Organic Agro-products certified under the Project

Provinces	Pollution free food		Green food		Organic food	
	No.	Area(ha)	No.	Area(ha)	No.	Area(ha)
Hebei	22	8775	14	2254	4	1333
Jiangsu	225	50204	51	19209	8	678
Anhui			3	300		
Shandong	3	170	47	12218	6	503
Henan			2	667		
Total	250	59149	117	34648	18	2514

3.4 Markedly Increased Farmer Incomes

Increase of agricultural outputs and restructuring of cropping mix greatly facilitated increase of farmer incomes. Per capita net income (including non-agricultural income) of farmers in the project area increased to 5138 yuan from 3,406 yuan at appraisal, accounting for 150.9% of that at appraisal. According to analysis of farming incomes of the representative farmer households in 5 provinces, after project implementation, per

capita income of households with high incomes increased to 3,742 yuan from 2,464 yuan at appraisal, accounting for 151.9% of that at appraisal; per capita income of households with medium incomes increased to 3,067 yuan from 1,423 yuan at appraisal, being 155.3% of that at appraisal; per capita income of households with low incomes increased to 2,541 yuan from 1,135 yuan at appraisal, being 156.5% of that at appraisal; per capita income of households producing green agro-products increased to 4,639 yuan from 3,423 yuan at appraisal, accounting for 135.5% of that at appraisal; per capita income of households involved in farmer specialized cooperative organizations increased to 4,031 yuan from 2,231 yuan at appraisal, being 180.6% of that at appraisal; per capita income of households included in pilot FCs increased to 4,160 yuan from 2,637 yuan at appraisal, being 157.7% of that at appraisal.

Through analysis of incomes of representative households in the project area, it is clear that, the project resulted in higher growth rate of incomes for farmers in the project area, compared with that of farmers in similar areas in the same period.

3.5 Rapid Development of WUAs and the Resulted Notable Benefits to the Members

As an important managerial water-saving measure, WUA development was greatly accelerated under the project, with extended area coverage and notable benefits brought to the association members. Results of monitoring conducted specifically on the WUAs in consecutive years show that, along with WUAs' establishment and putting into operation, unit yield of crops and farmers' income in the areas with WUAs established tended to increase year by year. At the end stage of the monitoring, incremental yield of crops of the WUAs ranged from 5 to 32 kg per mu on average, and the annual unit yields of the WUAs were 9 to 177 kg higher than those of the control group; per capita annual income of the households involved in the WUAs ranged from 5,318 yuan to 12,131 yuan, including 2,773 yuan to 5,366 yuan of farm income, and the incremental per capita annual incomes of households in the WUA areas and those in non-WUA areas ranged from 130 yuan to 1,437 yuan and from 58 to 766 yuan, respectively. Additionally, establishment and operation of WUAs facilitated, to a certain extent, a rise out of poverty of the poor population, as was shown by the increase of farm incomes of the poor households. At the final stage of monitoring, income of poor households included in the WUAs of the 5 project provinces ranged from 1,282 yuan to 2,414 yuan, with an increase between 25 yuan and 410 yuan; per capita farm income of the poor households in the WUAs of the 5 provinces ranged from 1,024 yuan to 1,221 yuan, with an increase between 42 yuan and 382 yuan.

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Arlene D. Reyes	Sr. Program Assistant	GSDPR	Administrative
Chongwu Sun	Sr. Environmental Spec.	EASCS	Environment
Hongwei Zhao	Program Assistant	EACSQ	Administrative
Houbin Liu	Consultant	EASCS	Water Resources Management
Jinan Shi	Sr. Procurement Specialist	EAPPR	Procurement
Lang Seng Tay	Consultant	EASRE - HIS	Irrigation Engineer
Li Ouyang	Program Assistant	EACCF	Administrative
Margaret Png	Lead Counsel	LEGEM	Legal
Marie Claire M. Li Tin Yue	Sr. Program Assistant	AFTUW	Administrative
Minhnguyet Le Khorami	Program Assistant	EASER	Administrative
Patria Consuelo M. Morente	Program Assistant	MDM	Administrative
Qingtao Xie	Consultant	EASCS	Environment
Qun Li	Sr. Operations Officer/Task Team Leader	EASER	Team Leader
R. Cynthia Dharmajaya	Program Assistant	EASER	Administrative
Richard B. Reidinger	Consultant	EASER	Water Users' Association Specialist
Robert Leonard O'Leary	Sr. Finance Officer	CTRFC	Financial Management
Shaojun Li	Project Coordinator	EASCS	DIFD Project Coordinator
Wen Poh Ting	Consultant	EASRE - HIS	Agronomist
Xiuzhen Zhang	Interpreter/Translator	GSDTI	Translator
Yi Dong	Sr. Financial Management Specialist	EAPFM	Financial Management
Zong-Cheng Lin	Sr. Social Development Specialist	EASCS	Social Aspects
Supervision/ICR			
Chongwu Sun	Sr. Environmental Spec.	EASCS	Environment
Chunxiang Zhang	Sr. Program Assistant	EACCF	Administrative
Geoffrey Spencer	Consultant	EASCS	Irrigation Engineer
Jinan Shi	Sr. Procurement Specialist	EAPPR	Procurement
Qun Li	Sr. Operations Officer/Task Team Leader for both supervision and ICR missions	EASER	Team Leader
Harideep Singh	Senior Rural Development Specialist	EASER	ICR Author
M. Salah Darghouth	Consultant	AFTWR	Agriculture and Water Resources
Minhnguyet Le Khorami	Program Assistant	EASER	Administrative

Patria Consuelo M. Morente	Program Assistant	MDM	Administrative
Richard B. Reidenger	Consultant	EASER	Water Users Associations Specialist
Sukanya Venkataraman	Program Assistant	HDNDE	Administrative
Usaid I. El-Hanbali	Consultant	AFTWR	IrrigationEngineer
Yi Dong	Sr. Financial Management Specialist	EAPFM	Financial Management
Yuan Wang	Procurement Analyst	EAPPR	Procurement
Yunqing Tian	Team Assistant	EACCF	Administrative
Zong-Cheng Lin	Sr. Social Development Specialist	EASCS	Social Aspects

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
PE-P084742-LEN-BB		
FY04	25.82	184.91
FY05	52.01	520.37
FY06	8.72	42.96
GE-P105229-LEN-BBGEF		
FY07	38.26	315.44
FY08	26.93	173.48
Total:	151.74	1237.16
PE-P084742-SPN-BB		
FY06	8.39	37.48
FY07	16.64	82.46
FY08	14.44	68.25
FY09	6.33	49.69
FY10	5.47	68.91
FY11	7.89	58.94
GE-P105229-SPN-BBGEF		
FY09		
FY10	5.61	34.72
FY11	10.04	16.90
FY12	14.73	55.62
Total:	79.50	526.35

Annex 5. Beneficiary Survey Results *(if any)*
N/A

Annex 6. Stakeholder Workshop Report and Results *(if any)*

N/A

Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR

COMMENTS RECEIVED FROM THE BORROWER/RECIPIENT ON THE DRAFT ICR ON DECEMBER 10, 2012

“We are pleased to receive and review the WB ICR which integrate the Irrigated Intensification Agriculture Loan III (IAIL 3) project and the Mainstreaming Climate Change Adaptation in Irrigated Agriculture (GEF) Project, because of the implementation of GEF project blended with IAIL 3 project. We think the ICR totally and truly reflect the actual implementation of two projects, objectively and fairly evaluate the achievements, lessons and impacts of two projects. We have no objection to ICR.

We highly appreciate the hard work and great effects of the task team leader and the related experts. All of them did a great contribution for the successful implementation of both projects.

SOCAD”

SUMMARY OF BORROWER’S ICR FOR THE IAIL3 PROJECT (prepared by the Bank)

The Borrower prepared a comprehensive and a very good ICR. The first time was during the November 2010, IAIL 3 Supervision Mission and the second time was during the GEF CC Project Supervision Mission in March/April 2011. SOCAD prepared the Borrower final ICR Report which was submitted to the Bank on May 1, 2011 (a copy of the Report is kept the project files). The Borrower confirmed that the design of IAIL3 components closely centered around the PDOs and emphasized innovations in the project design and those introduced during project implementation, while taking into full consideration the real needs of the farmers, agriculture sector and rural development in the project areas; and timely introduction of climate change adaptation concepts into IAIL3 at MTR that made overall design of the project components more scientific and rational.

The Borrower indicated that a number of key factors were behind the strong success of the Project, especially: strong attention paid to project implementation by the government at various levels; well-established institutions and close cooperation among concerned agencies; a well-established institutional system for management (based on IAIL2 experience) and standardized management; scientific and meticulous project planning and design; active participation by the farmers, which was strongly promoted and supported under the project; and stressing science and technology dissemination and technical training under the project. Other factors include the following:

- (i) Government commitment to repay the loan: SOCAD requested US\$ 200 million loan from the World Bank to co-finance the project. MOF (the borrower) committed to repay the loan. The finance departments at various levels committed to provide counterpart funding to the project;

- (ii) Policy support: in addition to the commitment of loan repayment, provision of counterpart funding and the establishment of project management institutions, GOC has also provided policy support in various areas, including the issuance of series of documents in favor of project implementation;
- (iii) Active participation by the beneficiaries. Farmers in the project area are the direct beneficiaries of the project. PMOs at various levels guided project farmers to actively participate in the whole process of project preparation, construction and maintenance, enabling them to become the owners of the project development, which is one of the important factors that impacted on the implementation achievements of the project; and
- (iv) Effective contribution to the project design by the World Bank and effective supervision by the World Bank. The Borrower highly valued the guidance, advice and the technical input by the Bank's missions at project preparation and during supervision. Accordingly, the World Bank performance was rated "Highly Satisfactory" by the Borrower.

The Borrower's ICR also included a number of comments on the issues associated with the project implementation. They include the following:

- (i) Large exchange rate changes during the project period caused substantial difficulties for project implementation;
- (ii) Variable rates for price contingencies based on the Bank's methodology were used for making the annual project budgets, but this was beyond the understanding and capacity of the local implementing agencies and the cost/budget estimates were far from actual costs.
- (iii) Data requirements under the project for monitoring, analysis, etc. were extensive and required a significant amount of organized manpower and effort. However, M&E and other data intensive activities were not treated like full project components, which made it difficult to manage data collection and use properly; for example, changes in personnel results in loose handling and loss of data in some cases.

To address the above issues, the Report recommended the following actions to be taken into consideration in future projects:

- (i) The World Bank in future project implementation should explore more scientific project management method. From the perspectives of the PMOs, project activities should be scientifically phased. Project management should be strengthened to speed up the implementation. Reimbursement should be carried out timely so as to reduce the loss caused by foreign exchange rate variations;

- (ii) The World Bank should take into consideration more accurate estimates of inflation; adopt fixed calculation methods for the two contingencies to facilitate the budgeting work of the project implementers; and
- (iii) Special attention should be given to collection, storage and use of data from the very beginning of project preparation, stability of the project data management staff should be maintained as it is for other project components, and proper transition from old to new data management personnel should be ensured. M&E and other data related activities should be treated as full project components in order to get the attention they need.

SUMMARY OF BORROWER'S ICR FOR THE GEF-SCCF PROJECT
(Borrower's contribution: un-edited)

1. Project overview

The Yellow River, Huaihe River and Haihe River Basin (3H River Basin) is one of the three largest river basins of China, covering an area of 1.44 million km². The 3H River Basin is also an important agricultural economic region and one of the major producing areas of grains and cotton of China. In recent years, the impact of climate change on agricultural production in the 3H River Basin becomes increasingly evident. Therefore, SOCAD started at the end of 2006 the preparation of requesting GEF grant for the implementation of adaptation to climate change in comprehensive agricultural development.

The proposal for the grant project envisaged the use of 5 million USD of GEF. In order for the grant project to achieve the effects of seed funding and to leverage more resources, SOCAD used the balance of 50.5 million USD of the then on-going IAIL3 of the World Bank as counterpart funds to be implemented in tandem with the grant project. The 5 million USD of GEF fund served as a harbinger to improve and address the weakness in terms of adaptation to climate change in the design of IAIL3, and the investment of 5 million USD also served as a platform and provided broader space to the introduction and practical application and popularization of the rationales of adaptation to climate change. The investment and activities of the grant program have been implemented as pilots in the 10 counties with climate conditions identical to the surrounding areas, i.e. Changxian County of Hebei, Xinyi Municipal and Suoyu District of Suoqian Municipal of Jiangsu, Mingguan Municipal and Huaiyuan County of Anhui, Yanggu County and Gaomi Municipal of Shandong, Wancheng District of Nanyang Municipal and Liangyuan District of Shangqiu of Henan, and Tongxin County of Ningxia. Activities of the grant project included adaptation measures with good ripping effects, replicability and accuracy of targeting as the construction of rainfall harvesting works, demonstration of agricultural technologies with climate adaptability, demonstration of crop varieties with adaptability to climate change, demonstration of biogas digesters and greenhouses.

The overall objective of the grant project aimed at the incorporation of the rationales of adaptation to climate change in the fields of water resource management and agricultural development. Through activities of enhancing awareness, demonstration of adaptation measures and institutional capacity building, the project would for the first time increase the capacity of adapting to climate change in agricultural production in the 3H River Basin. Furthermore, through capturing lessons learnt in the practice, the project would provide exemplary demonstrations and recommendations of actions for the adoption of the rationales of adaptation to climate change in larger scope.

2. Project management and implementation

The setup of the implementation institution of the grant project used the same team of IAIL3, which meant that the PMOs at various levels of the IAIL3 were also responsible for the implementation of the grant project. Meanwhile, in line with the characteristics of

the grant project, PMOs at various levels established mobile expert groups, through which, experts of various disciplines contributed technical support and guidance to project implementation, providing adequate human resource guarantee to the integration of the grant project and IAIL3.

By the end of June 2012, project implementers had completed project activities reaching or exceeding major output indicators.

3. Assessment of outcomes

The grant project has delivered all activities and the objective has been achieved.

(1) PMOs at all levels have used multiple media to extensively disseminate the objective, rationales of project design and the outcomes of the project. Multiple media and channels have been adopted to increase the awareness about the rationales of adaptation to climate change.

(2) On the basis of capturing the effects of the application of various adaptation measures, PMOs of all levels in line with the actuality of the project area of the province actively promoted and strengthened adaptation to climate change in agriculture and irrigation management.

(3) PMOs at all levels shared the experiences of adaptation to climate change of the demonstration counties and adopted relevant measures of adaptation to climate change in the project area of IAIL3 in an all round manner.

In accordance with the project implementation plan, project activities have been timely and efficiently carried out and realized the intended objective of the project. County PMOs focused on the implementation and demonstration of adaptation measures. The national and provincial PMOs delivered training and study tours and organized related consulting service providers to efficiently carry out studies on related subjects. Policy recommendations were proposed for comprehensive agricultural development to adapt to climate change. These activities have provided technical support and theoretical foundation for mainstreaming of adaptation to climate change in comprehensive agricultural development.

The implementation of the grant project has achieved good outcomes and fully realized the PDO in an overall manner.

- Firstly, project's actions and demonstrations of adaptation measures inspired actions of adaptation to climate change and provided references in comprehensive agricultural development.
- Secondly, through subject matter studies, the project established a checklist of adaptation measures to climate change and policy guideline in comprehensive agricultural development.
- Thirdly, through extensive information dissemination and training, the rationales of adaptation to climate change have been accepted by government officials of various levels and farmers of the project area and reflected and implemented on the ground.

As illustrated above, the activities of the grant projects have been fully delivered and the PDO has been realized. Therefore, the project is rated as highly satisfactory through the assessment of the grant recipient side.

4. Key factors affecting implementation and outcomes

In the process of project identification, PMOs of all levels fully considered various factors faced by the project. Effective measures were adopted to enhance the soundness of project identification, which laid solid foundation to the smooth delivery of the project. The smooth delivery of the project is attributable to the efforts of the management of the PMOs at all levels and to the intellectual support of the mobile expert groups, as well as the positive impact of the external environment.

In order to accurately master project implementation progress, timely uncover and resolve issues occurred in project implementation, assess the quality of project implementation and the results and outcomes the project produced and ensure correct decision making and effective monitoring of the PMOs at all level, the M&E indicators were identified at project preparation with full consultation with the World Bank. M&E system was established in which procedures and schedule of project inspection, supervision and audit were clearly defined. M&E and supervision in project implementation were efficiently carried out.

5. Challenges faced

In order to ensure the sustainability of the project and fully achieve the ripping effects of the project, PMOs at all levels made overall sustainability arrangement during project implementation and after completion.

(1) Sustainability of project works

After certification of completion acceptance, CPMOs following the stipulations of fixed asset management have completed the hand-over formalities for the works and facilities as small-scale rainfall harvesting works, biogas digesters and greenhouses.

(2) Sustainability of institutional capacity

During project implementation, POCAD systems have gradually established the mainstream framework of adaptation to climate change.

(3) Sustainability of policies

In recent years, governments at all levels have attached more and more attention to issues of climate change and formulated and issued one after another policy documents in relation to climate change, forming a policy support framework of national, local governments and line agencies.

6. Risk analysis

Since the possible risks of the project had been fully considered during project appraisal with corresponding counter measures formulated, the risks during project implementation had been effectively resolved, enabling the project to fully realize its PDO.

(1) Additional risk during project implementation and coping measures

In line with the additional risks appeared during project implementation, effective counter measures have been timely taken and there were no significant impact on the project.

(2) Post-completion risk analysis and coping measures

After completion of project implementation, there are certain risks for the sustainable development of the project, a challenge to the sustainable development of project outcomes. Through analyzing these risks and adoption of effective counter measures, the probability of such risks can be mitigated or completely avoided.

7. Performance of the World Bank and the recipient

(1) Assessment of World Bank's performance

During project preparation and implementation, the World Bank brought in advanced design rationales and project management experiences and timely and effectively guided the recipient to undertake project preparation and implementation; it hence played positive role in upgrading project implementation and management of the recipient. Its performance in fulfilling the legal agreement of the project is highly satisfactory. The performance of the World Bank is rated as highly satisfactory.

(2) Assessment of recipient's performance

During project preparation and implementation, the performance of the recipient is highly satisfactory.

8. Lessons learnt and recommendations

8.1 Experiences

- (1) Meticulous and solid project preparation provided important foundation to smooth delivery of the project.
- (2) Strong technical support is indispensable guarantee to smooth delivery of the project.
- (3) Project management in accordance with relevant stipulations was the fundamental
- (4) Participatory approach is an important path to smooth project implementation.

8.2 Lessons

The project even though has achieved good results and fully reached the planned PDO, there are inadequacies as follows:

- Firstly, the amount of SCCF grant is small and the application of adaptation measure is not sufficiently comprehensive.
- Secondly, due to the limited grant amount, the scale of the GEF CC adaptation project is small with limited scope of exploration of adaptation measures.

8.3 Recommendations

When implementing future projects, recipient recommends that the successful experiences of the project be fully used and lessons learnt in project implementation be captured so as to continuously improve project design and implementation.

Annex 8. Comments of Co-financiers and Other Partners/Stakeholders
N/A

Annex 9. List of Supporting Documents

IAIL 3 Project Appraisal Document
Mainstreaming Climate Change Adaptation in Irrigated Agriculture Project Appraisal Document
Pro-poor Rural Water Reform Project ICR
Promotion of Gender Equality in Water Users Associations Report
Assessment of Achievements of Farmers Associations and Farmers Cooperatives
Assessment of Achievements of Water User Associations Development
Assessment on Water Saving Component
Assess of Achievement of Agricultural Modernization and Agro-ecological
Environmental Protection and Management

Aide memoirs from 2006 to 2010
SOCAD Progress reports
SOCAD ICR for IAIL3 Project
SOCAD ICR for GEF Mainstreaming Climate Change Adaptation in Irrigated Agriculture Project The Summary ICR for GEF Mainstreaming CC Adaptation in Irrigated Agriculture Project
Consultant field studies
Borrower's Completion Reports
ISRs
Country Assistance Strategy

Map IBRD34174

