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IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IDA-40130 IDA-50620)

ON A

CREDIT

IN THE AMOUNT OF SDR 105 MILLION AND SDR 26.08
(US\$154 MILLION AND US\$ 40 MILLION EQUIVALENT)

TO

REPUBLIC OF INDIA

FOR THE

ASSAM AGRICULTURAL COMPETITIVENESS PROJECT

December 2, 2015

Agriculture Global Practice
Sustainable Development
South Asia

CURRENCY EQUIVALENTS

(Exchange Rate Effective December 2, 2015)

Currency Unit = Indian Rupee

INR66.86 = US\$ 1

US\$1.37 = SDR 1

FISCAL YEAR

July 1 – June 30

ABBREVIATIONS AND ACRONYMS

AACP	Assam Agricultural Competitiveness Project	GM	<i>Gopal Mitra</i>
APPL	Amalgamated Plantations Private Limited	GWM	Ground Water Monitoring
AF	Additional Financing	IBRD	International Bank for Reconstruction and Development
AH&VSD	Animal Husbandry and Veterinary Services Department	ICB	International Competitive Bidding
AI	Artificial Insemination	IDA	International Development Association
ALDA	Assam Livestock Development Agency	IFC	International Finance Corporation
ARIASP	Assam Rural Infrastructure & Agricultural Services Project	JFMC	Joint Forest Management Committee
ASG	Agro-Service Group	LLP	Low lift Pump
ATMA	Agricultural Technology Management Agency	MANAGE	National Institute of Agricultural Extension Management
BRC	Block Resource Center	MPI	Milk Producing Institution
BTT	Block Technology Team	MIS	Management Information System
CAS	Country Assistance Strategy	MMDC	Market Management and Development Committee
CPS	Country Program Strategy	MTR	Mid Term Review
CSS	Central Sector Scheme	MWDP	Micro Watershed Development Program
DCS	Dairy Cooperative Societies	M&E	Monitoring and Evaluation
DEA	Department of Economic Affairs	NABARD	National Bank for Agriculture and Rural Development
DOA	Department of Agriculture	NDDB	National Dairy Development Board
DOEF	Department of Environment and Forests	NGO	Non-Government Organization
DOF	Department of Fisheries	PCU	Project Coordination Unit
DOS	Department of Sericulture	PDO	Project Development Objective
EIRR	Internal Rate of Return	PEDGF	Pilot Enterprise Development Grant Fund

EMF	Environmental Management Framework	PIU	Project Implementation Unit
FAC	Farmer Advisory Committee	PWD	Public Works Department
FD	Forest Department	QALP	Quality Assessment of Lending Portfolio
FIRR	Financial Internal Rate of Return	RKVY	Rashtriya Krishi Vikas Yojana
FPO	Farmer Producer Organization	STW	Shallow Tube Well
GoA	Government of Assam	TTL	Task Team Leader
GOI	Government of India	VOC	Vehicle Operating Cost
GIS	Geographical Information System	WAMUL	West Assam Milk Union Limited

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 Country Director : Onno Ruhl
 Practice Manager : Martien Van Nieuwkoop
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INDIA
Assam Agricultural Competitiveness Project
CONTENTS

Project Data Sheet

A. Basic Information.....	v
B. Key Dates	v
C. Ratings Summary.....	v
D. Sector and Theme Codes	vi
E. Bank Staff	vi
F. Results Framework Analysis.....	vii
G. Ratings of Project Performance in ISRs.....	xii
H. Restructuring	xiii
I. Disbursement Profile.....	xiv
1. Project Context, Development Objectives and Designs	1
3. Assessment of Outcomes	11
4. Assessment of Risk to Development Outcome	20
5. Assessment of Bank and Borrower Performance	21
6. Lessons Learned.....	24
7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners...	25
Annex 1. Project Costs and Financing	26
Annex 2. Outputs by Component	27
Annex 3. Financial and Economic Analyses.....	44
Annex 4. Bank Lending and Implementation Support/Supervision Processes.....	60
Annex 5. Summary of Borrower's ICR	63
Annex 6. List of Supporting Documents.....	69
MAP: Assam Agricultural Competitiveness Project.....	70

A. Basic Information			
Country:	India	Project Name:	Assam Agricultural Competitiveness Project
Project ID:	P084792	L/C/TF Number(s):	IDA-40130,IDA-50620
ICR Date:	12/03/2015	ICR Type:	Core ICR
Lending Instrument:	SIL	Borrower:	GOVT OF INDIA
Original Total Commitment:	XDR 105.00M (OP) XDR 32.60 M (AF)	Disbursed Amount:	XDR 111.59M
Revised Amount:	XDR 131.08M		
Environmental Category: B			
Implementing Agencies: Assam Rural Infrastructure & Agricultural Services Society, Department of Agriculture, Government of Assam			
Co-financiers and Other External Partners:			

B. Key Dates				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	10/29/2003	Effectiveness:	02/24/2005	02/24/2005
Appraisal:	06/30/2004	Restructuring(s):		09/27/2006 12/09/2009 09/20/2011 10/28/2011 03/14/2012 12/10/2013
Approval:	12/14/2004	Mid-term Review:	02/01/2008	02/01/2008
		Closing:	03/31/2010	03/15/2015

C. Ratings Summary	
C.1 Performance Rating by ICR	
Outcomes:	Satisfactory
Risk to Development Outcome:	Low
Bank Performance:	Satisfactory
Borrower Performance:	Satisfactory

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

Overall Bank Performance:	Satisfactory	Overall Borrower Performance:	Satisfactory
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C.3 Quality at Entry and Implementation Performance Indicators

Implementation Performance	Indicators	QAG Assessments (if any)	Rating
Potential Problem Project at any time (Yes/No):	Yes	Quality at Entry (QEA):	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA):	None
DO rating before Closing/Inactive status:	Satisfactory	Quality Assessment of Lending Portfolio (QALP):	Moderately Satisfactory

D. Sector and Theme Codes

	Original	Actual
Sector Code (as % of total Bank financing)		
Agricultural extension and research	10	10
Agro-industry, marketing, and trade	9	9
General agriculture, fishing and forestry sector	11	11
Irrigation and drainage	10	10
Rural and Inter-Urban Roads and Highways	60	60
Theme Code (as % of total Bank financing)		
Other rural development	14	14
Rural markets	29	29
Rural policies and institutions	28	28
Rural services and infrastructure	29	29

E. Bank Staff

Positions	At ICR	At Approval
Vice President:	Annette Dixon	Praful C. Patel
Country Director:	Onno Ruhl	Michael F. Carter
Practice Manager/Manager:	Martien Van Nieuwkoop	Constance A. Bernard/Gajanand Pathmanathan
Project Team Leader:	Manivannan Pathy	Robert Epworth

ICR Team Leader:	BayarsaikhanTumurdavaa	
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F. Results Framework Analysis

Project Development Objectives

The project development objective was to increase the productivity and market access of targeted farmers and community groups. Key indicators of success were increased yields of crop, fish, and livestock products – complemented by an increase in the proportion of marketed surplus.

Revised Project Development Objectives

No Change

(a) PDO Indicator(s)

The original Results Framework was amended to revise two PDO indicators and to add one core indicator. Three new indicators were added and three were revised in the list of Intermediate Outcome Indicators. The revised Results Framework was approved by the Board in March 2012 as part a of the Additional Financing package.

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Increase in crop productivity (t/ha) (i) Dry season paddy (ii) Mustard (iii) Cabbage (iv) Cauliflower			
Value (quantitative or Qualitative)	(i) 1.5 (ii) 0.6 (iii) 7.0 (iv) 5.6	(i) 5.0 (ii) 0.8 (iii) 8.5 (iv)7.0		(i) 5.5 (ii) 1.1 (iii) 10.6 (iv) 9.8
Date achieved	December 2006	March 2010		January 2015
Comments (incl. % achievement)	Achieved: All productivity targets were exceeded by 10-38%. Against their baseline values, productivity of individual crops at project			

	completion increased by 267% for <i>dry</i> season paddy; 83% for mustard, 51% for cabbage and 75% for cauliflower.			
Indicator 2 :	Increase in fish productivity (t/ha) (i) Ponds (ii) Tanks (iii) Beels			
Value (quantitative or Qualitative)	(i) 0.485 (ii) 0.850 (iii) 0.480	(i)1.455 (ii)2.550 (iii)0.960	(i) 2.75 (ii)2.25 (iii)0.75	(i) 3.5 (ii) 2.3 (iii) 1.6
Date achieved	December 2006	March 2010	March 2015	January 2015
Comments (incl. % achievement)	Achieved: Revised at AF. All productivity targets were exceeded by 3 to 113% at project completion. Compared with their baseline values, productivities at project completion increased by 600% for ponds; by 156% for tanks, and 220 % for beels.			
Indicator 3 :	Increase in cropping intensity (%)			
Value (quantitative or Qualitative)	130	195		200
Date achieved	December 2006	March 2010		March 2014
Comments (incl. % achievement)	Achieved: Revised at AF. The cropping intensity at project completion exceeded its target by 3% and against the baseline value the cropping intensity increased by 54%.			
Indicator 4 :	Increase in crop diversification (%) (i) Area under cereals (ii) Area under high value crops			
Value (quantitative or Qualitative)	(i) 83 (ii) 17	(i) 80 (ii) 20		(i) 65 (ii) 35
Date achieved	December 2006	March 2010		January 2015
Comments (incl. % achievement)	Achieved: Crop diversification exceeded its target. At project completion, the area under high value crop (mainly vegetables and oilseeds) was increased from 17% to 35% with a concomitant decrease in area under cereals (predominantly paddy)			
Indicator 5 :	Increase in marketed surplus (%) (i) Dry season paddy (ii) Mustard (iii) Vegetables			
Value	(i) 18 (ii) 17	(i) 45 (ii) 50	(i) 45 (ii) 45	(i) 26.1 (ii) 64.5

(quantitative or Qualitative)	(iii) 28	(iii) 92	(iii) 65	(iii) 99.5
Date achieved	December 2006	March 2010	March 2015	January 2015
Comments (incl. % achievement)	Substantially achieved: Revised at AF. The marketed surpluses for mustard and vegetables exceeded their revised targets by 43% and 53%. However, the marketed surplus for dry season paddy achieved 60% of its target value. This reflects a significant decrease in area and production of rice due to introduction for potatoes in the project area and reflecting the strong diversification of agriculture production systems as reported under Indicator 4.			
Indicator 6 :	Beneficiaries (Number) (i) Project Beneficiaries (ii) Of which female (beneficiaries)			
Value (quantitative or Qualitative)	0	(i) 410,000 (ii) 82,000		(i) 565,745 (ii) 83,744
Date achieved	NA	March 2015		March 2015
Comments (incl. % achievement)	Achieved: New core indicator added at AF. At project completion, the total number of direct project beneficiaries reached 565,745 exceeding the revised target by 38%. 15% of direct beneficiaries were women.			

(b) 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 :	Component 1: STWs Installed and Operated (Number)			
Value (quantitative or Qualitative)	0	60,000	90,000	100,000
Date achieved	December 2006	March 2010	March 2010	March 2015
Comments (incl. % achievement)	Exceeded: Revised at AF. At project completion STW installation exceeded the revised target by 11%.			
Indicator 2 :	Component 1: Area Irrigated by STWs (Ha)			
Value	0	150,000	225,000	250,000

(quantitative or Qualitative)				
Date achieved	NA	March 2010	March 2015	March 2015
Comments (incl. % achievement)	Exceeded: Revised at AF. At project completion the area irrigated by STWs reached 250,000 ha exceeding the revised target by 11%.			
Indicator 3 :	Component 1: Drained Area Brought Under Cultivation (Ha)			
Value (quantitative or Qualitative)	0	20,000	35,000	31,706
Date achieved	December 2006	March 2010	March 2015	February 2015
Comments (incl. % achievement)	Substantially achieved: Revised at AF. At project completion, the drained area brought under cultivation substantially achieved the revised target at 91%.			
Indicator 4 :	Component 1: Increase in Crop Productivity in Drained Lands Under Cultivation (wet season paddy, t/ha)			
Value (quantitative or Qualitative)		2		4.41
Date achieved		March 2010		January 2015
Comments (incl. % achievement)	Exceeded: New indicator was added at AF. At project completion, the productivity of <i>wet season paddy</i> exceeded its target by 121%.			
Indicator 5 :	Component 1: ASGs Operating at Financially Sustainable Levels (%)			
Value (quantitative or Qualitative)		85		83
Date achieved	December 2006	March 2010		January 2015
Comments (incl. % achievement)	Substantially Achieved: At project completion the total number of ASGs operating at financially sustainable level reached 83%, substantially achieving its target.			
Indicator 6 :	Component 1: Fishery Groups Reporting Increased Fish Productivity (%) (i) CIGs (ii) CTGs (iii) Beels			
Value (quantitative or Qualitative)		(i) 85 (ii) 80 (iii) 70		(i) 100 (ii) 100 (iii) 100

Date achieved		March 2015		January 2015
Comments (incl. % achievement)	Exceeded: New indicator was added at AF. At project completion all fishery groups reported increased fish productivity exceeding agreed targets.			
Indicator 7 :	Component 2: Farmers Participating in ATMA Demonstrations Adopt at Least 50% of the Technologies Demonstrated (%)			
Value (quantitative or Qualitative)		50		50
Date achieved	December 2006	March 2010		January 2015
Comments (incl. % achievement)	Achieved: New indicator was added at AF. At project completion the target was fully achieved.			
Indicator 8 :	Component 2: Dairy Cooperative Societies (DCS) Functioning(Number)			
Value (quantitative or Qualitative)	35	175		294
Date achieved	December 2006	March 2010	NA	March 2015
Comments (incl. % achievement)	Exceeded: At project completion, the total number of DCS that collected at least 100 liters of milk per day one year after formation exceeded its target by 68%.			
Indicator 9 :	Component 3: Villages Connected With Improved Rural Roads (Number)			
Value (quantitative or Qualitative)	189	1,350		1,423
Date achieved	December 2006	March 2010	NA	March 2015
Comments (incl. % achievement)	Exceeded: At project completion the total number villages connected with improved roads were 1423, which exceeded the target by 5%.			
Indicator 10 :	Component 3: Increase in traffic density on completed roads by 200%.			
Value (quantitative or Qualitative)	96	285		302
Date achieved	December 2006	March 2010		February 2013
Comments (incl. % achievement)	Exceeded: At project completion, the traffic density on new/improved roads reached 302%, which is 6% higher than the target value.			
Indicator 11 :	Component 3: Increase in Trading Volume of Improved Markets by 30% (Tons)			

Value (quantitative or Qualitative)	393	510		652
Date achieved	December 2006	March 2010		March 2015
Comments (incl. % achievement)	Exceeded: At project completion, the trading volume of improved markets exceeded its target by 28%.			

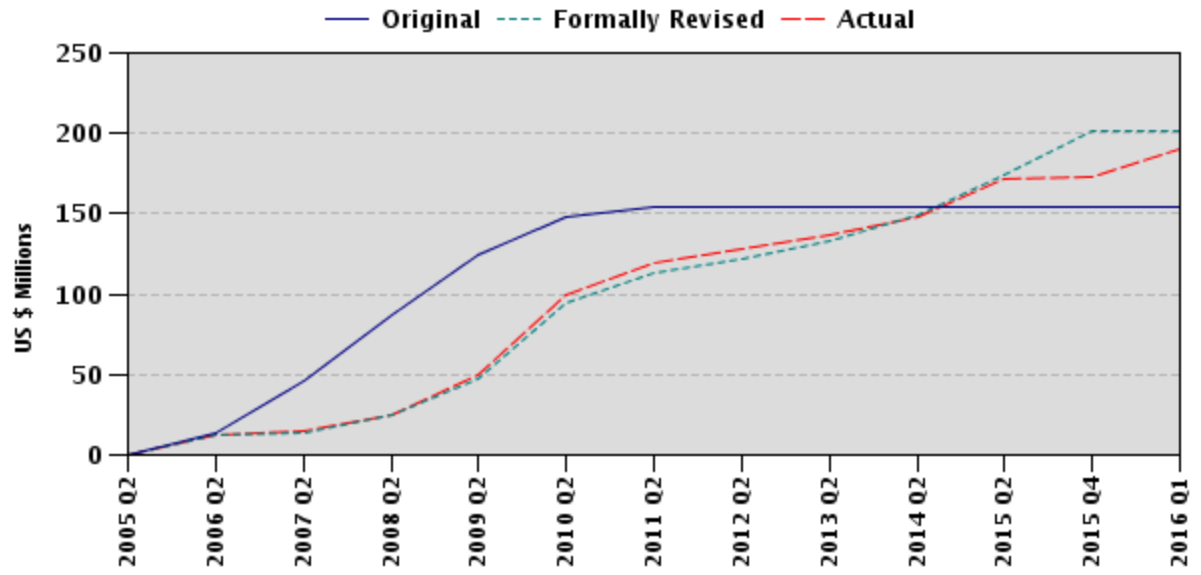
G. Ratings of Project Performance in ISRs

No.	Date ISR Archived	DO	IP	Actual Disbursements (USD Millions)
01	06/10/2005	Satisfactory	Satisfactory	12.50
02	12/14/2005	Satisfactory	Satisfactory	12.97
03	05/25/2006	Satisfactory	Satisfactory	13.37
04	07/12/2006	Satisfactory	Satisfactory	13.37
05	03/22/2007	Satisfactory	Satisfactory	15.21
06	10/05/2007	Satisfactory	Satisfactory	21.02
07	04/05/2008	Moderately Satisfactory	Moderately Satisfactory	32.89
08	12/21/2008	Moderately Satisfactory	Moderately Satisfactory	50.17
09	02/16/2009	Moderately Satisfactory	Moderately Satisfactory	52.12
10	11/08/2009	Satisfactory	Moderately Satisfactory	95.63
11	05/21/2010	Satisfactory	Satisfactory	104.89
12	12/11/2010	Satisfactory	Satisfactory	117.74
13	06/08/2011	Satisfactory	Satisfactory	124.37
14	01/16/2012	Satisfactory	Satisfactory	128.02
15	07/29/2012	Satisfactory	Satisfactory	133.79
16	12/14/2012	Satisfactory	Satisfactory	137.39
17	04/13/2013	Satisfactory	Satisfactory	145.87
18	10/26/2013	Satisfactory	Moderately Satisfactory	147.91
19	03/06/2014	Satisfactory	Moderately Satisfactory	149.99
20	10/23/2014	Satisfactory	Satisfactory	169.93
21	04/02/2015	Satisfactory	Satisfactory	171.67

H. Restructuring

Restructuring Date(s)	Board Approved PDO Change	ISR Ratings at Restructuring		Amount Disbursed at Restructuring in US\$ millions	Reason for Restructuring & Key Changes Made
		DO	IP		
09/27/2006	N	S	S	13.37	Matching grant for irrigation development was increased from 30% to 50% of total investment cost; requirement of farmers' mandatory borrowing to cover their part of investment cost was removed.
12/09/2009	N	S	MS	95.63	Project closing date was extended by 21 months until December 31, 2011.
09/20/2011	N	S	S	124.37	Unallocated amount of SDR10.5 million was reallocated to different expenditure categories.
10/28/2011	N	S	S	124.37	Project closing date was extended by 3.5 months until March 15, 2012.
03/14/2012	Y	S	S	128.02	Additional Financing and level I restructuring were done introducing following changes- Results Framework was revised; eight disbursement categories were consolidated into two categories and frequency of disbursement reporting was changed from SOE based to a quarterly report based disbursement (IUFRS).
12/10/2013	N	S	MS	147.91	Savings of SDR 6.5 million under Additional Financing resulted from depreciation of Indian Rupee were cancelled.

I. Disbursement Profile



1. Project Context, Development Objectives and Designs

1.1 Context at Appraisal

1. Assam is located in northeastern India and has a total population of 31.2 million, 86 percent of whom live in rural areas. Agriculture is the mainstay of the economy. At appraisal, agriculture, forestry, and fisheries jointly accounted for 31 percent of the state's gross domestic product (GDP) with direct bearing on Assam's rural non-farm economy.

2. Assam is a low income state with a high incidence of poverty. Poverty remains predominantly rural. At appraisal, 87 percent of the state's poor lived in rural areas with an unemployment rate more than twice the national average. The agriculture sector was characterized by rice-dominated farming systems and small farm size. Monsoon-based rice production systems in the Brahmaputra and Barak valleys accounted for about 70 percent of the net cropped area. Approximately 83 percent of farmers had less than two hectares of land, and limited capacity to invest in either capital works or crop inputs.¹

3. Assam's agriculture sector was performing poorly at appraisal. Between 1993-94 and 2001-02, agricultural GDP declined at a rate of 0.1 percent per annum compared with annual national agriculture GDP growth of 2.9 percent. Public investment in rural infrastructure such as rural roads, bridges and irrigation, and private investment in agriculture were very limited. Lack of irrigation was a major issue, especially during the dry season, when less than 20 percent of farmland was irrigated. Farmers had limited access to appropriate technologies, institutional credit, and markets. Livestock productivity was low as well.

4. The key constraints in agriculture and allied sectors were: (i) lack of capital to invest in irrigation and farm mechanization; (ii) inadequate market-linked technology transfer; (iii) low productivity of livestock and poorly performing livestock services; (iv) absence of the kind of effective producer organizations that would facilitate service delivery and the establishment of market linkages; and, (v) a poor rural road network and inadequate infrastructure connecting producers with markets. Livestock production was severely constrained by poor animal genetics. The fisheries sector was unorganized and underdeveloped.

5. To address these constraints, the Government of Assam (GoA) focused on providing an enabling policy environment. *The Agricultural Policy Paper* prepared in 2004 sought to expand shallow tube-well (STW) irrigation and farm mechanization, enhance research and extension services, and increase private sector involvement in farm

¹ Of the total farmers, 62% were marginal farmers with less than 1 hectare and 21% were small farmers with 1-2 hectares of land.

input supply to achieve higher productivity. The draft *Livestock Policy* promoted producer cooperatives and private sector marketing. The draft *Fish Seed Act* aimed to ensure the quality of fish hatchery outputs and protect fisheries biodiversity. Also, *the proposed amendments to the Assam Fisheries Rules (1953)* were to remove impediments to community management of oxbow lakes (known locally as *beels*) for fish production. *The Road Maintenance Policy* promoted the creation of government funding mechanism to support sustainable road maintenance. The implementation of these policy reforms was supported by several Bank-funded investment projects in the country, including the Assam Rural Infrastructure and Agricultural Services Project (ARIASP) launched in 1995.

6. There was a strong rationale for the Bank to support rural development in Assam through the project. The Bank's 2004 Country Assistance Strategy (CAS) promoted: (i) improving government effectiveness, fostering decentralized services, and community driven development; (ii) empowering local communities through investments; and (iii) promoting private sector-led growth through access to finance and development of private irrigation, community drainage, and all-weather road access. The project directly supported these objectives.

7. The project was to contribute towards the client's development objective of reducing poverty through upgraded infrastructure and improved physical access to market and social welfare services. It would do so by increasing farm productivity and family incomes, particularly those identified as small and marginal producers. It would also seek to improve sustainable natural resource management and community access to common resources.

1.2 Original Project Development Objectives (PDO) and Key Indicators

8. The original PDO was to increase the productivity and market access of targeted farmers and community groups. Key indicators of success would be increased yields of crops, fish and livestock products, and increases in the proportion of marketed surplus.

1.3 Revised PDO and Key Indicators

9. The PDO remained unchanged during project implementation. However, at Additional Financing, the Results Framework was amended to revise two PDO indicators and add a core indicator. Three new indicators were added and three revised in the list of Intermediate Outcome Indicators.

1.4 Main Beneficiaries

10. At appraisal, it was estimated that over 410,000 farmers and other producers across the agriculture, fishery, diary, forestry, and livestock sectors were to benefit directly from project interventions. The interventions were to focus predominantly on the most disadvantaged sections of farming community including small and marginal farmers, and traditionally socially excluded groups.

1.5 Original Components

11. The project had three components: (i) Investment Grant Scheme; (ii) Agricultural Services and Market Chain Development; and (iii) Infrastructure Development. The investment grant scheme-related activities were to be implemented in all 24 districts of Assam under the original credit. The agricultural services, marketing, and infrastructure development activities were to be implemented in selected districts, where the prospects for agricultural growth and poverty reduction were considered to be the highest.

12. **Component 1: *Investment Grant Scheme*** (US\$98.40 million).² The first component aimed to address two principal constraints: the lack of available investment capital and the limited capacity of farms and rural communities to undertake activities to increase productivity. The Investment Grant Scheme comprised three subcomponents: (i) irrigation development; (ii) farm mechanization; and (iii) fish production.

13. **Component 2: *Agricultural Services and Market Chain Development*** (US\$44.61 million).³ The second component aimed to address three principal constraints: the inadequacy of existing market-linked technology transfer, the absence of producer organizations with links to markets, and the low productivity of livestock resources. It consisted of seven subcomponents: (i) farm advisory services; (ii) marketing extension; (iii) livestock upgrading; (iv) fish seed; (v) milk marketing; (vi) forestry; and (vii) a project coordination unit.

14. **Component 3: *Infrastructure Development*** (US\$148.59 million).⁴ The third component aimed to address the poor rural road network and inadequate rural market infrastructure. It consisted of two subcomponents: (i) roads and bridges; and (ii) rural markets.

1.6 Revised Components

15. There was no change in the three components and twelve subcomponents during project implementation.

1.7 Other significant changes

16. During project implementation, an Additional Financing, one level-I restructuring, and five level-II restructurings were approved and implemented. An Additional Financing was approved in March 2012 to scale up the project activities and enhance its development impacts. This expansion and consolidation was pursued through policy initiatives to develop synergies between project activities and ongoing state and national government schemes to establish a system for sustainable groundwater use, encouraging more private

² The amount for the original project was US\$66.23 million and for the Additional Financing US\$ 32.17 million.

³ The amount for the original project was US\$32.22 million and for the Additional Financing US\$ 11.39 million.

⁴ The amount for the original project was US\$115.88 million and for the Additional Financing US\$ 32.17million.

sector participation. This is in addition to continued investments in irrigation, drainage, mechanization, extension, rural markets, roads, and access to markets in selected districts.

17. The Results Framework was revised under Additional Financing, consolidating eight disbursement categories into two (with a common reimbursement percentage of 80 percent). The frequency of disbursement reporting was changed from SOE based to a quarterly report based disbursement (IUFRS).

18. The following changes were introduced as part of one level-I and five level-II restructurings.

- i) On September 27, 2006 (level II restructuring) the matching grant provided to farmers for irrigation development was increased from 30 to 50 percent of the total investment cost, and the requirement of farmers' mandatory borrowing from commercial banks to cover their part of the investment cost was removed.
- ii) On December 9, 2009 (level II restructuring) the project closing date was extended by 21 months (to December 31, 2011) to complete the remaining project activities.
- iii) On September 20, 2011 (level II restructuring) a reallocation of credit among expenditure categories was done to utilize the un-allocated amount of SDR10.5 million.
- iv) On October 28, 2011 (level II restructuring) the project closing date was extended by 3.5 months (from December 2011 to March 15, 2012,) to provide the necessary implementation support to the project and also to complete the preparation of Additional Financing.
- v) On March 14, 2012 (level I restructuring) Additional Financing and restructuring revised the results framework and consolidated eight disbursement categories into two categories. The frequency of disbursement reporting was changed from SOE based to a quarterly report based disbursement (IUFRS).
- vi) On December 10, 2013 (level II restructuring) savings in the amount of SDR 6.517 million of the credit (US\$10 million equivalent) under Additional Financing were cancelled. These savings resulted from significant depreciation of the Indian rupee against US dollar at that time.⁵

⁵ Between March 2012 (AF appraisal) and December 2013, Indian Rupee depreciated by 24% against US\$ (from INR 50: US\$1 to INR 62: US\$1) resulting in significant savings of project proceeds in domestic currency terms.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

19. The overall project design was robust and satisfactory. The project supported the GoA's initiative to carry out substantive reforms in the public agricultural extension system to make it more pluralistic, improve collaboration between line departments, and introduce pilot changes in the planning of agricultural extension and utilization of government funds. The project design also supported GoA's program to upgrade the productive capacity of livestock and fish resources, and to invest in critical rural infrastructure including rural roads, bridges, and market yards.

20. The project drew lessons from earlier Bank-financed projects including the Diversified Agricultural Support Project, which promoted community participation and para-veterinary program development, and the National Agricultural Technology Project, through which the concepts of Agricultural Technology Management Agency (ATMA) and farmer organizations were piloted.

21. The project was ambitious in its scale and scope. It was implemented across all 24 districts of the State. It promoted policy and institutional reforms; changes in the planning and decision making processes of agricultural extension; training and capacity building; and community mobilization. The project management involved coordination across seven line departments, the State Agriculture University, and NGOs.

22. In the project design, specific measures were introduced to mitigate potential impacts of identified risks. These measures included selective use of contract staff, well-focused training programs for project staff, and seeking GoA's assurance to keep crucial staff in position during implementation. The introduction of the ATMA model required inter-agency collaboration at district level and below, and promoted the engagement of NGOs and private service providers during project implementation. To minimize political interference in road selection, the preparation of the Project Operations Manual clearly defined the selection criteria focusing on vulnerable groups and poor communities. This was incorporated into a loan covenant. A loan covenant was also introduced to ensure adequate funding for the maintenance of rural roads. The following covenants were also included to ensure the sustainability of livestock sector interventions: (i) the Assam Livestock Development Agency (ALDA) should develop a business plan to support sustainable artificial insemination (AI) and breed improvement services, and (ii) that AI services should operate on full-cost recovery basis.

2.2 Implementation

23. Overall project implementation was satisfactory. Overcoming the initial delays in implementation, the project was able to deliver all key results and exceeded most of the

output and outcome targets (see Results Framework in Datasheet). The conduct of the project was flexible and responded effectively to various challenges encountered during implementation. These challenges and issues and how the project responded to them are discussed below.

24. The project got off to a slow start primarily due to: (i) an unrealistic implementation schedule, which did not allow sufficient time for start-up activities and community mobilization; (ii) delays in filling critical positions; (iii) weak financial management, monitoring and evaluation; (iv) difficulties in using International Competitive Bidding for procurement of pump sets; and (v) excessive centralization of decision making at the project coordination unit (PCU). At the Mid-Term Review (MTR) in February 2008, with 54 percent of the project time already elapsed, only 16 percent of the total credit amount was disbursed. This led project implementation progress to be downgraded to *Moderately Satisfactory*. Project management and financial management were downgraded to *Moderately Unsatisfactory*.

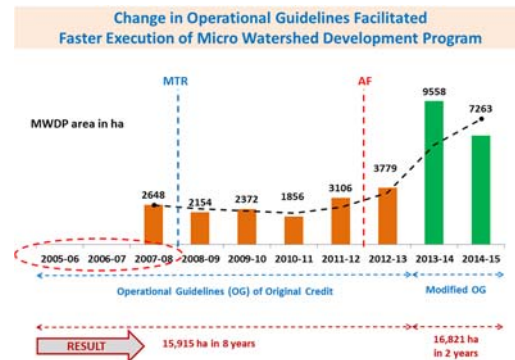
25. Risks and critical issues affecting implementation were identified jointly by Bank teams and implementing agencies (IAs) during MTR and support missions and well-defined and time-bound action plans were agreed upon with the GoA to address them. After MTR, the GoA took decisive measures to rectify a number of such issues. These included filling vacant positions, improving weak M&E and financial management systems, devolving authority to the implementing agencies, simplifying administrative procedures, streamlining fund flow arrangements, improving management effectiveness, and community procurement of assets. These changes led to improved implementation from mid-2009 onwards. The appointment of a fully committed new Project Director and Agriculture Production Commissioner was a critical factor in turning the project around.

26. Since 2010 until its closing date, the project progress has been consistently *Satisfactory* except for 2013/2014, when implementation pace slowed down (and the rating was downgraded to *Moderately Satisfactory*) due to weak performances of livestock, rural road, and market development activities. Periodic flooding in some areas and short construction seasons exacerbated the situation. At closing, the project had delivered all key outputs and outcomes, exceeding most of its original and revised targets. Bank supervision missions provided constructive guidance which was for the most part followed by the IAs.

27. In general, the project was highly responsive to changing needs and emerging issues. Overall, government commitment was strong, and stakeholders' engagement and participatory processes were satisfactory and beneficiary response was encouraging. Being a flagship project of the GoA, progress was periodically reviewed by the Chief Minister of Assam. A number of factors were instrumental in the improvements seen

during the course of the project, particularly during later phases of its implementation, and are summarized as follows.

i) *Simplification and streamlining of project implementation procedures including changes in Operational Guidelines of AF.* The micro watershed development program was introduced on 15,919 ha of land during the first eight years of the project. During the last two-and-half years, the watershed program expanded to cover an additional 16,821 ha – as the result of simplification and streamlining of procedures.



ii) *Improved M&E system.* The M&E system was revitalized and its performance was improved as a result of increased attention of the new project management team and persistent coaching efforts on the part of Bank supervision missions. This in turn helped the new project management team to recognize key issues affecting implementation more quickly and take actions in timely manner. This was one of the key factors contributing to the eventual success of the project.

iii) *Enhanced quality control systems.* Quality control mechanisms were operationalized for community-level and infrastructure investments, including enhanced audit scope for physical verification of community assets; third party supervision consultants for monitoring road and bridge activities; and GIS-based information system for spatial mapping all irrigation pumps along with water quality parameters. These measures helped improve the pace and quality of project implementation.

iv) *Greater transparency at community level,* including disclosure of ineligible applicants under irrigation and mechanization sub-components, disclosure of the beneficiary list, consultations with market participants, and use of road development committees enhanced project performance. Social audits undertaken for the community institutions (especially for Joint Forest Management Committees [JFMCs]) brought greater transparency to field-level implementation.

v) *New performance-based contracting system* for NGOs developed and implemented after the MTR significantly improved the performance of NGOs in executing field activities with communities.

vi) *Introduction of parent-child fund flow and accounting system* enabled the project to reduce the time required for payment to beneficiaries almost 10 times and brought in a significant efficiency in implementation.⁶

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

28. Overall, the M&E system of the project was well designed, and was used effectively.

29. ***M&E Design.*** M&E was designed to be comprehensive. It consisted of three elements: (i) Implementing departments and agencies regularly monitored and reported physical and financial inputs and outputs; (ii) Third party M&E consultants monitored and evaluated project processes, quantifying short-term outputs and outcomes; and (iii) The same M&E consultants carried out a baseline study, and comprehensive impact analysis reports during the MTR and at project completion. The M&E mechanism emphasized stakeholder participation and was designed to facilitate rapid identification of shortcomings and problem areas and facilitate timely corrections. Some PDO-level and intermediate-level outcome indicators in the Results Framework were too general to be suitable for monitoring progress. In March 2012, the Results Framework was revised as part of Level-I restructuring, during which at PDO level two indicators were revised and one indicator was added. At the Intermediate Outcome level, three indicators were revised and three added.

30. ***M&E Implementation.*** Important physical outputs and outcomes were regularly monitored through a Management Information System (MIS). Early on, monitoring failed to identify a number of issues because of problems with the indicators being used. The QALP-2 noted that at the time, the project had no indicators disaggregated by social group or gender, and performance indicators were poorly defined. After the MTR however, the system was revitalized and its performance improved owing to the efforts of the new project management team and to coaching by the Bank team during supervision missions.

31. The third party M&E consultants conducted a baseline survey, and two (midterm and final) impact analysis reports in 2010 and 2015. The combined sample size of these two reports comprised of data for 25,000 households including control groups. The reports found important progress in key indicators, progress which was corroborated by a number of specialized assessments that were commissioned by the project. The quality of data collected by the M&E consultants was further triangulated and verified through field visits, MIS data, and by employing technological advancements such as GIS (GIS for example, monitored water quality and Joint Forest Management Committees). Some of the M&E

⁶ The time required for payment was reduced from 30-60 days to 3-7 days.

arrangements developed and strengthened by the project (social auditing in JFMCs and third party supervision consultants for roads) were mainstreamed into GoA systems.

32. ***M&E Utilization.*** The utilization of M&E information was effective and the implementation feedback mechanism was responsive. Timely information on project progress was obtained through quarterly and annual reports and project management was able to make decisions based on the information. Some of the data was used as the basis for a Geographic Information System (GIS), which the MIS used to track progress on installations of STWs/LLPs and other field level studies. The two impact analysis reports were extensively used by project management and Bank supervision and ICRR preparation teams.

2.4 Safeguard and Fiduciary Compliance

33. ***Social Safeguards.*** Compliance with social safeguards was satisfactory. The project triggered Bank safeguard polices on Involuntary Resettlement (OP/BP 4.12) and on Indigenous Peoples (OD 4.20). A social assessment carried out during appraisal identified social issues that led project design to focus on inclusive service delivery among other matters. Screening criteria were developed to target Scheduled Tribes and Scheduled Caste and other vulnerable groups. The consultation strategy was based on free, prior informed consent to ensure that more than 18 percent of project beneficiaries belonged to Scheduled Tribes (higher than the state average of 12 percent). The Resettlement and Participatory Framework was developed to address any adverse impacts resulting from investments in road sector. No one was displaced and the project remained in compliance with Bank Social Safeguard Policies throughout implementation.

34. ***Environment.*** Compliance with environmental safeguards was highly satisfactory and the Environmental Management Framework (EMF) was fully implemented. The project's safeguards arrangements shifted the goalpost on monitoring of groundwater quality across the state and mainstreamed this in the sector. It developed a science and evidence based strategy for deploying the shallow tube wells through a safe yield of groundwater study and put in place a strict water quality monitoring system against arsenic and fluoride under which over 78,000 samples were tested and spatially mapped. The EMF implementation has led to exemplary best practices such as a state-wide ground water monitoring system installing piezometers with telemetric digital water level recorders linked to a central server through GSM network to provide data on ground water levels on continuous basis for ensuring sustainable ground water use and management. This is the largest database on groundwater quality for a single state in India. Under the safeguards arrangements, impact studies were commissioned on the introduction of exotic carps for minimizing impacts on local fish diversity. It put in place mitigation actions for ensuring that the wetlands and *beels* remained unaffected by project interventions. In addition to implementing the EMF, internal audits and a third party external audit of

compliance with safeguards arrangements were undertaken. Together, these kept management fully and regularly informed about the status of safeguards compliance. The Environment Management Unit (EMU) was staffed with two technically qualified consultants supporting the environmental specialist-cum-forest coordinator, who was responsible for environmental management.

35. *Procurement* performance was satisfactory. The risk associated with procurement was rated moderate during implementation. Because of decentralized procurement and limited capacity of line agencies, the PCU provided a summary of procurement manual/guidelines, including a detailed list of frequently asked questions. Procurement was carried out in accordance with agreed procedures, despite highly decentralized schemes involving multiple implementing agencies. Transparency was generally solid with different parties overseeing each other. In spite of the large number of schemes undertaken, there were very few cases of complaints and these were promptly attended to by the PCU. Equally important, community participation in procurement was very effective.

36. A number of training programs in procurement and contract management were used. Procurement capacity was built at PIUs as well as at other implementing agencies, and there were improvements over time in annual post-procurement reviews. The innovative farmer friendly community procurement model of AACCP for irrigation, mechanization and fisheries sub-component, gives authority of procurement decisions to the farmer groups. The Bank and the Government of India (GoI) recognized this model as one of the 'good practices' which was published in a document captioned "Innovation in Development." The GoI circulated this document to all the states for adoption. The model also received national and international recognition.

37. *Financial Management* was satisfactory. During the initial project implementation period, the financial management of the project was weak, causing major concerns and delays. After the new project team's renewed efforts, the performance of financial management system improved significantly. The accounting and reporting system functioned well at state, district and field levels. A three-tier accounting system included the PCU at the central level, PIUs at the department level and district level for field level activities. The staffing plan at various levels was well developed during project preparation and was successful in spite of some delays in filling vacant positions. The project received the government counterpart funds in a timely manner due to high level of commitment by the GoA. The flow and release of funds to multiple departments followed the state level system as well as criteria developed during the project design stage to meet needs likely to arise during the life of the project. The e-fund transfer and banking arrangements in the project were well-organized. To ensure efficient and economical transfer of funds, all accounting centers maintained bank accounts with branches of one of two nominated banks having a widespread core-banking network in

the state, as determined by the PCU. All district level offices of the implementing line departments and ATMA societies (in some cases at the state level directorate) maintained accounts in commercial banks. The verification process against the laid-down criteria, which were strictly followed by the PCU, helped prompt transfer of funds directly to the bank accounts of the accounting centers. The project consistently complied with the legal covenants through the timely submission of interim unaudited financial reports (IUFs) and external audit reports. The audit reports were clean, and the few issues that were flagged were quickly resolved.

2.5 Post-completion Operation/Next Phase

38. Starting April 1, 2015 the twelve ATMAs developed under the project were supported through GoI-funded regular agricultural extension programs. Support for shallow tube wells, low lift pumps, and farm implements was provided through the centrally sponsored scheme *Rashtriya Krishi Vikas Yojna* (RKVY). The departments of agriculture, fisheries and animal husbandry continue to provide technical services to farmers, fishers and livestock rearers through training, demonstrations, field days, and farmer fairs.

39. The GoA has submitted a new GoI approved project proposal entitled “Assam Agricultural Commercialization and Rural Transformation Project” for World Bank support. The proposed project would further strengthen the institutions that were set up under this project, scale up a number of its interventions, and expand its scope into marketing, agribusiness, and value chain development. Road connectivity and market access in the State is being further improved by the ongoing Bank-funded “Assam State Roads Project” since April 2012. Funds for continued support to Farmer Producer Organizations and ground water monitoring have been committed by the ARIAS Society.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design, and Implementation

40. The project objectives were highly relevant to GoI’s National Agricultural Policy and the Tenth (2002-2007) Five Year Plan (FYP), and continue to remain so for the Eleventh (2007-2012) and Twelfth (2012-2017) FYP. The objectives also remain consistent with GoA’s current strategy for reducing rural poverty and increasing income through upgraded infrastructure and improved physical access to market and social services by rural population.

41. The project objectives were highly relevant and complementary to the Bank’s India Country Assistance Strategies (CAS) 2005-2008, and remained so for the Country Partnership Strategies (CPSs) of 2009-2012 and 2013-2017. It promoted inclusive agricultural and rural growth through innovative investments in farms, rural roads and markets, and effective technology transfer for increased agricultural productivity.

42. The project design was very much in line with GoA's policy of promoting decentralized, demand-driven, agricultural extension services and empowering grass-root level beneficiaries. The project was designed to focus primarily on small and marginal landholders, landless farmers, and poor fishing communities continue to be among the poorest of India's poor. A decentralized extension service (based on a bottom-up approach) focusing on marginal and small farmers continues to be the core of GoA's current policy and, accordingly, confirming the continuing high relevance of the project design.

43. Implementation was consistent with GoI's development priorities and focused on economic growth and poverty reduction in one of the country's poorest states, with low income and high poverty incidence. Project implementation supported GoA's continuing policies to enhance the institutional capacity of government departments and community organizations by mainstreaming improved policies and best practices into their regular operations. Moreover, implementation is fully consistent with ongoing national and state policies of consolidating devolution and decentralization.

3.2 Achievement of Project Development Objectives

44. The PDO was fully achieved. As shown in summary table below, out of six PDO level indicators, five exceeded and one substantially achieved their original targets.

Summary Table: Achievements of PDO Indicators

PDO Indicator	Baseline Value	Target	Achievement	Achievement/Target
Indicator 1: Increase in crop yields (t/ha)				
Paddy (dry season)	1.5	5	5.5	110%
Mustard	0.6	0.8	1.1	138%
Cabbage	7	8.5	10.6	125%
Cauliflower	5.6	7	9.8	140%
Indicator 2: Increase in fish productivity (t/ha)				
Ponds	0.485	2.75	3.5	127%
Tanks	0.85	2.25	2.3	102%
Beels	0.48	0.75	1.6	213%
Indicator 3: Cropping intensity (%)				
Cropping intensity	130	195	200	103%
Indicator 4: Crop diversification (%)				
Area under cereals	83	80	65	81%
Area under high value crops	17	20	35	175%
Indicator 5: Increase in marketed surplus (%)				
Paddy (dry season)	18	45	26.1	58%
Mustard	17	45	64.5	143%
Vegetables	28	65	99.5	153%
Indicator 6: Project beneficiaries (No.)				
Total project beneficiaries		410,000	565,745	138%
Female project beneficiaries		82,000	83,744	102%

45. Yield increases of all key crops exceeded their targets by between 10 and 40 percent, with yields of high value crops such as mustard and cauliflower increasing the most (*PDO Indicator 1*). Also, productivity increases in fisheries exceeded their targets by between 2 and 113 percent (*PDO Indicator 2*). Cropping intensity exceeded its target by 3 percent (*PDO Indicator 3*) and increases in areas under high value crops (mainly vegetables and oilseeds) exceeded its target by 75 percent (*PDO Indicator 4*). Marketed surpluses for mustard and vegetables exceeded their targets by 43 and 53 percent respectively (*PDO Indicator 5*) revealing a strong trend towards diversification into high value crops. At project completion, the total number of direct project beneficiaries reached 565,745 exceeding its target by 38 percent (*PDO Indicator 6*). Around 15 percent of direct project beneficiaries were women.

46. Of 11 Intermediate Outcome Indicators, eight exceeded, one fully achieved, and two substantially achieved their original targets. The specific project outcomes achieved under various interventions are discussed below. The full details are in Section F (a) of Data Sheet and in Annex 2. A number of key achievements at the component level are highlighted below.

47. *Component A: Irrigation, Farm Mechanization, Fisheries.* The project brought about important, long-term transformation in target areas by successfully promoting simple- and yet proven- and cost-effective irrigation and agricultural technologies including shallow tube wells (STW), low lift pumps (LLP), and targeted farm mechanization. At project closing, a total of 100,000 STWs were installed in the project area exceeding its target by 11 percent.⁷ This brought additional 281,706 ha of land under assured irrigation (exceeding the target by 11 percent⁸). This addressed the key constraint that the farmers were facing in the project area- water shortage during the dry season. Average paddy yield under drained area reached 4.41 t/ha, exceeding its target by 121 percent.⁹ Farm mechanization enabled farmers to save between 16 and 25 days annually.¹⁰

48. To ensure the long-term sustainability of investments in irrigation and farm mechanization, the project facilitated the formation of 118,200 Agro-Service Groups

⁷ Intermediate Outcome Indicator 1: Installation of 90,000 STWs.

⁸ Intermediate Outcome Indicator 2: Area under STWs to reach 225,000 ha; Intermediate Outcome Indicator 3: Area to be drained and brought under cultivation 35,000 ha.

⁹ Intermediate Outcome Indicator 4: Productivity of paddy during wet season to reach 2 t/ha).

¹⁰ Under farm mechanization support scheme, 2,000 tractors and 1,100 tillers power were provided to farmers.

(ASGs). At project completion, 83 percent of AGSs were functioning financially sustainable achieving the target by 98 percent.¹¹

49. Micro watershed drainage support schemes supported floodplain communities in restoring natural drainage lines and reducing water logging and crop losses. This brought nearly 32,000 ha of previously unused areas under cultivation, and provided farming communities with significant opportunities to improve their livelihoods and income.

50. The project demonstrated semi-intensive fish cultivation covering around 6,125 ha. The productivity increase was phenomenal. Average productivity in ponds increased from 0.5 tons/ha to 3.5 tons/ha. About 3,200 fish farmer's groups were established with more than 72,000 members. All project beneficiaries under ponds, community tanks, and *beels* schemes reported increased productivity, exceeding their target by 28 percent.¹²

51. The project established, first time in India, a statewide comprehensive online groundwater monitoring system to prevent overexploitation and to better manage ground water and also introduced a mandatory groundwater testing system for arsenic, fluoride, iron, and hydrocarbon in water samples. The project also facilitated the enactment of the Assam Fish Seed Act (2005) and its *Rules (2010)* aimed to improve quality standards in fish seed production and marketing by enforcing regulatory measures.

52. The project has pioneered a highly innovative community-procurement system with unique procurement process that not only enhanced community role in procurement decision making, but also brought in the economies of scale that enabled beneficiary farmers to buy pumps at rates cheaper than the market rates without compromising on the quality. The GoA has mainstreamed this process in their programs.

53. *Component B: Agriculture Extension Services and Market Chain Development.* The project established the new Agriculture Technology Management Agencies (ATMAs) in 12 districts with training facilities for farmers, extension workers, and local public officials. Under ATMAs, an estimated 590,000 farmers adopted new and improved agricultural technologies. More than half of the farmers, who participated in ATMA demonstrations adopted the new technologies fully achieving the project target.¹³ Based on the success of ATMAs, the GoA designated ARIAS Society as the nodal agency for oversight of the entire ATMA program in Assam, including 14 ATMAs set up under the centrally sponsored scheme funded by GoI (see para 75 for more discussions on ATMA).

¹¹ Intermediate Outcome Indicator 5: 85% of all ASGs to achieve financial sustainability.

¹² Intermediate Outcome Indicator 6: Fishery groups reporting increased fish productivity by 70-85%.

¹³ Intermediate Outcome Indicator 7: Farmers participating in ATMA demonstrations adopt at least 50% of technologies demonstrated.

54. The project financed production of 9,000 tons of certified and truthfully labeled seeds of self-pollinated crops in the demonstration plots, significantly improving seed replacement rates in the ATMA districts. Other notable achievements include supply of pure- and cross-breed bucks and boars to genetically upgrade goats and pigs. ATMA also facilitated farmers' access to credit through Kisan Credit Cards scheme.

55. The project supported development and expansion of an Artificial Insemination (AI) program to increase the productivity of dairy animals in Assam, which resulted in birth of 789,000 calves, where crossbred females achieved an average milk productivity five times higher than local/non-descript cows. After initial trials of private-sector based IA service (Gopal Mitras) with mixed results, AI services were rendered sustainably through the West Assam Milk Union Producers Cooperative Limited (WAMUL). The project facilitated the management takeover of the originally defunct dairy plant of WAMUL by the National Dairy Development Board (NDDB), which led to revival of the plant and a 12-fold increase in formal milk procurement.¹⁴

56. The project supported the formation of 1,300 livestock producer groups.¹⁵ These comprised some 18,000 beneficiaries, enhancing their access to informal and formal markets, and input supply services. It made a significant contribution to market development particularly for the dairy sector. The dairy producer groups helped farmers sell their products at higher prices. At project closing, the number of well-functioning Dairy Cooperatives Societies (DCSs) reached 294 exceeding its target by 68 percent.¹⁶

57. The project also supported formation of Farmer Producer Organizations (FPOs) in five districts with a total membership of 17,000 farmers. The FPOs were linked to wholesale distributors of agriculture inputs, including fish feed, thus facilitating competitive access of FPO members to input markets. The project supported establishment of a *Pilot Enterprise Development Grant Fund* (PEDGF), under which some 491 commodity focused marketing groups were mobilized, market extension trainings were provided to understand market dynamics, price fluctuation and new opportunities. The project helped strengthen the capacities in the Forest Department (FD)

¹⁴ Between 2008 and 2014, the daily procurement of fresh milk through WAMUL increased from 2,700 liters/day to 32,000 liters/day.

¹⁵ This includes formation of 312 dairy groups (Dairy Cooperative Societies), 361 MPI, 250 groups for pigs and 300 groups for goat.

¹⁶Intermediate Outcome Indicator 8: The number of DCSs that collect at least 100 liters of milk per day one year after their formation to reach 175.

and participating communities for applying new and innovative approaches for community forestry.

58. *Component C: Development of Rural Roads and Local Market Infrastructure.* The project improved the connectivity between 1,423 villages and nearby centers by upgrading and rehabilitating 1,793 kilometers of rural roads. At project completion, the traffic density on improved roads has increased by more than three times compared to baseline (exceeding the target by 6 percent¹⁷) and average travel time of a motorized vehicle on upgraded and rehabilitated roads has reduced by 41 percent. This rendered significant economic and social benefits to large number of local populations by improving farmers' connectivity to market and providing rural residents with better access to health, education, and other social services.

59. The project's road rehabilitation activities leveraged the GoA to significantly increase the regular budget for road maintenance.¹⁸ Though delayed, the project also helped the GoA establish a dedicated Road Maintenance Fund and facilitated the establishment of the Assam State Road Board – an apex body for policy making and managing externally funded road projects. The Resettlement and Rehabilitation Policy that was prepared as a part of project preparation was moreover mainstreamed statewide in the road sector. With project support, the Road Research Laboratory Facility (recently reconstituted as the Assam Road Research and Training Institute) was revived and is currently playing important roles in training and capacity building.

60. The project also upgraded 93 wholesale markets and *haats*, which resulted in increase in traded volume by 66 percent – substantially exceeding the target of 27 percent.¹⁹ The number of traders participating in the markets increased by 51 percent. The lease values of markets have increased by 79 percent.

3.3 Efficiency

61. The overall economic efficiency of the project was found to be *high*. Costs and benefits were estimated at 2014 prices with a 12 percent opportunity cost of capital (Annex 3). At appraisal, the project was expected to yield a Financial Internal Rate of Return (FIRR) of 19.9 percent and an Economic Internal Rate of Return (EIRR) of 21.4 percent by completion. Based on data generated by large scale independent impact assessment studies conducted in 2010 and March 2015 (which included more than 25,000 respondents), FIRR was calculated at 22.2 percent and EIRR at 24.7 percent at completion.

¹⁷ Intermediate Outcome Indicator 10: The traffic density on completed roads to reach 285.

¹⁸ From 2004 to 2011, the GoA spent INR9,903.4 million on the maintenance of roads in the state, which is 89 percent higher than the target budget agreed with the Bank at project appraisal.

¹⁹ Indicator 11: Increase in trading volume of improved markets by 30% against baseline value.

62. These results were based on very conservative assumptions regarding benefits. In the agricultural models, for example, it was assumed that the increased cropping intensity by participants would result in reduced time for previous off-farm wage earning activities, and control group benefits were increased to include such wages. Furthermore, no attempt was made to quantify benefits arising from multiplier effects, downstream job creation (e.g. in food processing), or for wider financial or economic benefits arising from improved access roads, beyond those specifically affecting producers. It is also important to note that the actual economic efficiency of the project is much higher than the above estimates given that 95 percent of project beneficiaries were landless, marginal and small farmers, who benefited with an average net income increase equivalent to around 40 percent of 2014 poverty line. This clearly has a significant poverty reduction impact because of distribution effects of net benefits (see paras 69 and 70).

63. The financial analysis was conducted comparing the effects of drainage, irrigated agriculture, livestock, fisheries, mechanization (agriculture machinery rental), and physical infrastructure on farm income. These activities accounted for 86 percent of Bank expenditure. Results show that the project enabled farmers to generate substantial financial benefits. Average farm household incomes among participants in agricultural activities increased by 57 percent (drainage) and 39 percent (irrigation and technical services) compared to the control group. Members of farmer groups receiving tractors increased their incomes by 32 percent over the other irrigation and technical services recipients.

64. Significant improvements were also noted in both cropping intensity, as a result of the expansion of off-season cropping, and in the proportion of high value crops grown (principally vegetables).

65. The economic analysis was carried out to assess the project's economic performance. Prices were adjusted through the use of parity prices (for rice) and through Standard Conversion Factors (SCF) for non-traded goods. The analysis used the same models as those developed for financial performance. These were then aggregated for the entire project taking all project costs into account. Increased productivity and diversification into higher value crops were the principal benefits.

3.4 Justification of Overall Outcome Rating

Rating: *Satisfactory*

66. The PDO was highly relevant to the development priorities of GoI and GoA by supporting productivity growth and competitiveness of agriculture sector dominated by marginal and small farmers, and landless. The project fully achieved its PDO as demonstrated by increased agricultural productivity, more diversified agriculture, and greater market access by farmers on a sustainable basis in the project areas. All project outcome indicators as measured by higher crop yields, higher cropping intensity,

enhanced crop diversification, and increased marketable surplus have been either met or exceeded.

67. The project was also instrumental in bringing about major policy reforms in Assam's agriculture and rural infrastructure sectors, and made significant contributions in developing and strengthening new institutions like ATMAs, farmer groups, and producer organizations. It also successfully mobilized local communities and built social capital which is crucial for the long-term sustainability of project benefits.

68. In view of highly relevant PDO, robust project design, effective implementation, and overall efficiency, the overall project outcome is rated as *Satisfactory*.

3.5 Overarching Themes, Other Outcomes and Impacts

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

69. *Poverty Impacts.* While the overriding objective of the project was to stimulate growth in Assam's agricultural economy, the project interventions were purposefully pro-poor, and by design focused primarily on small and marginal landholders, poor fishing communities, and the landless farmers. Of total 566,000 project beneficiaries directly participated in the project, 17 percent were landless farmers, 47 percent were marginal farmers (with less than 1 ha of land), and 31 percent were small farmers (with less than 2 ha of land). Participating farmers increased their income significantly more than control groups. And this significantly decreased the proportion of household expenditures that need to be devoted to purchasing food or paying for education.

70. The average estimated net income gain per beneficiary household was about 40 percent of the estimated household poverty line in 2014 demonstrating a potentially very strong poverty reducing impact of the project. Moreover, more than 40 percent of all beneficiaries have had an impact of at least 66 percent of the estimated 2014 household poverty line suggesting a considerable improvement in living conditions as a result of the project. The project has therefore made a clear, positive and significant change in the income distribution pattern of the project participants. Other non-monetary benefits of the project include improvement in household food security status. Likewise, the gains in the value of household own consumption and food stocks were found to be considerable, especially for the poorest. Annex 3 provides more details of project activities' impact on household welfare.

71. *Gender.* Although no specific gender development strategy or action plan was developed for the project, the project provided extensive support to activities in which women were predominantly involved: 56 percent of the beneficiaries of fisheries activities and 43 percent of the beneficiaries of livestock activities were women. The project also

ensured that women were adequately represented in the community procurement and social audit committees.

72. *Social Development.* Traditionally socially excluded groups accessed project benefits across all sectors. Almost 50 percent of direct beneficiaries belonged to scheduled castes, scheduled tribes, and other disadvantaged communities. Screening criteria for selection of beneficiaries to enhance social inclusion were adopted across all sectors. The fishery sub-component rendered benefits to a significant proportion of vulnerable communities. 36 percent of the beneficiaries were small farmers and 27 percent were members of scheduled tribes. In livestock sector, 54 percent of the beneficiaries were members of scheduled caste and scheduled tribe and other backward communities. The local communities also built significant social capital through social mobilization activities such as forming of producer's groups across various sectors.

73. The institutional maturity analysis indicates that local institutions have sustained their membership and farmers have increased their income, enabling them to utilize additional resources for other social needs such as improved housing, clothing, education, health care, and diversified diets.

74. The amendment of Fishery Rule 1953, which was approved with direct project facilitation, has had major implications for social development, protecting the interests of women and other vulnerable members, and the rights of cooperatives of fishers.

(b) Institutional Change and Strengthening

75. The project has had a significant impact on institutional development. The establishment of ATMAs in 12 districts emerged as an effective and participatory means of transferring technologies to farmers in response to the needs they articulate. The model established by ATMA: (i) decentralized planning, funding and implementation of technology dissemination to district, block and village level; (ii) institutionalized farmer and other stakeholder representation on the ATMA Governing Board and the block-level Farmer Advisory Committee (FAC) to shape and approve extension programs; (iii) promoted convergence of separate extension activities of the different line departments into a single integrated system covering crops, horticulture, livestock, fisheries and marketing; and (iv) organized farmers into commodity or common interest groups. The ATMA model has proven to be acceptable and cost-effective for making state line department staff responsive to farmers' needs. Based on the success of AACP ATMAs, GoA designated SPD as the Nodal Officer and ARIAS as the Nodal Agency for oversight of the entire ATMA program in Assam, including 14 ATMAs set up under the centrally sponsored scheme funded by GoI. It is also important to note that most of ATMA activities are currently focused on development and dissemination of new agricultural technologies aimed at increasing yields and whereas advisory services in areas of value addition are still evolving.

76. Another important institutional innovation was the enhanced role assumed by communities in decision making concerning procurement. At the beginning of the project, a centralized procurement of irrigation pumps using International Competitive Bidding (ICB) made little progress owing to a lack of interest on the part of qualified bidders, and on the part of farmers who were unfamiliar with the brands of pump being offered. A number of farmers who did purchase a pump during this early phase of the project reported poor after sale service. A new community procurement process was designed to allow farmer groups to choose pump sets from a wider range of pre-selected alternatives listed in a databank. The databank was drawn up through a competitive selection process giving due attention to farmer preferences. It listed each pump offered and its price. With manufacturers of varying capacities being allowed to apply, the pump sets on offer included a choice of 90 different models and 46 suppliers. In view of assured bulk orders, suppliers offered significantly lower prices than for ICB procurement. An audit process ensured timely delivery and installation of pump sets. Farmers also received better after-sale service because the pumps were delivered by local dealers. Based on the success of this approach, community procurement has been mainstreamed into the regular operations of Departments of Agriculture and Fisheries.

(c) Other Unintended Outcomes and Impacts

77. The project had a significant if not altogether unanticipated demonstration effect. Seeing the productivity gains by direct beneficiary farmers, an additional 9,000 farmers adopted new fisheries technologies in 21 districts without direct project assistance. These adopter farmers reported productivity gains ranging from 3 to 5 tons per ha under individual fish farms.

4. Assessment of Risk to Development Outcome

Rating: *Low*.

78. The overall risk to development outcome is assessed as *Low*. The investments made in irrigation and farm mechanization are based on well-tested and simple technologies that were implemented through farmers groups to ensure long-term sustainability. ATMAs are solidly established and have proven to be an effective vehicle for technology transfer.

79. An assessment of the sustainability of community level institutions that were organized through the project and which received support for at least three years was carried out by M&E consultants. The assessment found that more than 95 percent of community investments had either exceeded or continued to meet end-of-project productivity targets. And some 93 percent of the *beel* development committees, continued to function and maintain and operate the assets. The continued smooth operation and

maintenance of assets and growth in productivity will be crucial for long-term sustainability of project benefits.

80. The GoA demonstrated its strong commitment to the sustainability of road maintenance by increasing road maintenance funds significantly during implementation.²⁰ The Public Works Department is responsible for the maintenance of upgraded and rehabilitated roads through its regular budget. It has also established a dedicated Road Maintenance Fund.

81. Rural markets constructed under the project have been handed over to the concerned village panchayats for their maintenance. The project also facilitated the constitution of Market Management and Development Committees in every market for transparent and efficient management. 10 percent of the annual lease income proceeds of the markets are kept in a bank account for maintenance.

82. No negative environmental impacts attributable to the project are expected to unfold in the future. The comprehensive ground water monitoring system established under the project will be instrumental in ensuring that groundwater is not overexploited.

83. Ownership of the project activities by government agencies is strong and a substantial part of project approaches and achievements have been mainstreamed into line department operations, including ATMA, the community procurement model for pumps, and a statewide ground water monitoring system.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Rating: *Satisfactory*.

84. The Bank team ensured that the project design incorporated important lessons from the relevant experience of Bank projects elsewhere in India and globally. The diagnostic works and technical solutions identified were highly appropriate and the rationale for Bank intervention was firmly established. The project was designed to increase crop and livestock productivity, and to promote diversification into high value commodities. These objectives were identified as priorities both within the Bank's CPS and by the GoI and the GoA. The design featured well-tested, simple, and appropriate

²⁰ During 2004-2011, GoA spent INR 3303.90 million (against the target of INR 1725.0 million) for road maintenance in the project districts, and spent a total of INR 9093.0 million (against the target of INR 5250.0 million) for road maintenance in the entire state.

technologies such as STWs, agricultural machinery and farm implements as well as mobilization of local communities and farmer organizations to promote their use.

85. Promoting ATMAs as the main vehicle for improved delivery of agricultural extension services, and focusing on improvement and rehabilitation of rural roads, bridges, and markets with high economic growth potential were other elements of project design. Given the complexity of the project, covering multiple sectors and wide geographic areas, the implementation capacity needs were somewhat underestimated, and this led to initial delays. The Bank performance in ensuring quality at entry was *Satisfactory*.

(b) Quality of Supervision

Rating: *Satisfactory*.

86. The Bank team carried out 17 missions and invested 295.69 staff weeks in supporting the project. The Bank team consisted of task team leaders, staff, and consultants based at both HQ and in New Delhi office. The technical skill mix of various project team members included agriculture, agricultural marketing, irrigation, fisheries, forestry, agricultural machinery, social mobilization, institutional development, financial management, procurement, and social and environmental safeguards.

87. The Bank task team leaders maintained effective working relationships with the implementing agencies. Missions were proactive, flexible, and identified issues that arose during implementation in a timely manner, providing practical recommendations and technical solutions which are well-documented in the aide-memoires.

88. The Bank's initial missions started a bit late, and a few issues which arose early on were resolved only slowly, such as the revision to the percentage of matching grants 18 months into implementation. However, the Bank missions gradually took on key issues to expedite project implementation and the later missions increasingly focused on enhancing development impacts and post-project sustainability. The overall Bank implementation support and review missions, particularly during the post-MTR phase, provided strong technical, managerial and fiduciary support, which made significant positive contribution towards achievement of project results and enhancing development impact.

(c) Justification of Rating for Overall Bank Performance

Rating: *Satisfactory*

89. Overall, the Bank team undertook robust work at entry and the project design was found to be sound. During implementation, the team was proactive, identifying issues in a timely manner and facilitating appropriate solutions. Given the Bank's performance in ensuring quality at entry is rated as *Satisfactory* and its performance for supervision is

rated as *Satisfactory as well*, the ICRR team rates the Bank's overall performance as *Satisfactory*.

5.2 Borrower Performance

(a) Government Performance

Rating: *Satisfactory*

90. The GoA was highly committed to the project and exhibited strong ownership, which was evident both during preparation and implementation. The GoA provided the counterpart funds in the amount of US\$55.05 million (98 percent of the initial commitment) on a timely basis. To effectively support the project implementation and ensure project's long-term development impact, the GoA issued a series of ten policy and legal documents which were critically important for the project. Overall, the GoA's performance is rated as *Satisfactory*.

(b) Implementing Agencies Performance

Rating: *Satisfactory*

91. The Assam Rural Infrastructure and Agricultural Services (ARIAS) Society was the central project implementing agency and was responsible for the overall management and coordination of the project. The PCU under the ARIAS Society coordinated the activities of the Project Implementation Units (PIUs) at eight participating line departments and agencies, and also provided administrative support, and technical backstopping in areas such as marketing, decentralized extension and supply chain development, and computerized information systems.

92. The progress reports and other documents the PCU prepared reporting on issues and developments which had emerged during the course of implementation were accurate and of good quality, and highly useful to the periodic Bank missions sent to supervise the project. Some initial delays experienced early on during implementation were attributable to the limited capacity of PIU staff.

93. The participating line departments and agencies responsible for implementing their respective components and subcomponents through project PIUs performed well. These included the departments of agriculture (DOA), animal husbandry and veterinary (AH&VD); dairy development (DD), fisheries (DOF); environment and forests (DOEF), public works roads (PWRD), West Assam Milk Producers' Cooperative Union Limited (WAMUL), and Assam Agricultural University.

94. The line departments and agencies demonstrated enthusiastic commitment during implementation, and their performance was satisfactory. Some line departments and agencies experienced procurement challenges owing to weak capacity and high turnover

of trained procurement staff. The PCU addressed this issue by providing training in Bank procurement rules and procedures to the incoming replacement staff. Proactive oversight on the part of the PCU helped to ensure that no case of questionable procurement or corruption arose during implementation. Financial management was sound. Overall, the performance of the implementation agency was rated as *Satisfactory*.

(c) Justification of Rating for Overall Borrower Performance

Rating: *Satisfactory*

95. Based on the performance ratings of the GoA and the central implementing agency (ARIAS Society) and eight PIUs, the overall performance of the Borrower is rated as *Satisfactory*.

6. Lessons Learned

96. The key lessons learned from the project which are likely to be relevant to the design and implementation of similar projects in India and elsewhere can be summarized as follows:

- ***Identifying the most important constraints and addressing them through well-tested simple technical solutions proved to be the key factor for project success.*** The lack of irrigation water during the dry season was quickly identified as the principal constraint limiting the productivity of crops and the potential of crop production to diversify. The project effectively pursued this potential through simple technical solutions, supported by improved extension services and rural infrastructure.
- ***Strong, high-level political commitment on the part of the Government of Assam was instrumental to the success of the project.*** Ownership of the project and political commitment to its objectives made it a flagship of the chief ministers and secretaries of Assam. It also greatly facilitated the enlistment of highly competent and proactive project management, particularly during the second half of implementation.
- ***Implementing project activities through government agencies can advance major policy reforms and mainstream innovations within and throughout public sector institutions.*** By effectively embedding project activities within the operations of line departments, the project was able to promote *sector-wide* policy improvements and reforms. These took place in areas like agricultural extension services, road maintenance, and fisheries development and led to a number of project innovations becoming incorporated into the routine practices of government agencies – including Assam’s state-wide ground water monitoring system. The PMU also housed middle to senior managers from all implementing agencies, who liaised with specific officers

in these implementing agencies. This proved a potent coordination mechanism among multiple agencies.

- ***The innovative community procurement model was a key factor contributing to the success of the project.*** The project pioneered a highly innovative community procurement system using a unique process that not only enhanced participating communities' role in decision making, but that also brought in economies of scale that enabled beneficiary farmers to buy pumps at lower than market rates without compromising quality. The GoA has since mainstreamed this process in its programs and the model has received international recognition.
- ***ATMA has proven an effective model for developing and disseminating new agricultural technologies but now its role should be extended to promoting value chain development activities.*** Most current ATMA activities are focused on enhancing farm-level productivity, and on narrowing yield gaps between progressive and average farmers. Over time this will need to expand more into agricultural commercialization and value chain development, with extension services tailored to farmer organizations and agribusinesses.
- ***Comprehensive groundwater monitoring system is an important policy tool for environmental and economic management of irrigation systems.*** The groundwater monitoring system developed under the project has immediate policy applications for the Department of Agriculture to prevent groundwater over-exploitation and make strategic decisions on future investments in the use of groundwater based irrigation systems, such as determining the density of STWs as well as groundwater recharge structures specific to different hydro-geological regions in the state. The system has statewide coverage, is well-integrated into the Government system and could be used as an example to inform and motivate other States to adopt similar systems.

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

(a) Borrower/implementing agencies

The GoA and its implementing agencies reviewed the report and concurred with its main findings. A summary of the Borrower's ICR is provided in Annex 5

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in US\$ million equivalent)

Components	Appraisal Estimate (US\$ millions)			Actual/Latest Estimate (US\$ millions)	Percentage of Appraisal
	Original at Appraisal	Additional Financing	Total		
Component 1: Investment Grant Scheme	59.79	38.61	98.40	114.36	116%
Component 2: Agricultural Services and Market Chain Development	29.32	14.29	43.61	35.44	81%
Component 3: Infrastructure Development	103.26	45.33	148.59	136.76	92%
Total Baseline Cost	192.37	98.23	290.60	286.56	98.61%
Physical Contingencies	2.15	(2.15)	0.00	0.00	0.00
Price Contingencies	19.81	(19.81)	0.00	0.00	0.00
Total Project Costs	214.33	76.27	290.60	286.56	98.61%
Front-end fee PPF	0.00	0.00	0.00	0.00	
Front-end fee IBRD	0.00	0.00	0.00	0.00	
Total Financing Required	214.33	76.27	290.60	286.56	

* Total expenditure includes actual expenditure up to January 31, 2015 and expected expenditure by end of project closing.

(a) Financing

Source of Funds	Type of Cofinancing	Appraisal Estimate (US\$ millions)			Actual/Latest Estimate (US\$ millions)	Percentage of Appraisal Target
		Original at appraisal	Additional Financing	Total		
Borrower		19.97	12.50	32.47	33.47	103%
Local Communities		40.36	13.77	54.13	62.33	115%
International Development Association (IDA)		154.00	50.00	204.00	190.76	94%

* US\$ 10 Million IDA Credit cancelled in Dec2013, Effective Total IDA=US\$ 194 Million

Annex 2. Outputs by Component

Component 1: Investment Grant Scheme

1. The performance of this component is **satisfactory**. Various outputs of Component 1 are summarized in this table.

Interventions	Unit	Project Target	Achievement
Component 1 : Investment Grant Scheme			
A. Irrigation Development			
a Assured irrigation developed through:			
i Shallow tube well irrigated area	Hectare	225,000	250,000
ii Low lift pump irrigated area	Hectare	44,000	38,050
iii Flow irrigation scheme irrigated area	Hectare	NT*	250
iv Sprinkler irrigated area	Hectare	NT	100
v Solar power irrigated area	Hectare	NT	30
b Farm power created	Horse power	NT	477,472
c Agriculture service group mobilised	Number	110,000	115,220
d Targeted beneficiaries reached	Number	330,000	351,867
B Farm Mechanization			
a Agriculture service groups mobilised for tractor s	Number	1,815	2,149
b Agriculture service groups mobilised for power tillers	Number	1,500	1,084
c Targeted beneficiaries reached	Number	24,000	26,932
d Farmers trained in operation and maintenance of farm machinery	Number	NT	7,850
e Farm power created	Horse power	NT	46,371
f Farmers groups availing bank loans	Number	NT	2,131
g Bank loans availed by the groups	Million INR	NT	353.22
h Hours of tractor use	Hours/year	750	914
C Micro-Watershed Drainage			
a Farmer group mobilised	Number	NT	89
b Area made available for cultivation	Hectare	35,000	31,706
c Targeted farm families reached	Number	26250	24,683
d Drainage line cleared	Km	NT	276.78
e Corpus fund generated for maintenance	Million INR	NT	8.18
D Fish Production			
a Farmer ponds rehabilitated for semi intensive fish production	Hectare	3,300	3,064
b Community tanks developed	Hectare	800	761
c Beels developed for low intensity fish production	Hectare	1,700	1,760
d Integrated fish farming demonstrations organized	Hectare	NT	540
e Groups mobilised	Number	NT	3162
f Fish farmer trainings organised	Number	NT	41,738
g Fish farmers exposure visits organised	Number	NT	185
h Fish farmers adopting demonstrated technologies	Number	NT	8,843
i Area covered by adopter fish farmers	Hectare	NT	546

*NT= No Targets were fixed because these interventions were demand-driven.

Subcomponents: Irrigation Development, Farm Mechanization and Micro-Watershed Drainage

2. **Irrigation development** significantly improved dry season cultivation, leading to all around productivity growth, increased crop intensification, and diversification of the production system. At the end of the project, target values have either been met or exceeded. There has been a significant increase in crop productivity (*dry season* paddy productivity by 267 percent, vegetables productivity by 62 percent), and significant diversification of area from cereals to high value crops (from 17 percent of area under high value crops at baseline to 35 percent of area at end of project). Assured irrigation is playing a key role in the adoption of improved technology and crop cultivation practices. Project beneficiaries with assured irrigation recorded a yield of 5.5 tons paddy per ha in the dry season, compared to the control group with 2.2 tons per ha. Yields of vegetables and mustard was higher in the project area than in the control group area. The project created an additional assured irrigation potential of about 288,430 ha, about 32 percent of the state's assured irrigated area.²¹ The expansion in irrigated area took place using shallow tube wells (STWs), micro low lift pumps (LLPs), and piloting of micro and flow irrigation. Although the irrigation program primarily targeted dry season cultivation of paddy, it had an impact on the wet season cultivation as well. The irrigation provided critical supplemental irrigation during the dry spells that normally occur during this time. Productivity of the wet season paddy under the project area was 4.4 tons per ha, compared to 3.6 tons per ha for the corresponding control group. The project also successfully demonstrated the use of solar power as an alternative energy source for powering irrigation pumps in Assam. 115,220 agro service groups were established under the project, well over the target of 110,000 groups. 351,867 direct project beneficiaries maintain these investments.

3. **Farm mechanization** had a significant impact on multiple cropping in the areas opened up by irrigation development. Cropping intensity increased by between 130 and 200 percent. Mechanization resulted in the timely completion of land preparation activities and sowing, resulting in a time savings of between 16 and 25 days compared to control groups. Together with irrigation, farm mechanization also facilitated crop diversification. For instance, with the use of tractors and irrigation pumps, the proportion of high value crops increased from 4 to 40 percent among beneficiary groups. The project promoted 3,233 agro service group (ASGs) by providing tractors (2,149 against the target of 1,650) and power tillers (1,084 against the target of 1,500), reaching out to 26,932 (target 24,000) direct beneficiaries. The project helped enable these ASGs to obtain

²¹ Source – Agriculture Department, GoA

commercial bank credit with which to access project grants (INR 353.20 million commercial bank loan was facilitated). The project also undertook systematic capacity building through training programs on operation and maintenance of farm machinery and implements. 85 percent of the ASGs are now operating as financially sustainable business enterprises.

4. **Micro-watershed drainage** brought 31,706 ha of the target 35,000 ha of waterlogged area under cultivation. As part of micro-watershed improvement activities, planning, training and mobilization raised awareness and increased cash and labor contributions by farmers, leading to successful removal of vegetation and silt from the existing collector and main drains. The project also undertook need based restoration and repair of drains and culverts. At project completion, 277 km of drains were cleared, benefitting 24,683 farm families. All of the treated area has been brought under cultivation. The average productivity of wet season paddy was 4.4 tons per ha, and that of mustard was 1.1 tons. The project formed 89 micro-watershed groups who have generated a corpus of INR8.18 million to maintain these drainage lines. Sustaining reclamation benefits through continued maintenance of drains is essential.

Significant changes

5. As per project design, the financing of irrigation development involved a project grant covering 30 percent, beneficiary contribution of 20 percent cash, and 50 percent credit through commercial bank loan. Although GoA supported the objective of reducing direct subsidies to farmers at project negotiations, they had expressed apprehension over the proposed 30 percent grant vis-à-vis 70 percent grant that was provided under the earlier project (ARIASP). It was therefore agreed during the negotiations that the proportion of grant would be reviewed after 12 months of implementation. After 18 months the project was able to provide only 470 irrigation pumps against the target of 6,170. In September 2006, the Bank agreed to raise the grant to 50 percent with the balance 50 percent contributed by the beneficiary as cash while dispensing with the mandatory commercial bank linkage.

Subcomponents

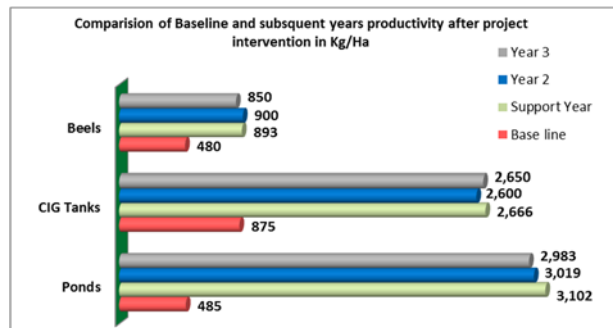
6. **Fish Production.** The fisheries subcomponent covered 6,125 ha of the target 6,350 ha of water spread area under improved fish farming in various categories of farmer ponds, community tanks, and *beels*.²² The project demonstrated semi intensive cultivation of fisheries in the state on a large scale. A total of 3,162 fish farmer groups have been mobilized with a membership of 72,184 beneficiaries. Development of farmer and

²² Oxbow lake

community managed water bodies, supplemented by demonstrations, capacity building, and technical support and advice by NGOs resulted in overwhelming gains through this subcomponent. In *farmer ponds* productivity increased from 0.5 ton per ha at the baseline to 3.5 ton per ha – an increase of 600 percent over baseline, and 113 percent over control. In *community tanks* the productivity has increased from 0.9 ton per ha to 2.3 ton per ha – an increase of 156 percent. In *beel* groups the productivity increased from 0.5 ton per ha to 1.6 ton per ha – an increase of 220 percent over the baseline.

7. The project also piloted a fish based farming system approach by integrating fish farming with livestock (pig-cum-fish farming), horticulture crops on bunds, and paddy-cum-fish farming, on 540 ha. The pilot involved some 3,000 farmers. Fish productivity increased by 3.45 ton/ha in pig-cum-fish farming, by 3.2 ton/ha by integrating horticulture, and by 1.6 ton/ha under paddy-cum-fish farming.

8. *Adoption by beneficiary farmers.* The intensification of fish production, with a one off grant from the project, was aimed at embedding the technology into the existing farming systems. As a result, these producers have generated sufficient savings for meeting the working capital needs in the subsequent seasons, and directly engaged with the improved technology (see graph). At the end of project assessment, all project beneficiaries under farmer ponds and *beels* have reported increased fish productivity in subsequent years (against the target of 85 percent beneficiaries for farmer ponds and 70 percent beneficiaries for *beels*). Under community tanks, 96 percent of the community tank beneficiaries reported increased fish productivity in the subsequent seasons (target 80 percent).



9. *Adoption by non-beneficiary farmers.* After witnessing the productivity gains experienced by the beneficiary farmers, 8,843 non-beneficiary farmers adopted the demonstrated technologies in 21 districts without project assistance. These adopter farmers reported productivity gains ranging from 3 to 5 tons per ha under individual fish ponds. These encouraging results have attracted the attention of financial institutions. *Commercial banks in Assam have started to support these adopter farmers with bank loans, and 435 non-beneficiary farmers were sanctioned loans amounting to INR63.50 million.* The National Bank for Agriculture and Rural Development (NABARD) has started to provide soft loans (interest rate @ 5 to 6 percent per annum) for the initiative, and 50 non-beneficiary farmers have received loans amounting to INR2.50 million from the NABARD scheme.

10. *The project provided and facilitated a large number of training and capacity building programs.* In all, 41,738 fish farmers received training on packages of improved fish farming practices, 185 fish farmers were taken on exposure visits to West Bengal and Andhra Pradesh. 1,159 DoF officers were trained within and outside the state, and 23 officers participated in international exposure visits and study tours to Thailand, Vietnam, Indonesia, China, and Bangladesh.

Policy initiatives, institutional development and capacity building

11. *The project established a statewide comprehensive online monitoring system for the sustainable use of groundwater, whereby investments in groundwater irrigation are linked to groundwater levels to prevent overexploitation of groundwater resources* (<http://59.90.201.12:50005/webdata>, with login and password). This system assesses the impact of development of groundwater irrigation and guides planning for future groundwater management. For example, the system would enable the Department of Agriculture to make strategic decisions about future investments in the use of groundwater based irrigation systems. This decision making will include determining the density of STWs as well as groundwater recharge structures specific to different hydro-geological regions. It is the first time that a real time system has been installed on such a large scale in India.

12. GoA has taken initiatives to bring together the various departments handling irrigation water. Towards this end, state and district level coordination committees have been constituted for future planning of irrigation resources in the state, including groundwater resources. Apart from this, GoA has recently enacted the Assam Ground Water Control and Regulations Act 2012, with the Irrigation Department as the nodal agency for enforcing this act. The rules for the act not yet formulated and a wider consultation on different aspects of regulation and evidence based decision making for use of groundwater is necessary.

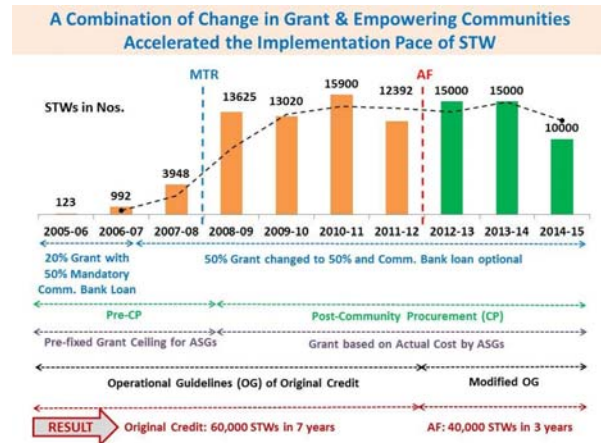
13. The project undertook mandatory groundwater testing for the presence of arsenic, fluoride, iron, and hydrocarbon in water samples. Of 77,745 water samples tested, 13 bore wells had arsenic and 77 had fluoride above the permissible limits. In villages where the water samples were found to have higher than the permissible limit of these chemicals, sensitization programs (including caution boards and painting the bore wells in red color) were undertaken to educate the communities in these locations about the unsuitability of water from these bore wells for potable purposes.

14. The project facilitated the enactment of the first of its kind **Assam Fish Seed Act in 2005 and its Rules in 2010** in order to improve the quality of fish seed, maintain quality standards in fish seed production and marketing by enforcing regulatory measures. The project also facilitated strengthening of the existing legal framework in the fisheries sector, the **Assam Fisheries Rules of 1953**, to provide an enabling environment for the fishing

communities to gain long term lease access to their local water bodies. The project organized legal literacy programs, intensive stakeholder consultations and workshops for wider dissemination of awareness about the legal changes.

Innovations, good practices and their scaling up

15. *Community procurement.* The project pioneered a unique community procurement process that not only enhanced community role in procurement decision making, but that also brought in the economies of scale that enabled beneficiary farmers to buy pumps at prices beneath market rates, without sacrificing quality. Buyers can also select the pump models as per group preference. This not only empowered the community groups, but also had a substantial positive impact on the project implementation speed. Building upon the success and experience gained from this, GoA has mainstreamed this process in their own programs as well.



16. *Pilot program of using solar power for running irrigation pump sets.* With rising diesel cost, project piloted alternative energy source through solar power, first of its kind in the state. This pilot was taken up in 12 locations, identified based on the agro climatic conditions, cropping patterns, and willingness of the farmers to participate. Solar pumps at all 12 locations have been commissioned. Early results show that solar power in Assam is adequate for generating enough power for running water pumps for irrigation, and the water discharge from the demonstrated water pumps is both satisfactory and adequate.



17. *Enhanced audit scope for physical verification of community assets.* The scope of external audit was enhanced to include physical verification of assets provided to community groups under this component. This gave, in such a decentralized program, additional fiduciary assurance not only on the existence of the assets funded by the project, but also useful additional qualitative information such as continued use of such assets and their maintenance, and any diversion of assets for other uses. Key findings from these audits were: (i) very insignificant (less than 4 percent) diversion of assets, (ii) large number of irrigation scheme beneficiaries receiving consistent after-sale services from the

suppliers (about 4 percent did not receive such services), and (iii) large number of community groups maintaining records (about 3 percent fisheries groups did not maintain stock register). These findings reinforce that the project was successful in targeting, training and capacity building of the communities.



Component 2 Agricultural Services and Market Chain Development

18. The performance of this component is **satisfactory**. Outputs are summarized here.

Interventions	Unit	Project Target	Achievement
Component 2: Agricultural Services and Market Chain Development			
A Farm Advisory Services			
a. ATMAs established and operationalized	Number	11	12
b. Block Resources Centres set up	Number	214	208
c. Farmer Advisory Committees operationalized	Number	123	123
d. Block Technology Teams operationalized	Number	123	123
e. Extension plans (District Agricultural Development Strategies) prepared	Number	11	11
f. On farm demonstration organised	Number	NT*	41757
g. Field days organised	Number	NT	6729
h. Farmers trained	Number	NT	15354
i. Exposure visits organised	Number	NT	835
j. Farmers covered under technology dissemination activities	Number	NT	814664
k. Productivity gain from the demonstrations on paddy	%	NT	47.83
l. Productivity gain from the demonstrations on mustard	%	NT	52.53
m. Productivity gain from the demonstrations on vegetables	%	NT	36.89
n. Certified/Truthfully labelled seed distributed under farmer to farmer mode	Metric ton	NT	8984.37
o. Pure breed bucks distributed under demonstration programme	Number	NT	3053
p. Pure breed boars distributed under demonstration programme	Number	NT	2505
q. Cross breed bucks distributed under farmer to farmer mode	Number	NT	4605
r. Cross breed boars distributed under farmer to farmer mode	Number	NT	6976
s. Farmers adopting demonstrated technologies	Number	NT	590136
t. Area covered by adopter farmers	Hectare	NT	159088
u. Productivity gain in paddy by adopter farmers	%	NT	36.77
v. Productivity gain in mustard by adopter farmers	%	NT	38.30
w. Productivity gain in vegetables by adopter farmers	%	NT	22.09
x. Farmers facilitated with bank linkages for crop loans	Number	NT	514540
y. Bank credit made available to farmers through Kisan Credit Cards	Million INR	NT	13670.27
z. Adaptive research sub-projects implemented	Number	7	7
B Livestock Upgrading			
a. Gopal mitras trained	Number	166	164
b. Breeding bulls procured for Barapeta Bull Mother Farm	Number	12	12
c. Artificial inseminations undertaken	Number	900000	802113
d. Animal health camps organised	Number	2,611	2493
C Fish Seed Production			
a. Improved mini hatcheries set up	Number	19	19
b. Cage culture units set up	Number	20	20
D Commodity Marketing			
a. Farmer Producer Organizations formed	Number	25	25
b. Marketing groups mobilized	Number	NT	491
c. Market study tours organized	Number	NT	624
d. Pilot Enterprise Development Grant Funds provided	Million INR	NT	4.39
e. Dairy Cooperative Societies formed	Number	312	312
f. Milk Producing Institutions organised	Number	361	361
g. Pig rearer self-help groups mobilised	Number	250	250

h.	Goat rearer self-help groups mobilised	Number	300	300
E	Pilot Operation			
a.	Afforestation area	Hectare	7048	6844

*NT= No Targets were fixed as these interventions were demand-driven.

Subcomponents

19. **Farm Advisory Services.** The goal of this sub-component was to introduce decentralized, pluralistic farm advisory services integrating crop, horticulture, livestock and fishery sectors. This goal was fully achieved by establishing Agricultural Technology Management Agencies (ATMAs) in 12 project districts (11 identified at appraisal and the new district of Baska) which facilitated the programmatic convergence of the line departments. Gender and equity concerns were fully reflected in both the structure and programmatic focus of this new model, with all ATMA Governing Boards and block level Farm Advisory Committees (FACs) having 30 percent women members and with appropriate representation of scheduled castes and tribal groups. 208 Block Resource Centers (BRCs) were completed which provided the required space for training of farmers and meetings of the Farm Advisory Committees and interdepartmental Block Technology Teams (BTTs) of government officials. Six BRCs could not be constructed due to non-availability of land. National Institute of Agricultural Extension Management (MANAGE, an apex institute in the country for agricultural extension) and an experienced State Extension Advisor provided mentoring and hand holding support to the newly established ATMAs. This played a key role in successfully operationalizing this new extension approach.

20. Technology dissemination activities have increased significantly in 12 project districts as a result of the project. For example, 835 exposure visits, 41,757 on-farm demonstrations, 15,354 training events and 6,729 field days were organized. A total of 814,664 farmers participated in these activities. After witnessing the productivity gains in the on-farm demonstrations, 590,136 farmers adopted the demonstrated technologies on 159,087 ha in the following years and produced additional 169,196 tons of agricultural produce. These adopter farmers reported productivity gains ranging from 36 percent in vegetable crops to 47 percent in. Farmer-to-farmer exchange of 8,984 tons of certified, truthfully labeled seed of self-pollinated crops produced on the demonstration plots significantly improved seed replacement rate in ATMA districts. Other notable achievements include supply of 3,053 pure breed and 4,605 cross breed bucks, and 2,053 pure breed and 6,976 cross breed boars for genetic upgrading of goats and pigs in project villages. In order to facilitate access to credit ATMAs assisted 514,540 farmers in obtaining Kisan Credit Cards from the commercial banks and availing crop loans amounting to INR13,670.27 million.

21. *Adaptive Research.* Based on the researchable issues identified in the extension plans (District Agriculture Development Strategies), Assam Agricultural University carried out seven research sub-projects covering integrated pest and nutrient management, seed storage, integrated fish and livestock production systems. Notable achievements include development of a new biofertilizer, seed storage bins and cost effective cattle feed using tea waste.

22. **Livestock Upgrading.** Infrastructure development and full cost recovery supporting productivity enhancement through breed improvement relies in large measure on artificial insemination. Artificial insemination (AI) to create crossbreds has been the primary contributor to increased milk productivity in India and was an area in which Assam had lagged considerably. Infrastructure development under the project, including supply chain management through the Assam Livestock Development Authority (ALDA) facilitated the delivery of 2,108,240 doses of semen. These resulted in the birth of 788,513 calves and an estimated 394,257 crossbred females with production capacity on an average 6.3 liters per day compared to 1.1 liters among unimproved indigenous cattle.²³ The availability of liquid nitrogen increased two and a half times. Capacity enhancement for producing semen doses by financing bull and equipment purchase increased semen production more than 3.5 fold, from about 90,000 semen doses in 2004 to 330,049 semen doses in 2014. The coverage of breedable cattle with AI increased from 6.48 percent in 2003-04 to 10 percent in 2013-14. A covenant to achieve full cost recovery of AI services, together with the expansion of services, resulted in a revenue increase to ALDA of about 12.5 times during the project period, and supported further expansion and modernization of facilities post-project.

23. *Privatization of breed improvement services.* Expansion of breed improvement services through AI resulted in policy change to expand delivery beyond the government veterinary department to unemployed youth. The project provided intensive training, capacity building and mentoring program to 164 *Gopal Mitras* (GMs, target 400). Of these, 78 GMs are active in the field and have delivered 65,933 AI services resulting in the birth of 21,257 (32 percent success) crossbred calves. Building on this success, AI services have recently been outsourced to West Assam Milk Union Limited (WAMUL) and 75 Mobile Artificial Insemination Technicians have been trained and equipped in Nagoan district to increase the volume of services and success of AI delivery to 45 percent, up from the current 32 to 37 percent.

24. As an important departure from the past, a pilot fodder development program was taken up by the Animal Husbandry and Veterinarian Services Department (AH&VD) along with their regular activities. In collaboration with 1,570 DCS members' oat

²³ AACP financed purchase of liquid nitrogen, frozen semen straw and bull purchase.

demonstrations were taken up on 68 ha. On seeing the benefits, AH&VD has scaled up this program from their funds, covering about 11,800 ha.

25. **Fish Seed Production.** In order to improve quality of fish seed and fish stock biodiversity, the project rehabilitated four State Brood Banks for rearing spawn collected from river Brahmaputra, and also provided investment grant support to 19 entrepreneurs for setting up improved mini hatcheries on a demonstration basis. By doing so Assam was able to produce about 47 million fingerlings besides spawn and fry, meeting about 1 percent of the state's requirement of quality seed. Also, based on the success of the improved mini hatcheries demonstrated under the project, GoA has scaled up this activity under their own program supporting 57 improved mini hatcheries. Systematic extension, exposure visits and capacity building activities were also taken up to raise awareness about the benefits of using quality fish seed and the hazards of hybridized fish.

26. **Commodity Marketing.** To enhance marketing options, the project supported a number of initiatives that enabled the farming community to acquire the technical capacity and to access emerging market opportunities that allowed for higher returns and better farm incomes resulting from the growing opportunities associated with the agriculture and food sectors.

- a) *AACP piloted Farmer Producer Organizations (FPOs)* in five districts of Assam. These FPOs represented 17,241 of farmers, mobilized INR717,000 as paid up capital, and were federated to 25 farmer cooperatives (15 for agriculture commodities and 10 for fisheries). The FPOs were linked to 15 wholesale distributors of agriculture inputs (including fish feed) facilitating competitive access of FPO members to input markets, which resulted in savings in agriculture inputs of about 10 percent to 38 percent. The FPOs were also linked to 49 wholesale traders of agriculture commodities, enabling direct farmer access to output markets resulting in about 7-10 percent higher price.
- b) *Developing producer organizations and building their capacity to access formal and informal markets.* 1,276 livestock producer organizations, including 250 pig groups, 300 goat groups, 361 MPIs, and 312 Dairy Cooperative Societies (DCSs) were formed.²⁴ Together, these represented 18,334 beneficiaries (78 percent dairy, 12 percent goat, 10 percent pig). The organizations enabled their member to access both formal and informal markets, supporting transparency in product pricing and enabling better targeting of productivity enhancing inputs and services. The project made a significant contribution to market development,

²⁴ While the DCSs are formally registered institutions, MPIs are informal institutions for milk collection and marketing. Typically a DCS would have a membership base of on an average of 30 members and is registered under the Assam Cooperative Act, an MPI membership base is about 11 and is an informal and not-registered body.

particularly for the dairy sector where over 95 percent of milk is sold informally to traders. Dairy producer groups helped farmers realize higher prices from 20 to INR30 per liter on an average due to collective action and market information, regardless of whether market links were formal or informal. Anecdotal evidence suggests that informal trade resulted in higher market prices. About 40 percent of DCSs were able to efficiently manage the supply chain, including value addition activities; while overall 24 percent DCSs and 7 percent MPIs had access to chilling, quality and weighing technology. 361 MPIs were equipped and trained for small scale dairy processing. The largest impacts in profitability were achieved with pigs and goats. These profits increased by 4.1 and 2.4 fold respectively, with a 22 percent increase due to better prices as a result of collective action, while nearly 80 percent increase was due to productivity enhancement from better breeds, shelter, feed and other services delivery facilitated by the organization of groups.

- c) The project established a *Pilot Enterprise Development Grant Fund*, under which 491 of commodity focused marketing groups were mobilized and imparted market extension trainings to understand market dynamics, price fluctuation and new opportunities. This resulted in these groups undertaking post-harvest processing and farm level value addition activities, and accessing distant and nontraditional markets for their produce. Under direct marketing arrangements, 396 commodity groups sold 165 tons of vegetables realizing about 13 to 14 percent higher price over traditional marketing channels. Under postharvest value addition, 95 commodity groups sold 241 tons of value added products, realizing about 35 percent higher price.
- d) *Private sector involvement and public-private partnerships.* The project facilitated collaboration and linkages of the dairy and fisheries groups with corporate sector – specifically with Amalgamated Plantations Private Limited (AAPL), an IFC client based in Assam. As a result, specialist inputs such as high yielding fish fingerlings were made available to these groups at competitive prices, and technical assistance on commercial fish production were provided by AAPL.

27. **Pilot Program on Forestry.** Forestry subcomponent was implemented to strengthen capacities and underlying forest management systems in the Forest Department and participating communities for applying new and innovative approaches to community forestry activities. The intention of the project was also to link the pilot forestry component with the other components in the AACP where possible, and apply more widely the lessons learned to forest fringe communities across the state. The forestry component was initiated in 2006 in two divisions (Kamrup West and Nagaon) covering 10 Joint Forest Management Committees (JFMCs). Building on the progress made, the

MTR added another 37 communities, including five in the original two divisions and 32 communities in six new forest divisions.

28. *Plantation establishment and maintenance.* Subcomponent investments to develop plantations for community uses – minor forest produce, fuel wood, timber, etc. - has achieved 97 percent of the target coverage of 7,048 ha. The overall survival rate of 62 percent, measured across all participating JFMCs is reasonable.

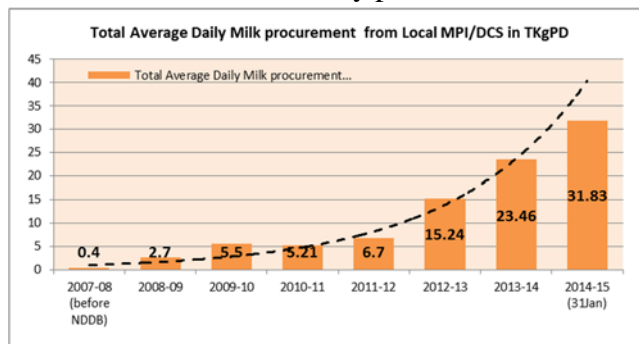
29. *Nurseries.* As part of both forestry and livelihoods, small nurseries have been established in all 47 JFMCs. These nurseries provide seedlings for the plantations and other forest works developed in each community, as well as serve longer-term livelihoods support through commercial sales.

30. *Alternate livelihood activities.* In spite of delays, the project implemented several activities to improve livelihoods within the participating communities so as to increase household incomes and broaden the economic base. This includes intercropping with short rotation cash crops, fisheries, supplementary plantations of medicinal and aromatic crops, etc.

31. **Policy initiatives, institutional development, and capacity building.** The project had a significant impact on institutional development under this component. The establishment of Agricultural Technology Management Agencies (ATMAs) in 12 districts decentralized planning, funding and implementation of technology dissemination to district, block and village level. It also institutionalized farmer and other stakeholder representation on the ATMA Governing Board and on the block level Farmer Advisory Committee, enabling representatives to shape and approve extension programs. The ATMAs promoted the consolidation of the extension activities of different line departments into a single integrated system covering crops, horticulture, livestock, fisheries and marketing, and organized farmers into commodity or common interest groups. ATMAs have emerged as the focal point for channeling resources for technology dissemination in response to farmer needs expressed through participatory processes. The ATMA model has proven to be acceptable and cost-effective for mobilizing State Line Department staff to respond to farmer needs. Based on the success of AACP ATMAs, GoA designated the state project director of AACP, as the Nodal Officer and ARIAS society as the Nodal Agency for oversight of the entire ATMA program in Assam, including 14 ATMAs set up under the centrally sponsored scheme funded by GoI.

32. Phased cost recovery for artificial insemination services provided by the Animal Husbandry and Veterinary Department, though delayed, was fully implemented by GoA. This together with the expansion of services resulted in a 12.5-fold revenue increase by ALDA.

33. The project facilitated the management takeover of the defunct dairy plant of West Assam Milk Union Limited (WAMUL), by National Dairy Development Board. This not only led to the revival of this plant, but has also dramatically increased the formal milk procurement in the state from 2700 liters per day in 2007-08 to about 32,000 liters per day in 2014-15. This was facilitated by setting up of 141 MPIs by WAMUL.



34. GoA amended the Joint Forest Management Policy of the state with regard to the benefit sharing arrangement, wherein the project JFMCs are eligible for 50 percent of the net receipts from main fellings of trees from the forest land managed by them, as against 25 percent for non-project JFMCs.

35. **Rural Markets.** At project closure 93 rural markets against the target of 97 had been upgraded. Surveys undertaken by the third party M&E consultant (triangulated with internal studies) show a significant impact: as compared with the pre-project situation traded volume increased by 66 percent; number of traders participating in the markets increased by 51 percent; market lease value increased by 79 percent.

36. **Infrastructure Development.** The performance of this component was **satisfactory**. Various outputs of Component 3 are summarized in this table.

	Interventions	Unit		Project Target	Achievement
1.	Rural road and bridge upgrades				
A	Improved rural connectivity by				
i	Roads rehabilitated	Kilometer		1000	900
ii	Roads upgraded	Kilometer		1000	836
iii	Bridges upgraded	Number		287	196
iv	Market linkage roads rehabilitated	Kilometer		57	57
B	Villages connected through improved rural roads	Number		NT	1420
2	Road maintenance				
A	Amount spent on annual maintenance of roads in project districts from 2004-05 to 2010-11	INR million		1725.0	3303.9
3	Capacity building				
A	Strengthening of Road Research Laboratory	Number		1	1
4	Rural markets				
A	Wholesale markets upgraded	Number		49	46
B	Rural Haats (Periodical markets) upgraded	Number		48	47

37. **Rural Roads.** Infrastructure development has significantly improved through the expanded rural roads program, connecting over 1,423 villages with improved roads. The

project developed a unique set of criteria for selection of roads, wherein apart from traditional indicators like habitation and traffic intensity, unique indicators comprising agriculture and allied activities like irrigation intensity, cropping intensity, and market facilities were also used. This helped in linking production hubs to markets. Impact assessment studies suggest that these improvements have had a significant economic impact. At project closure, 1,793 km of rural roads, comprising 836 km of black top roads (target of 1,000 km), 900 km of gravel roads (target of 1,000 km) and 57 km of market access roads (target of 57 km) had been upgraded, rehabilitated, and opened up for traffic. Except for 217 km of roads which remain under the defect liability period, all roads have been transferred to the regular divisions of PWD for maintenance. The use of gravel surfacing was found to be a cost effective solution to low traffic situations. These roads have also shown relatively good performance under the submergence conditions that often prevail in Assam. The vehicle traffic density increased from 389 vehicles per day at baseline to 1,563 vehicles per day at project closure. This increase of 302 percent is higher than the anticipated end of project increase of 200 percent. Road rehabilitation also decreased the average travel time of motorized vehicles by about 41 percent.

38. The GoA complied with the covenant regarding the provision of funds for road maintenance, resulting in regular maintenance and all-weather connectivity between the habitations. As reflected in the negotiation documents of the original credit, for the period 2004-5 to 2010-11, GoA had spent INR3303.90 million (against the target of INR1725 million) for the maintenance of the roads in the project districts and spent INR9093 million (against the target of INR5250 million) for the state as a whole. For the FY 2014-15, GoA spent INR2236.6 million for maintenance of rural roads in the state. After initial delays a dedicated road maintenance fund has been created, supported by a Road Maintenance Policy and Road Maintenance Fund Rules. AACP also facilitated the establishment of the Assam State Road Board as an apex body for policy decisions and for managing GoI programs and externally funded projects in the sector. Going forward, this Board would be responsible for managing the state road maintenance fund as well.

39. The Resettlement and Rehabilitation policy that was prepared as part of the project preparation, was complied with under AACP, and has subsequently been mainstreamed statewide in the road sector.

40. The project facilitated constitution of Market Management and Development Committees (MMDC) in every market for transparent and efficient management of the markets developed under the project. Also, the project made it mandatory to set aside 10 percent of the annual lease value for the operation and maintenance of the developed market to be done by the MMDC. Although MMDCs have been constituted in all the markets developed under the project, only 18 markets have set aside the annual lease value for market maintenance purposes.

Status of allocation for annual road maintenance fund (ARMF) for the period 2004-2011 as envisaged in the minutes of negotiation

Financial Year	As envisaged in minutes of negotiation (INR million)		Actual expenditure (INR million)	
	Total ARMF for the State	Total ARMF for 09 Project Districts	Total ARMF for the State	Total ARMF for the 09 Project Districts
2004-05	600.00	200.00	541.6	200.0
2005-06	650.00	215.00	797.5	201.5
2006-07	700.00	230.00	898.1	333.5
2007-08	750.00	245.00	1580.4	592.2
2008-09	800.00	260.00	1292.3	484.2
2009-10	850.00	275.00	1639.2	614.2
2010-11	900.00	300.00	2343.9	878.3
Total	5250.00	1725.00	9093.0	3303.9

41. *Institutional development and capacity building.* The Road Research Laboratory facility had limited infrastructure facilities before the project. The Laboratory was revived and reconstituted as the Assam Road Research and Training Institute, and has now become recognized as a center of excellence for training and capacity building in this region. This facility is being further strengthened under the ongoing Bank funded Assam State Roads Project. Systematic capacity building of the PWD, the implementing agency for this subcomponent, included training in planning, survey and investigation, material evaluation, design, preparation of detailed project report, quality assurance, etc. This built in-house capacity for handling projects funded from internal and external resources. The in-house team has thus far designed about 3,500 km of rural roads and 3,792 bridges without external technical assistance.

42. Capacity building of the PWD and Agriculture Department, the implementing agencies for this subcomponent, included identifying market users' needs, assessment of market trading conditions, and the preparation of master *plan*, market design, etc. This resulted in the development of in-house capacity. Of the 93 markets upgraded under the project, the in-house team prepared the design and estimates for 81 markets.

Innovations, good practices and scaling up

43. The rural roads subcomponent introduced innovations and good practices that have been adopted by PWD in their ongoing program – this includes the use of precast bridges and standard box culverts for cross drainage works, the use of technical examination consultants for independent quality monitoring and regular technical assistance, the identification of a core network of rural roads to ensure basic access to each habitation, and the use of a road condition index to assess road condition and plan road maintenance. The project also experimented with market link roads using non-conventional materials like concrete paver blocks.

Innovations under rural roads subcomponent

- For the first time in Assam pre-cast, pre-tensioned RCC bridges have been introduced under AACP. 16 bridges have been constructed in Hailakandi district. This resulted in 15 - 20% reduction in cost, but also reduced the construction time by 25 to 30%.
- Project pioneered the use of “segmental pre-cast box culverts” avoiding RCC Hume pipe culverts resulting in 15 - 20% cost reduction and 25 - 30% saving in construction time.

Annex 3. Financial and Economic Analyses

A. Introduction

44. The Assam Agricultural Competitiveness Project (AACP) was approved in December 2004 with a total cost of US\$214 million. In addition to management, the other components were as follows.

Component 1: *Investment Grant Scheme* (initially US\$66.3 million, later increased to US\$98.40m) to address the constraints arising from lack of investment capital and institutional capacities in farm and rural communities for productivity enhancement, and comprised the following subcomponents: (i) irrigation development; (ii) farm mechanization; (iii) micro-watershed drainage, and; (iii) fish production.

Component 2: *Agricultural Services and Market Chain Development* (initially US\$32.22 million, later increased to US\$44.61 million) to address the constraints arising from inadequate market linked technology transfer, the absence of producer organizations with links to markets, and low productivity of livestock resources, and comprised the following subcomponents: (i) farm advisory services; (ii) marketing extension; (iii) livestock upgrading; (iv) fish seed; (v) milk marketing; (iv) forestry; and (v) project coordination unit

Component 3: *Infrastructure Development* (initially US\$115.88 million, later increased to US\$148.59 million) to address the constraints arising from poor rural road network and inadequate rural market infrastructure, and comprised of the following subcomponents: (i) roads and bridges; and (ii) rural markets.

45. Although restructuring was introduced five times over the 10 year implementation period (the project concluded 15 March 2015), these components did not change. An Additional Financing of US\$75.73 million was approved in April 2012.

46. The FEA conducted as part of the PAD projected benefits deriving from: (i) increased cropping intensity; (ii) diversification of crop production into non-cereal production; (iii) increased productivity of fish ponds/tanks and livestock operations; (iv) reduced operating costs and travel time and increased traffic volumes from road upgrades, and; (v) improved market prices through better access and market knowledge.

47. Returns to investment were calculated at appraisal to be highest for the agricultural interventions and lowest for livestock, with the projected rates of return to activities shown in Table 1.

Table 1: Rates of Return Calculated at Project Commencement

Activity	Financial Returns		Economic Returns	
	IRR (%)	NPV (INR bn)	IRR (%)	NPV (INR bn)
Agriculture	36.3	4.47	39.1	4.60
Fisheries	20.9	0.17	20.7	0.15
Livestock	16.2	0.37	16.2	0.33
Rural Roads	17.5	0.83	18.9	0.94
Overall Project	19.9	4.06	21.4	4.43

2. Investment Completion Analysis

48. The completion analysis was prepared separately for 10 activities (ATMA and irrigation, drainage, mechanization, fisheries, AI, diary, roads, markets, forestry, and livestock groups) accounting for 86 percent of the Bank’s share of project financing. This approach differs slightly from that used in the PAD FEA in that it includes separate models for micro-watershed drainage and mechanization activities, both of which were subsumed within the agricultural model in the original analysis.

49. The models evaluate both the original credit and the additional financing as a single instrument over the period 2005-2024 – consistent with 20-year-long-period of analysis assumed during the project’s appraisal. The analysis includes not only additional financing costs but also the actual value of beneficiaries’ contributions made under Component 1 as well as program maintenance costs for drainage (Component 1), ATMA (Component 2) and roads (Component 3).

50. Key assumptions made in preparing the activity models are presented in relation to each activity below. However, additional discussion is attached to the relevant Excel sheets concerning two adjustments to agricultural control group results: (a) including off-farm earnings in control group benefits. These are not available to participants, as higher cropping intensities reduce surplus labor available for wage employment, and; (b) increased costs of production for participants to account for the expected use of higher levels of inputs (fertilizers, improved seeds, etc.) associated with the higher yields.

51. Data on project costs and beneficiary contributions were supplied by the project’s financial records. Data on project outputs and participant benefits were accessed from the project’s M&E systems and the Impact Analysis Reports of 2010 and March 2015.²⁵ The combined sample size of these two studies comprises in excess of 25,000 households

²⁵ Mott MacDonald, AACP Project Impact Study, March 2015

including control groups. The surveys were carried out using a customized sampling methodology which ensures statistically significant presentation of the different agro-climatic conditions in Assam and allows for multiple measures of the project's impact. The control groups selected for the Impact Assessment Reports (IAR) had not benefitted directly from project expenditures or support, although no evidence is provided in the IARs as to whether they did not participate by choice, for instance because they are older, or simply because they did not live in areas targeted for participation. Because the original economic analysis was made more than 10 years ago, all original modelling assumptions were critically reviewed against the most recent data and new economic modelling practices adopted by agricultural and rural development projects in India. When more recent data were not available, the updated economic model maintained the original assumptions.

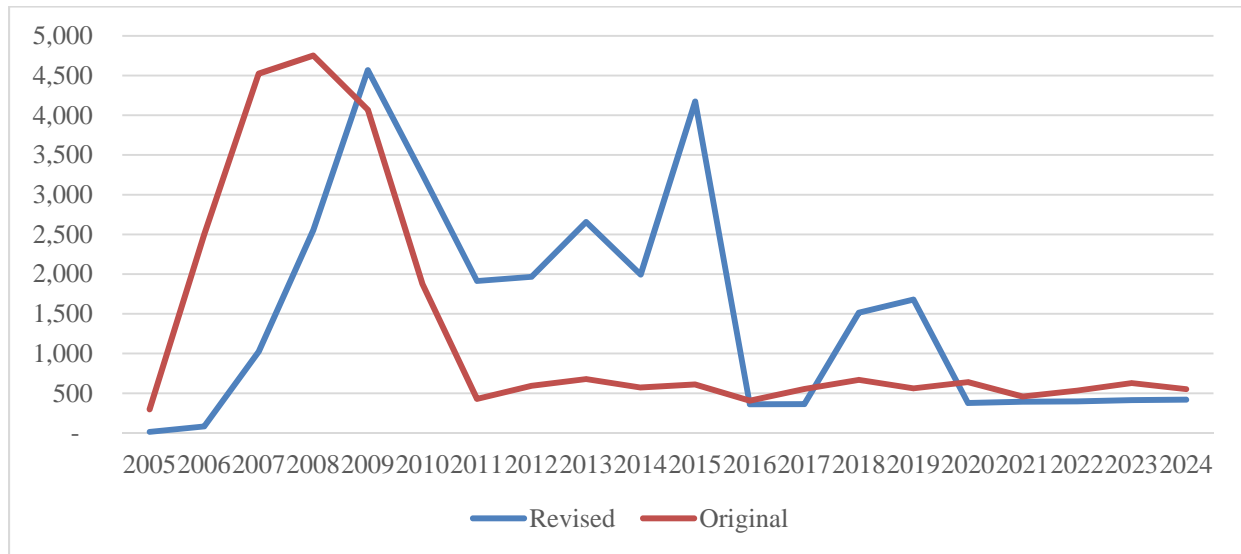
52. The definition of the *with project* and *without project* scenarios were guided by the most recent IAR, which included both qualitative and quantitative discussion of results for participants and control groups. The original economic model formulation was used to the extent possible. To ensure consistency of presentation all data is presented in 2014 prices and, in line with an original assumption, the opportunity cost of capital of 12 percent is applied for deriving net present values.

2.1 Project costs

53. Both the projected and actual economic project expenditure is presented in 2014 prices in Figure 1. The key differences with those assumed in the PAD include: (i) delays at initial stages of project implementation (i.e. during 2005-2008 period); (ii) the cost of additional financing processed at the beginning of 2012; (iii) full integration of beneficiary contributions under Component 1 in the updated project cost structure; and (iii) higher than budgeted costs of road maintenance and rehabilitation.

54. Other differences between the original and updated economic analyses consist of: (i) the revised projections included continued maintenance expenditure for micro-watershed sub-projects; and (ii) the costs of continued provision of ATMA services until 2024.

Figure 1. Original and Revised Project Cost Curves (million INR, in 2014 prices)



2.2 Financial Analysis

55. Results of the financial analysis of the project are presented in Table 2 and discussed below. While the comparison for agriculture is not exact because different models were used, Table 1 shows that in financial terms, the project outperformed projected returns at appraisal in all cases except rural roads, where the FIRR was 15.9 percent, instead of the projected 17.5 percent. Overall, the projected FIRR of 19.9 at appraisal was exceeded by an FIRR of 22.2 percent at completion. It is worth noting that these results were obtained using a range of very conservative assumptions regarding benefits. For the agricultural models, for example, it was assumed that the increased cropping intensity would result in reduced time for off-farm wage earning activities, and control group benefits were increased to include such wages (see Key Assumptions note accompanying the supporting Excel spreadsheets.). Furthermore, no attempt was made to quantify benefits arising from multiplier effects, downstream job creation (e.g. in food processing) or for wider financial or economic benefits arising from improved access roads, beyond those specifically affecting producers.

Table 2: Financial Rates of Return Calculated at Project Completion

Activity/Component	Number of Direct Participants	Financial Rates of Return	
		FIRR (%)	NPV (INR m)
Micro-watershed (drainage)	24,683	29.3	56
STW/LLP/ATMA/Mechanization	330,000	42.7	4,888
Tractor Rental	26,932	28.7	246
Fishery	72,184	31.4	468
Livestock (dairy cooperatives)	294	26.3	496
Roads (villages connected)	1,423	15.9	1,423
Markets (structures)	93	15.4	44
Component 1		30.2%	771
Component 2		18.4%	1,643
Component 3		26.0%	5,505
Overall Project	565,475	22.2%	7,327

56. **Micro-watershed drainage** activities permitted producers to obtain higher yields during the winter (Sali) season as well as produce vegetables and other crops during the Boro season when flooding commonly rendered much of the land uncultivable. Because of the impact of accumulated organic matter in the soil, the micro-watershed farm model assumes that the project benefits would peak 12 months after draining the submerged agricultural land. The benefits are assumed to peak during the first year after the completion of drainage works, and to decline during the subsequent two seasons, and then to remain unchanged thereafter. The farm model also assumes that the stream of benefits will continue to accrue for 15 years in total. The annual drainage maintenance costs were estimated by the Agriculture Department and were added in the calculation of the project costs for the entire period of economic analysis.

57. According to data from the Impact Assessment Report (IAR) published in March 2015, and converted into small and large farm models, micro-watershed cropping intensities rose from 153 percent to 193 percent during the course of implementation. While returns from the investment were good, at 29.3 percent, they were lower than for the main irrigation and TA package due to the absence of irrigation in most cases and the need for producers to forego prior wage income during a significant part of the year as on-farm cropping intensity increased. No direct comparison with PAD estimates are possible, as this activity was not analyzed separately at that time.

58. **Technology-based Interventions.** Shallow Tube Well, Low Lift Pump, Agricultural technology transfer, and Mechanization activities were grouped to avoid the likely duplication of benefits arising from the high level of overlap between these services. (They are abbreviated in figures below as “STW/LLP/ATMA.”) Most participants in this activity category group received technical support and access to both irrigation water and

tractor or power tiller services. Returns to activity investment are simulated using representative farm models with different cropping patterns and cultivation intensities to measure the impacts of STWs, Tractors, ATMA investments. To recognize the differences of the impacts on crop composition and cropping intensity on farms of different sizes, the impact of each intervention is modelled differently for two ‘typical’ farm sizes – ‘small’ and ‘large.’ The basic structure of farm models was calibrated using the factual project beneficiary statistics reported by the project impact studies, as noted above.

59. Both small (0.85 ha) and large (2.58 ha) models were prepared using data from the IAR. The principal benefits arose from two sources: (a) Increases in yields. These were sometimes substantial; for example, Boro rice yields rose from 2.2 MT/Ha to 5 MT/Ha, according to data from the IAR; (b) Cropping intensities, which the models show rising from 140 percent to over 200 percent for participants in this combined activity.

60. The FEA at appraisal projected an FIRR of 36.3 percent, so actual implementation results (42.7 percent) were higher than anticipated, largely due to greater than expected yield increases and a more rapid take up of high valued crops than anticipated.

Table 3: Key Assumptions Used in the Analysis of Technology-based Interventions

	Cropping intensity	Area under cereals	High value crops
At project appraisal			
Without project (control)	140-155	100	0%
With project	195-210	86-92	8-14%
At impact assessment			
Without Micro-watershed – Control	153	85	15%
	193	65	35%
STW/LLP/ATMA - Control	140	65	17%
With project	201	52	48%

61. **Mechanization.** Mechanization, mainly through the use of rental farm tractors, was an integral element of the cultivation practices participants undertook during implementation, whether or not they were members of a tractor group. However, the IAR found significant income being generated by tractor group members (typically 10 farmers per group) renting out the equipment for land preparation and other tasks. As a result, half of the costs of mechanization activities were assigned to the combined irrigation and technical assistance activity discussed above and half were assigned to the tractor group. On average, each tractor generated net earnings of INR106,000 per annum for its 10 participating group members, in addition to its use on group member holdings, resulting in an FIRR of 28.7 percent. This activity was not analyzed separately in the PAD FEA.

62. **Livestock.** The livestock model follows the approach of the original economic model in terms of measuring project benefits – the net economic value of incremental milk production resulting from the additional crossbred cows produced as a consequence of the AI program. The benefits of AI are modelled as the product of additional lactating crossbred cows produced and a net economic value of incremental milk production per single crossbred cow relative to that per single indigenous cows. The data on the former were supplied by the Livestock Department while the estimates of gross margins from milk production by crossbred and indigenous cows were obtained from the impact study.

63. **Fisheries.** Three sets of fish farm models were built with gross margins estimated using data from 585 observations made as part of the IAR. Table 4 illustrates the differences in ‘with project’ and ‘without project’ fish yield assumptions made by the original and updated fish farm models. The average sizes of the beneficiary ponds, tanks and beels were found to be, respectively, 0.6, 1.2 and 12.8 hectares.

Table 4: Projected and Actual Productivity Gains under Fisheries (MT/unit)

	Farmer ponds	Community tanks	Beels
At project appraisal			
Without project	0.8	0.7	0.1
With project	2.5	2.15	0.5
At impact assessment			
Without project	2.1	1.7	0.8
With project	3.5	2.3	1.6

64. **Roads.** Road related benefits result from reductions in vehicle operating costs (VOC), reduced journey times and changes in cropping patterns arising from improved connectivity. Total physical outcomes from the activity comprised the rehabilitation or upgrading of 1,793 km of rural roads, comprising 836 km of black-top (bitumen) roads, 900 km of gravel roads and 57 km of market access roads. VOC benefits were the most important element of total returns for both gravel and black-top roads. The assessment of transportation and time used in the analysis follows the same approach as the original model. The calculated FIRR at investment completion, at 15.9 percent (Table 2), is slightly lower than that projected in the PAD (17.5 percent, see Table 1), despite a greater than expected increase in vehicle usage on the target roads. However, investment costs were higher than projected. The data on cost and time savings were supplied by the PWD department and are presented in Tables 5 and 6.

Table 5: Estimated Impact of Rehabilitated Blacktop Roads on Cost and Time of Travel

Mode of Transportation	VOC (INR per km)		Traffic volume density (average daily number of vehicles)		Travel time (hours per 10 km)	
	Without project	With project	Without project	With project	Without project	With project
Carts	7.7	6.0	154	604	0.76	0.46
Cycle/Rickshaw	0.5	0.3	208	773	0.70	0.42
Bus	12.4	11.0	3	11	0.38	0.28
Truck	16.0	14.1	3	11	0.46	0.33
Tractor/Trailer/Power tiller	15.6	13.6	3	16	0.74	0.40
Car/Jeep	7.0	3.9	10	70	0.36	0.13
Two wheelers	2.3	1.2	10	79	0.27	0.14

Table 6: Estimated impact of rehabilitated gravel roads on cost and time of travel

Mode of Transportation	VOC (INR per km)		Traffic volume density (average daily number of vehicles)		Travel time (hours per 10 km)	
	Without project	With project	Without project	With project	Without project	With project
Carts	7.9	6.2	15	31	1.2	0.85
Cycle/Rickshaw	0.6	0.4	35	90	0.95	0.72
Bus	12.8	11.1	2	9	0.4	0.3
Truck	16.2	14.5	3	10	0.46	0.35
Tractor/Trailer/Power tiller	16.2	13.9	3	6	0.8	0.62
Car/Jeep	8.0	4.8	8	50	0.38	0.2
Two wheelers	2.6	1.4	20	54	0.31	0.2

65. The PWD data are corroborated by the findings from the IAR survey of 1,204 residents of villages connected by the roads rehabilitated by the project.

66. **Market development** comprised the improvement of existing physical infrastructure for 46 wholesale markets and 47 periodic markets within the project area, improving market access for an estimated 1.5 - 2.8 million residents within 750 beneficiary villages. The benefits of greater market access include higher agricultural sales, higher farm gate prices, higher cropping intensity, and higher yields. The analysis includes two sets of farm models – small and large, with and without improved marketing access. The differences in cropping intensity, yields and prices were obtained from the survey of 13,750 farmers conducted by the impact assessment study seeking to identify differences among farmers reporting problems with market access and farmers not reporting such problems. The comparative data from the survey together with assumptions used in the analysis are provided in Table 5.

Table 7: Key Assumptions Used in the Economic Analysis of Rural Market Investments

Item	Impact study results		Assumed by the model	
	Farmers with assured access to markets	Farmers reporting problems with market access	Farmers with assured access to markets	Farmers reporting problems with market access
Cropping intensity	200	189	175	170
Yields (tons/Ha)				
Paddy	4.4	4	4.3	4.2 (Sali); 4.3 (Boro)
Mustard	1.1	0.88	1	0.9
Cabbage	10.6	9.17	10	9.6
Cauliflower	9.8	4.32	10	9
Prices (INR/kg)				
Paddy	11	11	11	11
Mustard	25	22	25	22
Cabbage	7	7	7	7
Cauliflower	9	8	9	8.5

67. Data indicates that farmers with relatively better market access have statistically significantly higher cropping intensity levels, higher yields and, as a rule, enjoy higher prices for mustard seed and some vegetables. The number of markets upgraded was slightly less than originally projected, and most upgrading occurred later in the implementation period. The FIRR for this activity, based upon improved crop productivity resulting from the market improvement across an estimated area served by the market, is calculated at 15.4 percent. No comparative estimate was given in the PAD.

68. **Crop Diversification.** One of the principal benefits arising from agricultural activities under the project was diversification. This change not only reflected the increased dry season cropping activity as a result of project supported irrigation, but also allowed farmers to increase their incomes from sale of high value crops – principally vegetables (see Section 4). Table 3 above demonstrates the significant changes that occurred in comparison with control groups. For both the micro-watershed and other technology models, the proportion of high value crops grown more than doubled, while cropping intensity increased by 26 percent (micro-watershed participants) and 44 percent (irrigation/TA participants). Although the IAR only collected data on product sales, not volumes, it is clear that much of the vegetable production resulting from the increased cropping intensity has been for sale off-farm.

69. **Other Benefits.** Other miscellaneous benefits include the value of additional net income from milk sales and from livelihood activities by, respectively, MPIs, DCs and forestry groups established and supported by the project. They also include net economic returns from incremental production of livestock products by pilot goat and pig groups. The estimates of economic benefits were drawn from IAR data.

70. **Returns to Individual Project Components.** Returns to investment on a component basis were also calculated, showing that the highest returns resulted from Component 1 (irrigation, micro-watershed, mechanization and fisheries activities), which achieved a return of 42.1 percent. Component 2, including farm advisory services, market support activities and livestock, generated an FIRR of 18.1 percent, while Component 3 (Infrastructure Development) achieved an FIRR of 26. No component-based analysis of returns is provided in the PAD documentation.

2.3 Economic Analysis

71. In the economic analysis, the concepts of ‘tradables’ and ‘non-tradables’ are used to determine the calculation of ‘economic’ prices. Because India is self-sufficient in rice production, the economic analysis uses export parity price in determining the economic price for paddy. A Standard Conversion Factor (SCF) of 0.9 has been applied to all non-tradable items and has a significant impact, in particular, on labor and hence overall production costs. Table 6 presents the EIRR figures for major project activities, components and the overall project.

Table 8: Summary of the Project Economic Analysis

Activity/Component	Economic Rates of Return	
	EIRR (%)	NPV (INR m)
Micro-watershed (drainage)	31.7	59
STW/LLP/ATMA/Mechanization	67.2	7,915
Tractor Rental	34.8	302
Fishery	28.8	377
Livestock	27.2	468
Roads	21.2	2,946
Markets	8.5	-38
Component 1	31.2%	711
Component 2	28.2%	4,509
Component 3	22.7%	3,485
Overall Project	24.7%	8,181

72. Review of EIRRs for individual activities reveals that, in most cases, completion results exceeded those projected at appraisal. While the STW/LLP/ATMA combined analysis at 67.2 percent was significantly higher than the overall result initially projected of 39.1 percent, this is balanced in part by the results for the other two activities under the initial analysis – micro-watershed (31.7 percent) and tractor (34.8 percent) investments, both of which were lower than the average agricultural figure at appraisal. The large difference between financial and economic results for the combined STW/LLP/ATMA activity can be attributed to the increased price of rice in economic terms and the lower labor costs when the SCF is applied.

73. The superior performance of the overall project can be explained by the reallocation of project expenditures by the project implementing agency towards more profitable activities during the latter parts of the implementation period (2010-2014). The implementing agency took advantage of the midterm project review and processing of additional financing to fine-tune project targets and re-program project expenditures in favor of activities with higher economic returns.

3. Sustainability Analysis

74. The project has tracked a number of project beneficiaries over time to understand the sustainability of project benefits. Table 7 presents the summary indicators for selected groups drawn from M&E data.

Table 9: Average sustainability indices for selected groups

Beneficiary groups	Average sustainability score*	
	18 months after the investment	36 months and more after the investment
Drainage	n.a.	3
Ponds	2.8	3
Forestry	n.a.	3
MPI	2.3	2.7
Farm mechanization	2.1	2.5

*from score 1 - 'unsustainable' to score 3 - 'highly sustainable'

75. Each group has been assigned a score based on the weighted score of financial, institutional and social parameters ranging from 'unsustainable' (a score of 1) to 'highly sustainable' (a score of 3). The analysis revealed that most groups were sustainable and were improving their performance over time.

4. Impact on Household Incomes and Poverty

76. The project has delivered direct benefits to an estimated 1,050,000 households (direct and indirect beneficiaries) organized in an estimated 122,000 groups. Around 57 percent of all beneficiaries are participants in the ATMA program. Almost all others (99 percent) benefited from Component 1 programs. Among those, members of STW/LLP groups account for 76 percent of all beneficiary households, with tractor and micro-watershed group members responsible for further, respectively, 6 percent and 5 percent of the total. The remaining 11 percent of all households benefiting from Component 1 activities is made up of the participants of the different fishery groups.

77. A number of the key activities of the project have significantly increased household incomes over control groups which did not participate in project activities. The micro-watershed activity is calculated to have resulted in a 57 percent greater income among participants than among controls, while the STW/LLP/ATMA participants have incomes 39 percent higher than the controls. The membership of a tractor group is

estimated to increase participants' incomes by 32 percent over the already increased STW/LLP/ATMA participants. It should be noted that these increases occur after taking into account the loss of wage labor opportunities and income resulting from the higher labor demands of the increased cropping intensities of the project activities. The project has shown a moderate coverage of women and disadvantaged groups (Table 8). Overall, about 15 percent, or over 156,000 direct beneficiaries, were women, with livestock groups being almost exclusively female in composition. With the solitary exception of pond fishery groups all project activities have enjoyed more than 50 percent participation by scheduled castes, scheduled tribes and other backward castes. With over 54 percent of all project benefits (excluding ATMA for which no information was available) being received by poor and marginal groups the project has a demonstrable pro-poor focus at the core of its support programs.

Table 10: Project Beneficiaries under Components 1 and 2

Component or Activity	Number of beneficiary groups	Estimated number of beneficiary households	Including		
			Share of scheduled castes, scheduled tribes and other backward castes	Share of landless and marginal farmers	Share of women beneficiaries
Component 1					
STW/LLP	115,220	330,000	50	55	9
Farm mechanization	3,233	26,932	52	34	17
Micro-Watershed	89	24,683	52	44	11
Ponds	1,879	27,181	34	58	15
Tanks	629	19,182	75	60	15
Beels	103	4,612	60	70	15
Component 2					
ATMA	n.a.	590,136	64	n.a.	18
MPI	361	2,527	67	74	43
Pig rearing groups	250	1,250	73	85	99
Goat rearing groups	300	1,500	73	85	99
Forestry	79	395	57	59	44
TOTAL*	122,143	1,044,058	58%	54%	15%

*Share of landless and marginal farmers excluding the unknown value for ATMA beneficiaries

78. The project exhibited an impressive coverage of women and disadvantaged groups (Table 8). Overall, about 15 percent, or over 156,000 beneficiaries, were women. Livestock groups were almost exclusively female in composition. With the solitary exception of pond fishery groups, all project activities enjoyed more than 50 percent participation by scheduled castes, scheduled tribes and other backward castes. With over 54 percent of all project benefits (excluding ATMA for which no information was

available) being received by poor and marginal group the project has a demonstrable pro-poor focus at the core of its support programs.

79. Table 9 presents the average net income gains per beneficiary household relative to an estimated 2014 household poverty line of INR73,660. The average estimated net income gain per beneficiary household was about 40 percent of the estimated household poverty line, suggesting the project had a very strong impact in reducing poverty. Over 40 percent of all beneficiaries moreover have had an impact of at least 66 percent of the estimated 2014 household poverty line, suggesting a considerable improvement in living conditions as a result of the project.

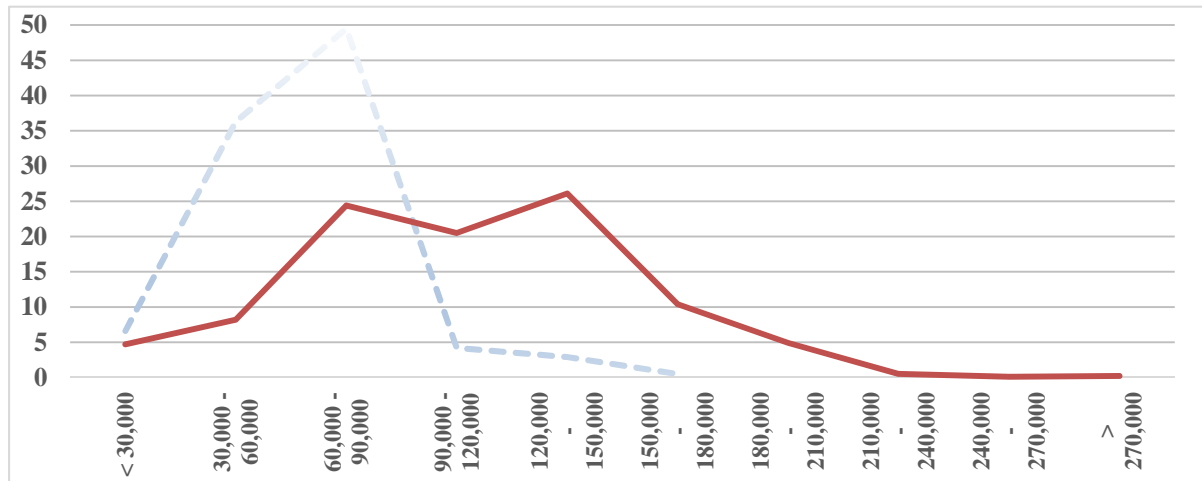
Table 11: Net Household Income Gain Relative to Estimated Poverty Line

Activity	Per Beneficiary Household	% of estimated 2014 poverty line*
Tractor Hire	10,938	19%
Drainage	15,386	27%
STWs/LLPs/ATMA	36,207	62%
Pig rearing groups	24,956	34%
MPI	22,614	31%
ATMA	17,871	24%
Forestry	12,014	16%
Beels	10,392	14%
Ponds	4,146	6%
Goat Rearing Groups	3,251	4%
Tanks	1,607	2%

* 2011 poverty line of INR58,000/household inflated by 2011-2014 inflation. All prices financial.

80. The project paid meticulous attention to the appropriate scale of investments. Economies of scale effects – which are hard to attain when supporting a range of activities in a large number of communities with poor market connections – were not targeted. As a result, the project brought about tangible and transformative impact on rural livelihoods.

Figure 2: Change in Income Distribution for STW Beneficiaries With- and Without- Project Intervention (N=3,872)



81. To illustrate the extent of the project impact on household welfare Figure 2 presents the distribution of total (gross) income of STW beneficiary households without project and after the receipt of the project-funded STW based on a sample of 3,872 households. The Figure shows that without project three quarters of all households' income hovered within the INR30,000 – 90,000 range while with project the income of more than half of all beneficiary households have expanded into INR90,000-175,000 range. The project has therefore made a clear, positive and significant change in the income distribution pattern of the project participants.

82. To illustrate the specific project impact on different income groups Table 10 presents an income mobility matrix based on the data of the same 3,872 STW beneficiaries. The rows represent the movement of households across income quintiles in 2014 from their original income position in 2012. The first row, for example, shows that 27.5 percent of households that in 2012 belonged to the lowest income quintile have managed to improve their income levels by 2014 *relative* to the other households originating from the same (poorest) income quintile in 2012. The performance of the households belonging to the second income quintile in 2012 is even more impressive, with 44 percent managing to improve their relative income levels, and only 25.3 percent declining to the bottom quintile.

Table 12: Income mobility matrix for STW households over 2012-2014 (N = 3,872)

Quintile in 2012	Quintile in 2014				
	Bottom Quintile (INR18,220 to 82,285)	Second Quintile (INR82,286 to 108,807)	Third Quintile (INR108,808 to 136,481)	Fourth Quintile (INR136,482 to 162,111)	Fifth Quintile (INR162,112 to 347,723)
Bottom Quintile (INR11,607-46,427)	72.5	15.4	9.0	3.0	0.1
Second Quintile (INR46,429 to 58,927)	25.3	30.6	27.6	10.0	6.4
Third Quintile (INR58,929 to 67,896)	1.4	27.4	28.5	25.8	16.8
Fourth Quintile (INR67,898 to 78,447)	0.8	23.7	11.7	35.2	28.7
Fifth Quintile (INR78,449 to 260,453)	0.0	3.0	23.1	26.0	47.9

83. Table 11 shows data on agriculture output sales in constant 2014 prices by STW participants in order to show the scale of the project's impact on producer behavior. It is noteworthy that, while the sale of agricultural products has increased significantly among all participants, the greatest impact has occurred among the lowest income quintile.

Table 13: Agriculture Sales by STW Households During 2012-2014 (N = 3,872)

Quintile	Sales of agricultural products (in INR)		
	2012	2014	Gain
Bottom quintile in 2012	12,544	38,838	210%
Second quintile in 2012	21,477	60,404	181%
Third quintile in 2012	25,053	73,548	194%
Fourth quintile in 2012	27,035	74,481	176%
Top quintile in 2012	27,654	76,430	176%
Sample Average	22,733	64,588	184%

84. Other non-monetary benefits of STW interventions include improvement in household food security status. In 2012 approximately 15 percent of the 3,872 households interviewed reported that their own food production was insufficient to cover their food needs. In 2014 none of the respondents from the same group of households reported being food deficit.

85. Although closely related to the size of the land endowment, the value of agricultural sales appears to be another important determinant of 'positive' income mobility. Households with 'positive' income mobility report the value of agricultural sales in the range of INR40,000-66,000, while the difference in the value of food stocks and own food consumption appears to be relatively minor. It is notable that households

with ‘negative’ income mobility (i.e. declining from the 3rd to the 2nd quintile) exhibited a much higher growth in the value of own consumption and food stocks, likely indicating that they are more concerned about household food security than higher agricultural sales.

Table 14: Factors explaining income mobility in the third income quintile in 2012 for STW households

Characteristic	Households moving from the third quintile in 2012 to the second quintile in 2014	Households staying in the third quintile during 2012-2014	Households moving from the third quintile in 2012 to the fourth quintile in 2014
Net area farmed	0.54	0.7	0.85
Gross agricultural sales in 2012 (INR)	2,606	10,888	17,272
Gross agricultural sales in 2014 (INR)	6,306	26,163	42,256
Difference (%)	142%	140%	145%
The value of own food consumption in 2012	20,433	19,298	18,099
The value of own food consumption in 2014	27,689	27,310	22,394
Difference (%)	36%	42%	24%
The value of food stocks in 2012 (INR)	3,058	3,821	4,995
The value of food stocks in 2014 (INR)	5,346	5,721	6,625
Difference (%)	75%	50%	33%

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Deepak Ahluwalia	Lead Agriculture Economist	SASDA - HIS	Economist
Madhavan Balachandran	Sr. Financial Management Specialist	GSUCA	Finance
Dhimant Jayendraray Baxi	Consultant	SARPS - HIS	Procurement
Robert S. Epworth	Agriculture Consultant	GFADR	Task Team Leader ²⁶
Prabir Joardar	Irrigation Consultant	GSURR	Task Team Leader ²⁷
Ashok Kumar	Sr. Highway Engineer	GTIDR	Transport
Tapas Paul	Senior Environmental Specialist	GENDR	Environment
Parmesh Shah	Lead Rural Development Specialist	GFADR	Rural Livelihoods
Mridula Singh	Senior Social Development Specialist	GSURR	Social
Paul Singh Sidhu	Consultant	GFADR	Agriculture
N. R. Bhasin	Consultant		Livestock Specialist
Grahame Dixie	Advisor- Marketing Specialist	GFADR	Task Team Leader ²⁸
Tanuj Mathur	Sr. Financial Management Specialist	GSURR	Finance
Supervision/ICR			
Nibir Kumar Bandyopadhyay	Consultant	SASDA - HIS	Irrigation Engineer
Dhimant Jayendraray Baxi	Sr. Procurement Specialist	SARPS - HIS	Procurement Consultant
Debabrata Chakraborti	Consultant	GGODR	Procurement
Mohan Gopalakrishnan	Sr. Financial Management Specialist	GGODR	Finance
Prabir Joardar	Consultant	GSURR	Irrigation Engineer
Anupam Joshi	Senior Environmental Specialist	GENDR	Environment
Jacqueline Julian	Operations Analyst	GFADR	Cost tables Specialist
Ashok Kumar	Sr. Highway Engineer	GTIDR	Transport
A.K.Kalesh Kumar	Programs and Capacity Building	GGODR	Procurement
Assaye Legesse	Senior Agriculture Economist	GFADR	Economist
Tanuj Mathur	Sr. Financial Management Specialist	GGODR	Finance
Grant Milne	Sr. Natural Resources Mgmt. Specialist	GFADR	Forestry
Manivannan Pathy	Sr. Agricultural Specialist	GFADR	Task Team Leader ²⁹
Tapas Paul	Senior Environmental Specialist	GENDR	Environment
Paul Ryan	Consultant	LCSHS - HIS	Forestry
S. Selvarajan	Consultant	SASDA - HIS	Economist
Paul Singh Sidhu	Consultant	GFADR	Agriculture
Mridula Singh	Sr. Social Development Specialist	GSURR	Social
Varun Singh	Sr. Social Development Specialist	GSURR	Social
Ai Chin Wee	Sr. Operations Officer	SASDA - HIS	M&E Specialist
Robert Epworth	Agriculture Consultant	GFADR	Task Team Leader
Deepak Ahluwalia	Lead Agriculture Economist	GFADR	Economist
Grahame Dixie	Advisor- Marketing Specialist	GFADR	Task Team Leader

²⁶ TTL from Preparation till June 2005

²⁷ TTL from July 2005 till December 2007

²⁸ TTL from January 2007 till December 2010

²⁹ TTL from January 2011 till closure

Mario Pedini	FAO Consultant		Fisheries Specialist
N.R. Bhasin	Consultant		Livestock Specialist
Vijayasekar Kalavakonda	Sr. Insurance Specialist	GFMDR	Finance and Micro Credit Specialist
Maroti Upare	FAO Consultant		Fisheries Specialist
Anju Gaur	Sr. Water Resources Specialist	GWADR	Irrigation, Drainage Mechanization
Bekzod Shamsiev	Sr. Agriculture Economist	GFADR	Agriculture Economist
Helen Winifred Leitch	FAO Consultant		Dairy
Heenaben Yatin Doshi	Procurement Specialist	GGODR	Procurement
Mohammed Atikuzzaman	Financial Management Specialist	GGODR	Finance
Kanv Garg	Consultant	GEEDR	Energy Specialist
Sanjay Vashishtha	FAO Consultant		Solar Energy Specialist
Suraiya Zannath	Sr. Financial Management Specialist	GGODR	Finance
Vanitha Kommu	Consultant		Environmental Specialist
Sanjukta Roy	FAO Consultant		Project Economist
Leena Malhotra	Program Assistant	SACIN	
Garima Sahai	FAO Consultant		Economist
Reena Gupta	Rural Development Specialist		Forestry
Jai Mansukhani	Program Assistant	SACIN	
Gitika Hora	FAO Consultant		Social Development Specialist

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	US\$Thousands (including travel and consultant costs)
Lending		
FY04	39.02	152.31
FY05	45.42	147.45
Total:	84.44	299.76
Supervision/ICR		
FY04	00.00	0.00
FY05	15.14	49.15
FY06	35.56	93.78
FY07	20.24	54.46
FY08	35.13	158.07
FY09	28.63	109.36
FY10	46.39	196.12
FY11	32.69	120.90
FY12	26.03	62.38
FY13	21.81	85.00
FY14	22.07	72.13
FY15	12.00	64.61
Total:	295.69	1065.96

Annex 5. Summary of Borrower's ICR

86. Agriculture and allied sector play a significant role in the socio-economic development of the State of Assam, as the sector continues to support over 75 percent of the population of the State and directly or indirectly providing employment to about 50 percent of the workforce. The Government of Assam has always been on the task of improving the agriculture and allied sectors in the State, and has taken up many programs for development of these sectors. One such initiative was the World Bank financed Assam Rural Infrastructure and Agricultural Services Project (ARIASP), which was taken up during the period 1995-2004. That project had laid down the foundation of an integrated development process in the agriculture and allied sectors of the State. Satisfactory and successful completion of ARIASP facilitated the State in taking-up 'Assam Agricultural Competitiveness Project (AACP) from February 2005, which included World Bank credit of US\$ 154 million. In January 2012, AACP got an Additional Financing (AF) of US\$ 50 million³⁰ from the World Bank. AACP along with the Additional Financing was closed on 15th March 2015.

Project Objectives and Components

87. The main objectives of the project were to increase the productivity and market access of targeted farmers and community groups. The key indicators of success was envisaged as increased yields of crops, fish, and livestock products - complemented by an increase in the proportion of marketed surplus. Although the over-riding objective is to stimulate growth of Assam's agricultural economy, project activities are predominantly pro-poor, directed primarily at small and marginal landholders, poor fishing communities and the landless.

88. To achieve these objectives the Project supported a number of activities under three components viz. (a) Investment Grant Scheme; (b) Agricultural Services and Market Chain Development; and (c) Infrastructure Development.

Project Design

89. The principal objectives of the Project, and the size and scope of the Project was well thought out and focused on the objectives. Nevertheless, the design of the 'marketing extension subcomponent' was not adequately designed during the original credit, though this was corrected during the Additional Financing period. Similarly, uptake of the Low Lift Pumps (LLP) by the farmers was low, as LLP depends on the perennial source of water, which become scare in the dry season.

90. The change in the grant pattern to 30 percent (from 70 percent during ARIASP) during design for irrigation pumps and also the mandatory linkage to commercial bank's credit, caused severe setback initially, as farmers were not accepting such a drastic change in the grant pattern. An apprehension in this regard was recorded in the Minutes of

³⁰ US\$ 10 Million was cancelled in December 2013 as additional funds were available with the project due to exchange rate changes.

negotiation for the credit with the World Bank. However, this was corrected post MTR and thereafter the Shallow Tube Well program was effectively implemented and farmers contributed upfront very enthusiastically.

91. Further, had the project design in case of fisheries could have provided for marketing aspects to facilitate more remunerative prices to the fish farmers for their produce.

92. Notwithstanding, the project design immensely benefited the State by inducing various institutional reforms initiatives and built the capacities of various implementing agencies. The capacities of these agencies have been so well built in the areas of project preparation, design, implementation, procurement, and evaluation that it would continue to be an asset for effective preparation and implementation of any Externally Aided Project, in addition to the regular departmental projects. This aspect is well reflected in the World Bank funded project 'Assam State Roads Project', where the detailed design of roads, bridges, preparation of DPR, procurement etc. are being carried out in-house, resulting in substantial saving in cost.

93. The pioneering community procurement model has been a great success and brought a paradigm shift in managing community involved programs of the project. This has created a vivid sense of ownership of the assets amongst the farmers and these assets were put to more productive use by the farmers.

94. The finance plus agenda of the additional financing (AF) viz. (a) Mainstreaming management approaches and best practices - convergence of Central Sector Scheme (CSS) ATMA into ARIAS Society, (b) Establishment of a Ground Water Monitoring System, (c) Collaboration with private sectors – Formation of Farmer Producer organization and (d) Pilot program on Solar powered minor irrigation pump sets (added latter) was appropriate and the project successfully completed these activities.

Project Appraisal

95. The Developmental Objectives were not changed during the life of the project. However, the minor changes that were effected in the scope, size and small operational modalities of some of the programs like in minor irrigation; farm mechanization; community tanks, beels and farmers ponds in fishery; dairy; forestry; and rural roads; both during the original credit & AF were essential and adequate. Similarly, it was also logical to drop the sub-component of pilot Sericulture. However, it is felt that the quantum of investments in farm mechanization could have been enhanced, commensurate to the expanded command area through STWs. Similarly, more funding should have been provided for roads connecting markets and productions hubs (like dairy & fishery), as it gives additional benefits to the farmers.

Project Implementation

96. The project, being a multi-sectoral, was implemented by the departments of Agriculture (ATMA, minor Irrigation, Farm Mechanization), Animal Husbandry &

Veterinary (Livestock & Milk Marketing), Fisheries, and Public Works Roads Department and Assam Agricultural University, with a dedicated Project Coordination Unit (PIU) to manage, supervise, monitor & evaluate project activities.

97. Though the implementing agencies and other partners were too many, coordination was efficiently and effectively managed by the ARIAS Society. Implementation got expedited post MTR due to the concerted support and guidance of the World Bank, dedicated effort by the PCU and the implementing agencies and the project has been completed successfully. The arrangement of a 'Nodal Officer' in each of the Project Implementation Units (PIU) at the Directorate level Head Quarter of the implementing line departments and a corresponding 'Coordinating Officer' from the line departments at the PCU has outstandingly helped in smooth coordination of the activities.

98. Being a demand driven project, reputed and upright NGOs were involved to ensure active participation of farmers and community in all the sectors for developing community stewardship and formation of Community groups.

Performance of IDA

99. Regular supervisions/ review missions and hand-holding by the World Bank have outstandingly helped in achieving the project objectives. The Mission members have always been very cooperative and the wrap-up discussions with topmost Government level functionaries aided in resolving implementation issues very promptly. Field visits by the mission members and the Aide Memoirs have provided an objective and useful feedback for initiating corrective actions. The Task Team Leaders (TTL) of the Bank had always been pro-active in providing guidance and advices. Overall performance of the World Bank has been highly satisfactory especially post MTR.

100. The MTR mission of the World Bank had sorted out almost all the deficiencies of the Project design by objectively assessing all the relevant aspects. Project had received a focused attention from the IDA post MTR, and many micro implementation level issues were sorted out. Close review and ample guidance on Safeguards related issues ensured better community involvement and environmental mitigating measures. The support on procurement and financial management ensured the fiduciary compliance and highest level of transparency and efficiency. Over the 10 years of the project life, while only 12 percent of the project cost was incurred during the first 3 years, 40 percent of the cost was incurred in next 3 years and the rest 48 percent was incurred during the last 4 years. This was due to more closure technical support, and focused supervision by the Bank.

Performance of the Implementing Agencies

101. After removal of the initial constraints during MTR, performance of the implementing agencies had improved considerably and the PCU played an efficient and significant role in coordinating with the Bank, GoA, GoI and the implementing agencies, and also ensured smooth fund flow across all the project locations.

102. Government of Assam's resolve to make AACP a success has ensured placing of efficient Governmental staff in the PCU. The dedication and determination of the implementing officials of the line departments, coupled with close monitoring and supervision by PCU has made the project implementation smooth. Continuous efforts by the PCU for building efficiency in the management of safeguards, procurement and financial aspects brought a fair level of synergy & unity of purpose.

Project Results

103. The project directly benefitted about 565,745 beneficiaries of Assam as against the envisaged 410,000 beneficiaries. Small, marginal and land less farmers³¹ communities (consisted 96 percent of the direct beneficiaries under the project) were the key focus of the project. The intensity of the activities in each district varied due to the demand-driven nature of the beneficiary selection criteria. The outcome of the project has already been recorded in other sections of this report.

KEY PHYSICAL OUTPUT & INTERMEDIATE OUTCOMES

104. The key physical output and the intermediate outcomes of the project have already be recorded in other sections of this report and hence not repeated.

Reform Initiatives

105. AACP had induced various reform initiatives such as- (a) Assam Fish Seed Act in 2005 and its Rules in 2010; (d) establishment of ATMAs (b) statewide comprehensive online groundwater monitoring system for sustainable use of groundwater; (c); Amendment to the Fishery Rules to facilitate community oriented development of beels, which is under active consideration by the State Government, following a demographic survey of all the beels in the State; (e) Phased cost recovery for AI services; (f) management takeover of the sick WAMUL by NDDDB; (g) amendment to the JFM principle regarding benefit sharing whereby, wherein the project JFMC, would be eligible for 50 percent of the net receipts from main felling of trees from the forest land managed by them; (h) complying with the covenant of funds for road maintenance; (i) Resettlement and Rehabilitation policy that was prepared as part of the AACP preparation; (j) constitution of Market Management and Development Committee in every market; etc.

Beneficiary Contribution & Sustainability

106. Beneficiary of the project have contributed total Rs.3427 million for participating in different activities, which had ensured ownership, efficiency, and sustainability of the project investments. The Sustainability Analysis report of the independent M&E consultants shows that most of the project activities are sustainable.

Community Involvement & Social Profile

³¹ Small farmers own 1-2 ha of land, Marginal Farmers : 0.5-1 ha, Landless: 0-0.5 ha, Semi-Medium: 2-4 ha

107. Community involvement and participation through formation of community groups was successfully done by involving NGOs. In all, 565,745 beneficiaries consisting of small, marginal, & landless³² famers (constituted 96 percent of the total beneficiaries) under total 123,436 groups were mobilized and trained for different activities. Of the total beneficiaries 15 percent were women and 50 percent total beneficiaries were from Schedule Caste, Schedule Tribe, or Other Backward Class.

Lessons Learned

108. If design issues of a project is taken care of at a very early stage, projects can deliver in a much faster way, e.g. - (a) a combination of change in grant & empowering communities accelerated the implementation pace of the STWs and the project could achieve a mammoth 40,000 STWs was achieved in just 3 years as against 60,000 STWs in the initial 7 years; (b) while the project could complete 329 ha of beel fisheries in initial 3 years, 1431 ha was achieved in 6 years due to a change in the implementation criteria of the beel development program; (d) the project completed 15915 ha of Micro Watershed Development Program [MWDP] in the initial 8 years, but during the AF period total 16,821 ha was achieved in just 3 years due to changes in the operational guidelines for MWDP; (e) similarly, changes in the implementation approach speeded up the market infrastructure development program resulting in construction of 55 Markets in 3 years, as against 38 Markets over 4 ½ years.

109. Deliverables of a project needs to be forecasted with a realistic implementation schedule, with sufficient time for start-up activities and community mobilization.

110. Successful project interventions are normally mainstreamed by the line departments in their own programs.

111. Projects with multiple implementing agencies should be monitored & coordinated by an apex single entity (like ARIAS Society), for easier supervision, monitor, fiduciary control, environmental & social safeguards and for greater operational synergies.

112. A clear objective strategy and transparent beneficiary selection criteria facilitate smooth implementing of project activities, without any controversies or biasness.

113. Monitoring and Evaluation is an important tool for measuring project performance against given indicators.

114. A well-knit rural road network can change the economy of an area and its impact on the agricultural economy due to easy and faster access to the markets, availability of quality inputs and increase in diversification to more high value crops.

Looking forward – Next Step

³² Small farmers own 1-2 ha of land, Marginal Farmers : 0.5-1 ha, Landless: 0-0.5 ha, Semi-Medium: 2-4 ha

115. On successful completion of AACP, the GoA proposed a follow-on/new Project to the GoI titled ‘Assam Agricultural Commercialization and Rural Transformation Project’ and GoI has posed the project to the World Bank on 25th March 2015. The World Bank vide letter of 27th April 2015 has inter alia mentioned that “The World Bank would be pleased to work with the Government of Assam (GoA) to prepare this project”.

Annex 6. List of Supporting Documents

1. Project Appraisal Document (PAD), Report No. 29580 IN, November 12, 2004
2. Project Paper (Additional Credit), Report No. 66052-IN, February 3, 2012
3. Aide Memoires and ISRs following Implementation Support Missions
4. World Bank Management Letters
5. India Country Assistance Strategy (CAS) FY 05-08 and FY 09-10
6. India Country Partnership Strategy (CPS) FY2013-17
7. Borrower's Project Completion Report
8. First Six Monthly Subsequent Monitoring Report of M&E Consultant of Original Credit
9. Second Six Monthly Subsequent Monitoring Report of M&E Consultant of Original Credit
10. Third Subsequent Monitoring Subsequent Monitoring Report of M&E Consultant of Original Credit
11. Fourth Six Monthly Subsequent Monitoring Report of M&E Consultant of Original Credit
12. Fifth Six Monthly Subsequent Monitoring Report of M&E Consultant of Original Credit
13. Final Impact Assessment Report of Original Credit
14. First Six Monthly Subsequent Monitoring Report of M&E Consultant of Additional Financing
15. Second Six Monthly Subsequent Monitoring Report of M&E Consultant of Additional Financing
16. Sustainability Study Report of M&E Consultant of Additional Financing
17. Final Impact Assessment Report of Additional Financing
18. Report on Farmer Producer Organizations submitted by Deloitte
19. Report on "Revisit on the Study on the Increasing Pattern of Use of Fertilizers, Pesticides..... ..in Assam"
20. Hand Book of Statistic of Assam 2013
21. Economic Survey of Assam 2013-14
22. Status Report of Agricultural Technology Management Agencies
23. Beneficiary Profile of Assam Agricultural Competitiveness Project
24. Assam Agricultural Competitiveness Project Marketing and Value Addition Report of Agricultural Technology Management Agencies
25. Tapping the Vast Agricultural Potential of Assam for a new 'Green Revolution' World. Bank in India, March 2011
26. Assam Agricultural Competitiveness Project Community Procurement of Pump Sets and Using SMS for Communication. Innovations in Development Issue 3, 2011
27. Improving Lives through Irrigation: How Introducing Community Procurement of Pumps Raised Productivity in Assam. IFC Smart Lessons, January 2012
28. Fish Farmers Meet New Technology Raising Aquaculture Productivity of Small Farmers in Assam. IFC Smart Lessons, November 2011

MAP: Assam Agricultural Competitiveness Project

