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IMPLEMENTATION COMPLETION REPORT
(IDA-27330)

ON A

CREDIT

IN THE AMOUNT OF SDR 81.0 MILLION
(US$ 126.0 MILLION EQUIVALENT)

TO THE

REPUBLIC OF INDIA

FOR THE

ASSAM RURAL INFRASTRUCTURE AND AGRICULTURAL SERVICES PROJECT

December 23, 2004

Agriculture and Rural Development Unit
South Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective)

Currency Unit	=	Indian Rupees (Rs)
Re 1	=	US$ 0.022
US$ 1	=	Rs 45.56

FISCAL YEAR
GoA, April 1 to March 31

ABBREVIATIONS AND ACRONYMS

AEO	Agricultural Extension Officer	M&E	Monitoring and Evaluation
AFDC	Assam Fisheries Development Corporation	MTR	Mid Term Review
		NABARD	National Bank for Agriculture and Rural Development
AI	Artificial Insemination		
ARIASP	Assam Rural Infrastructure and Agricultural Services Project	NCB	National Competitive Bidding
		NGO	Non Government Organization
Beel	Ox-bow lake formed due to shifting of river course	NPV	Net Present Value
		OWF	Open Water Fisheries
BPL	Below Poverty Line	PD	Project Director
CAS	Country Assistance Strategy	PIU	Project Implementation Unit
CMLI	Community Managed Lift Irrigation	PSR	Project Status Report
DCA	Development Credit Agreement	PWD	Public Works Department
DO	Development Objectives	Rs.	Indian Rupees
DoA	Department of Agriculture	SAR	Staff Appraisal Report
DTW	Deep Tube Well	STW	Shallow Tube Well
ERR	Economic Rate of Return	TA	Technical Assistance
FMC	Field Management Committee	T&V	Training and Visit
GoA	Government of Assam	VLEW	Village Level Extension Worker
GoI	Government of India		
ha	Hectare	WUA	Water User Association
ICB	International Competitive Bidding		
MANAGE	National Institute for Agricultural Extension Management		

Vice President:	Praful C. Patel
Country Director	Michael F. Carter
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INDIA
ASSAM RURAL INFRASTRUCTURE AND AGRICULTURAL SERVICES PROJECT
(IDA - 27330)

CONTENTS

Project ID: P010522	*Project Name:* ASSAM RURAL INFRA
Team Leader: Prabir Joardar	*TL Unit:* SASRD
ICR Type: Core ICR	*Report Date: December 23, 2004*

1. Project Data

Name: ASSAM RURAL INFRA
L/C/TF Number: IDA-27330
Country/Department: INDIA
Region: South Asia Regional Office

Sector/subsector: General agriculture, fishing and forestry sector (43%); Roads and highways (39%); Sub-national government administration (18%)
Theme: Rural services and infrastructure (P); Infrastructure services for private sector development (P); Gender (S); Other environment and natural resources management (S)

KEY DATES		*Original*	*Revised/Actual*
PCD:	03/12/1993	*Effective:*	08/31/1995	08/31/1995
Appraisal:	10/14/1994	*MTR:*	06/30/1999	07/22/1998
Approval:	05/25/1995	*Closing:*	12/31/2003	06/30/2004

Borrower/Implementing Agency: GoI/GoA
Other Partners:

STAFF	Current	At Appraisal
Vice President:	Praful C. Patel	Joseph D. Wood
Country Director:	Michael F. Carter	H. Vergin
Sector Manager:	Gajan Pathmanathan	S. Barghouti
Team Leader at ICR:	Prabir Joardar	G. Mukami
ICR Primary Author:	William J. Sorrenson (FAO/CP)	

2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

Outcome: S
Sustainability: L
Institutional Development Impact: SU
Bank Performance: S
Borrower Performance: S

	QAG (if available)	ICR
Quality at Entry:		S
Project at Risk at Any Time:	Yes	

3. Assessment of Development Objective and Design, and of Quality at Entry

3.1 Original Objective:

The principal objectives of the project were to: (i) improve equity and alleviate poverty by offering better opportunities for poorer farmers and women to contribute to agricultural growth and income generation; (ii) improve nutrition of the rural poor; (iii) accelerate agricultural growth through improved use of resources, relieving infrastructural and technical constraints, and providing an enabling environment to facilitate the growth of private sector investments; (iv) encourage sustainability of resource use and quality of the environment; and (v) improving Assam's long term capacity for a strategic agricultural planning.

3.1.1 Assessment. The Project Development Objectives (PDO) were highly relevant to the development context of Assam: high dependence on agriculture with a farming system dominated by a single important crop (paddy), low productivity, shortage of food grains and high incidence of rural poverty. The Staff Appraisal Report (SAR) rightly gave adequate attention to enhance income opportunities of poor farmers and women by specific poverty targeted interventions. It also recognized that enhancement of agricultural productivity leading to growth in rural income and reduction of poverty, would require adequate irrigation facilities, intensification and diversification of crops, creation of rural road network to improve access to the markets, and a favorable policy environment. The PDOs were also in line with the Bank's Country Assistance Strategy (CAS) which aimed to support rural development at state level through policy and institutional reforms.

3.2 Revised Objective:

There was no revision of the development objectives during the course of the project.

3.3 Original Components:

The project was structured in four components as indicated in the SAR:

(i) poverty alleviation: it had three sub components, i.e. (a) Fisheries Development, (b) Horticulture, and (c) Livestock development
(ii) institutional development: it had five subcomponents, i.e. (a) Technology Generation, (b) Education and Training, (c) Extension, (d) Seed Multiplication, and (e) Land Administration;
(iii) infrastructure: it had two subcomponents, i.e. (a) Irrigation, and (b) Rural Roads; and
(vi) project implementation: including strengthening Project Implementation Unit (PIU) and conducting technical studies.

3.4 Revised Components:

There was no formal revision of project components although the Development Credit Agreement (DCA) was amended four times to: (i) modify physical targets associated with irrigation, rural roads and fisheries; (ii) cancel land administration; (iii) include farm mechanization; and (iv) divert SDR 7.7 M for emergency reconstruction of earthquake affected infrastructure in Gujarat. The assessment of the latter will be discussed as part of the overall Gujarat Emergency Earthquake Reconstruction Project.

3.5 Quality at Entry:

The project objectives were consistent with the State's development policies and the CAS. Project design facilitated changes in policies, planning and implementation process, community participation and institutional capacity building. However, the difficult security and law and order situation prevailing in Assam limited the extent of stakeholder consultations and field work during project preparation. The preparation team should be complimented for developing a project in a very difficult and hostile environment, for anticipating a long implementation period by taking into account the preparation and implementation capacity of Government, and actually for taking a proactive and dominating role in project

preparation in this very difficult north-eastern state. The Project preceded the introduction of Bank's Loan Administration Change Initiative (LACI) guidelines on financial management and reporting, and therefore, no formal financial management assessment was conducted at the appraisal stage. However, the Bank could have given more attention to the process of identification of rural roads to facilitate convergence of benefits and also to the preparation of this component so as to avoid delays during implementation. In addition, the project design could have been clearer on procedures for attaining improved equity at all levels. These are the main weaknesses at the entry level. Considering these shortcomings, the Quality at Entry was rated as only marginally **Satisfactory**.

4. Achievement of Objective and Outputs

4.1 Outcome/achievement of objective:

The development objectives were valid and clearly focused on addressing the high incidence of poverty in Assam. They were consistent with the Government of Assam's (GoA's) agricultural strategy at the time (SAR para. 1.19) which included policy adjustment and assistance targeted to small and poor farming communities. They were also in line with the Bank's approach to agriculture in Assam which was to assist the GoA to (i) expand successful development experiences to poor communities; (ii) intensify the use of human capital and natural resources; (iii) improve the management of its resources through policy reforms and institutional development; and (iv) redress inequities (SAR para. 1.21).

Satisfactory. The overall achievement of the project development objectives is satisfactory. The project has had a significant impact on raising agricultural production and household incomes primarily through an impressive expansion in Shallow Tube Well (STW). The substantial increase in agricultural production due to the Project (and National Bank for Agriculture & Rural Development (NABARD) financed STWs which followed the development principle of the project STWs and were implemented simultaneously), - estimated at 600,000 tons of rice annually - has had an important impact on household and state level self-sufficiency in paddy, and has increased employment opportunities for the landless wage laborers as well as marginal and small farm families. Direct beneficiaries of STW component are about 197,260 farm families (excluding landless laborers) comprising mostly small and marginal farmers. In addition, the project has had a positive impact on raising rural incomes by (i) improving access to markets through rural road improvements; (ii) increasing diversification into vegetables and fruits through research, training and extension activities; (iii) increasing milk production through artificial insemination and breeding of better quality livestock; (iv) training targeted to interest groups benefiting particularly women (breeding of ducks, cultivation of flowers etc.); (v) raising supplementary farm income by fish production in farmers' ponds and community tanks (benefited about 12,000 farm families); and (vi) piloting NGO-led *beel* fisheries development which have proved effective in targeting poorer communities and in ensuring poor people get an equitable share of increased income.

The objective of improved nutrition of rural poor has been satisfactorily achieved because of the positive impacts of the project in terms of increased production of rice, vegetables, milk and fish with significant increase in retention and consumption of milk and fish at the farm level. The objective of accelerated agricultural growth has been successfully achieved due to significant shift in cropping pattern and enhanced agricultural production aided primarily by the successful STW program coupled with improved access to markets. Studies have been carried out to estimate the safe yield of ground water including its chemical properties, and 12 blocks have been identified for regular and careful monitoring of arsenic presence in ground water. Another study deals with residual effects of fertilizers and pesticides in water systems, which also provides comprehensive data on district-wise uses of fertilizers and pesticides. An environmental checklist has been developed and used during the implementation of the road maintenance component for

identifying the adverse effects and adopting mitigation measures during construction. Thus, the objective of encouraging sustainable resource use and quality of environment has been achieved in short and medium terms. The objective of long term strategic agricultural planning has been achieved through policy reforms including (i) formulation of State Agricultural Policy, (ii) formation of Road Board and adoption of Road Maintenance Policy, (iii) privatization of some seed farms and progeny orchards, (iv) formulation of Fish Seed Act, (v) *beel* (ox-bow lakes formed due to shifting of river course) lease reforms (benefiting poor community groups) etc. The principle governing selection of beneficiaries particularly for the irrigation and the fisheries development components largely followed the response of demands, although simultaneously targeting small and marginal farmers. Rural roads upgradation had been carried out in six out of 23 districts of the state, although the road maintenance component covered the entire state.

The impact of STWs on the equity and poverty within the Field Management Committees (FMC) was analyzed based on the data provided for four districts benefited by both NABARD and ARIASP program. Out of 140,976 farms benefiting in these districts by STW distribution, 79% are marginal farmers (MF) and 19% are small farmers (SF). Out of 103,005 ha area irrigated by STWs in these four districts, 59% belong to MF and 34% belong to SF. Thus the equity impact of the STW component is impressive. On the poverty side, available statistical data indicate that one out of three MF is classified under the Below Poverty Line (BPL) category. In case of SF in these four districts, about 17% are classified under BPL category. Furthermore, the landless agricultural laborers who mostly come under BPL category are also directly/indirectly benefited by the STW program due to intensification of agriculture (more working days) and greater demands of daily wage workers in related activities.

In case of fisheries, community tank and farmer pond interventions benefited mostly small and marginal farm holdings resulting in significantly enhanced income levels. Here also, the equity impact is impressive. Even in case of *beels* program following Mid Term Review (MTR) led corrective measures, the focus was shifted to involving poorer communities which has the potential of promoting equity and alleviating poverty among these households.

4.2 Outputs by components:

The nomenclature adopted for the project components - Poverty Alleviation, Institutional and Infrastructure Development do not accurately reflect the division of activities between components, and their relation to the project's development objectives. Poverty alleviation is a primary goal for the whole project and all project activities contribute to this objective, not just the activities under the Poverty Alleviation component. All components also contain activities that involve institutional and infrastructure development.

The project was prepared in the early 1990s when the State was passing through a very difficult law and order condition. This adverse work environment of limited access to the field during implementation stage (the first 3-4 years) and weak institutional arrangements resulted in very slow progress of implementation of the project. Non-familiarity of project staff/government in Bank's procurement, disbursement and financial management procedures also significantly contributed to the delay in implementation. However, the situation improved with the improvement of law and order conditions (after the MTR), particularly after the creation of a fully staffed Project Implementation Unit (PIU) headed by a senior administrative officer. The initial delays resulted in most activities being implemented and expenditures incurred during the last 3-4 years of the project, with delayed realization of project benefits and lowering of economic returns of some components.

Component 1 - Poverty Alleviation.

Overall achievement of this component is **satisfactory.**

(a) Fisheries: Implementation of this sub component was very slow during the early stage of the project due to lack of understanding, attention and focus by the implementing agencies. The success with *beel* and open water fisheries (OWF) was very limited as the project design did not provide a clear strategy for these activities and appraisal targets were unrealistically high. Because of the lack of clear targeting, early activities provided limited incremental benefit to poorer communities. The subcomponent design was later modified based on the advice of the fisheries expert (May 1999), through modifications of leasing conditions of *beels* to directly benefit the poorer communities, and shifting the focus from infrastructure development to better stocking, feed, practice etc. The achievements for *beels* and OWFs were 2,139 ha (SAR target 5,000 ha) and 164 ha (SAR target 500 ha) respectively. Towards the end of the project, the Fisheries legislation was again reviewed and strengthened to ensure benefits flow to poor adjacent communities through the development of cooperative *beels*. However, due to the delayed start (much after May 1999), the constraints in the supply of inputs and marketing were not fully resolved within the left over project period. In contrast, the pond culture has been a successful activity and was found to be very attractive for small and marginal farmers, particularly during the second half of the project when the activity was handled in a more systematic manner. Consequently, the appraisal targets were significantly increased. The achievements have been 602 ha (SAR target 200 ha) for farm ponds, and 822 ha (SAR target 300 ha) for community tanks, which have benefited predominantly marginal and small farmers. There had been a multiplier effect from the new pond techniques being demonstrated, with farmers adopting project models for the farmer ponds in 21 districts without any project assistance. The overall fisheries activity achievement was moderately **satisfactory**.

(b) Horticulture: Three core activities were planned for promoting horticultural crops: (a) the rehabilitation of 23 progeny orchards and leasing them to private entrepreneurs; (b) field demonstrations; and (c) farmer and staff training. Of the 23 progeny orchards that were to be rehabilitated and leased to private entrepreneurs, 16 were privatized, only two have operated successfully, and arrangements are in place to resume the leases of under performing orchards and to reallocate the leases. The sustainability of privatized progeny orchards is questionable and would be enhanced if the lease periods were longer (currently 5 years) and if there was better technical support to the lessees. There have been 7,400 horticultural demonstrations (34% of SAR target and 52% of the revised target). However, implementation performance on horticultural training was much better with 20,450 farmers having received horticultural training (157% of SAR target). In addition, 445 technical staff received training in extension and technologies (SAR target was 126). Demonstrations of hybrid vegetables especially of tomatoes, cabbage, cauliflower, capsicum, and broccoli coupled with extensive farmer training have had a positive impact in farmers diversifying into vegetables. The lower water requirement for vegetables in comparison to paddy has also facilitated more efficient use of water. In spite of weak performance of progeny orchard privatization, the impact of demonstration and horticultural training had a very positive effect on crop diversification and water conservation which justifies a fully **satisfactory** rating for this subcomponent.

(c) Livestock: The project design did not articulate a clear strategy for this sector and this was not clarified until consultants reviewed and reported on sector strategies (report July 2000). However the approach continued to focus on the development of Artificial Insemination (AI) infrastructure in line with the SAR, with lesser attention to other important aspects of animal nutrition and health. The development of AI infrastructure achieved or exceeded appraisal targets with the establishment of 3 frozen semen production centers (target 3), 7 semen banks (6), and 10 diagnostic laboratories (7). The Barapetta bull

farm was strengthened with imported Jersey bulls and heifers, but transportation and reception arrangements were inadequate and there were acclimatization problems due to which 33 of the 100 imported animals died. The project supported the improvement of disease investigation laboratories, but animal health services remain weak, particularly in respect of effectively controlling liver fluke and foot and mouth disease. The target for AI set out in the SAR was unrealistically high and disproportionate to the number of cattle available in the State. This also resulted in somewhat lowering of achievements and benefits. During the project period, 495,619 artificial inseminations have been completed resulting in the birth of more than 164,500 crossbred calves. The success rate with AI has risen slowly, but at 42% is currently above the national average of 39%. The increase in annual milk production from project activities has been estimated at 57 M liters (appraisal target was 140 M liters after 10 years). Per capita milk intake has increased from 80.4 gm/day to 185 gm/day after the project intervention. However, there was inadequate integration between agricultural extension services and the livestock activities. In absence of any clear strategy for milk marketing in the project design, milk surpluses have occurred in some areas due to increased production from crossbred cows. Activity achievement was therefore moderately **satisfactory.**

Component 2: Institutional Development

Overall achievement of this component is moderately **satisfactory**.

(a) Technology Generation: Activities focused on strengthening research capabilities including upgrading six regional agricultural research stations, and one station each for livestock and horticultural research, and the funding of one new fisheries research station during the initial three years. The planned infrastructure development has been completed but the investment in these facilities has limited impact on research activities that directly support the field activities of the project. Supervision missions, particularly during the last three years have stressed the need for greater attention to farming systems research and crop diversification, although significant crop diversion was achieved due to primarily the impact the successful STW subcomponent. Overall there has been an improvement in capacity of these research organizations in seed multiplication, technology generation and research delivery system.

(b) Education and Training: The upgrading of training facilities and the training programs has largely achieved SAR targets. There have been 2,082 participants in women's training, 14,535 Village Level Extension Workers (VLEW) have been trained, and 8,820 farmers have participated in training. National Institute for Agricultural Extension Management (MANAGE), Hyderabad in association with the Assam Agricultural University (AAU) conducted training for 1,764 FMCs, and this has had a positive impact on the management and operation of FMCs, particularly in relation to project STW and mechanization activities. There have been good productivity increases in the STW areas with significant crop diversification particularly into vegetable production facilitated by horticultural training and availability of irrigation water. The impact would have been further enhanced if research and extension had been better coordinated with other project activities and provided clearer guidance during the early years of the project on economically viable farming systems.

(c) Extension Service: Infrastructure and equipment has been provided to expand extension services to all agricultural sub-divisions including construction of 8 new sub-divisional offices. There have been 7,976 farm demonstrations (83% of SAR target). Although there have been a large number of demonstrations the approach basically follows the traditional Training & Visit (T&V) model with FMCs replacing farmer groups, and the system is delivering narrowly based technical messages with relatively weak research/extension linkages.

(d) Seed Multiplication: Storage and processing facilities were provided at six locations (full SAR achievement) to support GoA's plan for the production of breeder, foundation and certified seed. This enhanced availability of improved varieties of seeds, and also facilitated crop diversification.

(e) Land Administration: In view of the high level of land fragmentation, the project design correctly recognized the need for land consolidation, and a 3-year pilot project of 10,000 ha was envisaged. But the design did not foresee the risks related to social issues in connection with land consolidation. After considerable efforts in an area of about 400 ha, 72 ha belonging to 90 landholders was identified as suitable for reallocation, but the unwillingness of farmers to part with land of better quality without adequate compensation resulted in the activity being suspended at the MTR. There was no achievement on the computerization of land records, but this activity is now underway through a separate GoI project.

Component 3: Infrastructure

Overall achievement of this component is **satisfactory.**

(a) Irrigation: The project strategy was to develop irrigation works/systems for the poor farming communities through construction of 15,000 STWs, rehabilitating 320 Deep Tube wells (DTW), 150 River Pumping Schemes (RPS), and the construction of 5 pilot irrigation tanks. The STW program has been particularly successful and GoA was able to identify at an early stage the potential of this activity. The flexibility on the part of the Bank allowed this program to be significantly increased at the MTR and thereafter. Other planned irrigation activities have not achieved the same measure of success as the STW program.

(i) Shallow Tube Wells (with diesel pump sets)
Achievement has been 70,450 (SAR target 15,000 revised to 70,000) with 154,990 ha being brought under irrigation (33,000ha SAR target), and increasing cropping intensity in the STW areas from 150% to 195% (213% as per latest Monitoring and Evaluation (M&E) report – SAR target 210% after 10 years). FMC's have played a key role in coordinating farmer participation, and 9,955 FMC's have been involved. The success of the STW activities under this project influenced GoA to seek NABARD financing for an additional 99,000 STWs (installed in 2000/2001). Project and NABARD STWs have had an important impact on family and state level self-sufficiency in paddy, with an estimated annual increase of 600,000 tons of rice (SAR target was 132,000 tons of paddy equivalent to 80,000 tons of rice) and the state has become more or less self-sufficient in rice for the first time in two decades. The beneficiaries are fully responsible for STW operation and maintenance, and the sustainability of the STWs that have been installed is likely. Before any further large-scale expansion of STWs can be taken up, studies are needed to determine safe yield of ground water. The project has completed this study with the help of external consultants, which also indicate district-wise levels of iron, fluorides, arsenic and hydrocarbon in the ground water system. Activity achievement was **highly satisfactory**.

(ii) Deep Tube Wells and River Pumping Schemes (RPS)
Achievements have been 138 DTWs (SAR target 320), 54 RPS (SAR target 150), and of these, only 149 (99 DTWs and 50 RPS) have been handed over to Water User Associations (WUA) for management. It is estimated that only 32% and 29% of the potential areas are being irrigated respectively with DTWs and RPS, and there has been low recovery of beneficiary contributions to these schemes. The lack of farmer enthusiasm for these activities is due to inadequate involvement of the beneficiaries in the initial site selection (done well before the project was prepared), delayed NGO involvement in this process, and also the high cost of rehabilitation and the consequent higher cost of the beneficiary share in comparison to the

STW program. The longer-term sustainability of the DTW and RPS schemes is unlikely. Activity achievement was **unsatisfactory**.

(iii) Community Managed Lift Irrigation Schemes (CMLIS)
CMLIS is an additional pilot activity, and 10 schemes have been completed. NGOs have been involved in mobilizing beneficiaries and in forming WUAs. Beneficiary contributions have been received for all schemes. It is too early to evaluate this activity, but it appears to have potential where STW is not feasible due to technical reasons, and surface water is easily available.

(iv) Tank Irrigation
No progress was made on the planned pilot irrigation tank activity (5 planned) by the MTR, and the activity was dropped as the selection of technically feasible schemes was found to be difficult.

(b) Rural Roads: Support was to be provided for improving the rural road network through rehabilitating rural roads in areas of agricultural potential where land acquisition and negative environmental effects could be avoided, and support for road repair and maintenance subject to the preparation of a road maintenance policy and a road fund.

(i) Road Rehabilitation
Improvement of 1392 km of gravel roads with 285 bridges was envisaged at the SAR stage. The Government later realized that due to lengthy monsoon period and heavy rainfall in Assam, the durability of gravel roads was questionable. Bituminous road surface, although costlier, lasts longer, particularly in adverse weather conditions. Consequently, there was a strong demand from the beneficiaries for the construction of black top roads. Following this and after protracted discussions, the target was revised in May 2000 to about 800 km of rural roads with mostly black top surface. Ultimately, 723 km rural roads with 209 bridges were constructed, of which 212 km roads (taken up earlier) were gravel surfaced. The overall cost of the rural roads component was about 23% higher than the SAR estimate, primarily due to change in technical specifications from gravel to bitumen surfacing and greater concentration of bridges and culverts per kilometer of road length. Bituminous surfacing significantly reduces the maintenance costs, particularly where truck volumes are high as is the case of feeder roads connecting to State Highways (SH) and Major District Roads (MDR). But where truck volumes are lower as in the case of access roads connecting villages to feeder roads, gravel roads could be cheaper to construct and maintain. As most of the roads selected for upgrading under this activity were feeder roads (connecting to SH and/or MDR), the choice of using bituminous surfacing is justified on technical and economic grounds. The climatic conditions and the acute shortage of good roads for access to the market places in Assam, justify the conversion of gravel roads to black top category both on economic and social considerations. However, reduction of road length reduced the coverage of agricultural land area benefits and corresponding number of beneficiaries, resulting in lower Economic Rate of Return (ERR). Delay in selection of roads, inadequate convergence between the selected roads and other activities of the project (particularly STW development), much higher actual unit costs (appraisal estimate did not have the backing of detailed investigations and designs) and the delay in implementation also contributed in lowering ERR. Nevertheless, the benefits from the implementation of this component are significant. It not only lowered transportation costs and improved access to market places resulting in better realization of prices for farm products, various studies conducted by the external consultants also indicate other social benefits including easier access to education and significant improvement to access to health facilities. These benefits have not been considered in the ERR. In spite of these significant gains, the activity achievement is considered to be moderately **satisfactory** due to lower ERR than what was anticipated at appraisal.

(ii) Road Maintenance
The SAR included provision for US$8 million to be used for upgrading rural roads and repair of existing timber bridges subject to the constitution of a Road Board and a Road Maintenance Fund. These requirements were met in 2002, and approximately 2,013 km of rural roads were rehabilitated at a cost of Rs 433 M. Maintenance works included renewal of bituminous and gravel surfaces, improvement of shoulders and side drains, and repair of existing timber bridges. Activity achievement was **satisfactory**.

(c) Mechanization (New component): With the successful expansion of irrigated area, and the narrow window available in Assam for preparing land between crops due to heavy and extended rainy periods, there was a justifiable need for mechanization as land can be cultivated more rapidly and at reduced cost compared to bullock cultivation. GoA requested to add this activity which was accepted by the Bank towards the end of project. Up to project end, 554 tractors, 1,500 power tillers and 300 threshers were distributed to FMCs in 23 districts. The introduction of mechanization has had a positive impact on FMC activities, particularly where FMCs have received MANAGE training. Long term sustainability needs to be monitored. Activity achievement was **satisfactory**.

Component 4: Project Implementation

The project financed the establishment of the PIU including office equipment, vehicles and staff. Provision was also made for supporting studies considered necessary for improving the use of natural resources (soil and water management) and the marketing of highly perishable horticulture products. The project also included support for a package of state-specific policy reforms.

Project management was initially very weak and problems were experienced in adequately staffing the PIU, the release of funds to the Line Departments, and in procurement, which significantly slowed implementation. The extremely difficult security and law and order situation that prevailed during the initial 3 - 4 years also contributed considerably to the slow progress. During the initial period, project officials were not familiar with the procurement procedures under Bank financed projects. Further, the legal agreement required International Competitive Bidding (ICB) method for procurement of all Goods till the DCA was amended to include the National Competitive Bidding (NCB) method. The first set of bidding documents for the rural roads component became ready only in September 1997. However, the project implementation improved after the PIU was established as a registered society in (November 1998) and staffed adequately. Since then, the PIU functioned as an independent authority led by a senior bureaucrat as the Project Director who had the authority to interact with various line agencies at the highest level. This helped in achieving better coordination, management and reporting. The PIU was adequately staffed with a senior technical staff being trained in Bank procurement procedures, which helped in the procurement process. While the change in the institutional framework in the PIU vastly improved overall performance, the consequential impact on the accounting and reporting arrangements was not initially achieved to the desired level. The financial reporting during initial years primarily focused on disbursement to implementing agencies and preparation of withdrawal claims. The situation improved significantly with several initiatives taken in FY02 by conducting training program for line department staff, and introducing appropriate reporting formats and computerization of accounting system. Overall, the reporting of physical and financial progress has been satisfactory. However, the quality of monitoring the impacts of the project activities on beneficiary groups remained weak even following the contracting in the year 2000 of the Indian Institute of Management, Lucknow (Agriculture Management Center), in association with Assam Institute of Management, Guwahati. A computerized project management system (MIS) was developed only towards the end of the project. Overall activity achievement was **satisfactory**.

4.3 Net Present Value/Economic rate of return:

The comparisons of the base case Net Present Values (NPV) and ERRs at appraisal, and as at June end 2004 are presented below. The ERR at appraisal was recalculated based on the data provided in SAR. The overall project ERR at implementation completion is marginally higher than the re-calculated figure - 21% compared to 20% at appraisal. The ERR from irrigation is higher due primarily to the rapid expansion in STW irrigation, which has large economic benefits and has offset the reduced ERR for rural road improvement. ERR for the horticulture subcomponent is also higher than what was calculated for SAR. Economic returns to livestock and fisheries have been below appraisal estimates, significantly due to lack of understanding and weakness in project implementation during the initial years, which deficiencies were corrected during the last 3-4 years of the project. Project costs have been 14% lower in dollar terms than estimated at appraisal (see section 5.4), but the economic impact of this has been negated through lower than anticipated benefits from improvements in rural roads, livestock and fisheries production.

NPV and ERR Estimates at Apppraisal and Project Completion					
	NPV (Rs million) a/		ERR (%)		
	SAR c/	ICR	SAR b/	SAR c/	ICR
Overall Project	3,394	2,296	24	20	21
Irrigation	1,485	3,061	57	60	64
Rural Roads	1,014	130	33	25	14
Livestock	1,147	56	21	20	16
Fisheries	138	0	22	18	12
Horticulture	1,159	836	66	58	65

a/ December 2003 prices discounted at 12%

b/ As given in SAR

c/ The baseline ERR quoted in the SAR is 24%, but according to the detailed baseline economic cash flow presented in Annex 11, Table 33 of the SAR it is in fact 20.2%. There are also some discrepancies in the ERRs of individual components quoted in the SAR; the ERRs presented above are the re-estimated ERRs based on the economic cash flows presented in Table 33 of SAR.

4.4 Financial rate of return:

No financial rates of return were calculated at appraisal although financial impacts at household level were estimated based on a number of typical models for crop, dairy and fish production. The financial impacts at farm level at the time of project completion, compared to appraisal estimates, are detailed in Financial and Economic Analysis Working Paper and summarized in Annex 3. The project has resulted in significant increases in household incomes as evidenced in the examples tabled below. Actual increases are similar to those estimated at appraisal.

Estimated Percentage Changes in Net Income		
Household Models	**SAR (%)**	**ICR (%)**
0.4 ha farm model no diversification	nc	82
0.4 ha farm model with diversification	72	103
0.8 ha farm model with diversification	85	92
1.5 ha farm model with diversification	83	85
Per cow (cross bred compared to indigenous)	416	255
0.25 ha fish pond	nc	200
1 ha community fish tank	nc	218

nc = not calculated

4.5 Institutional development impact:

The project used existing government Line Departments, the Assam Agricultural University (AAU), FMCs and farmer interest groups. Project support provided through additional staff (in the case of agricultural extension), and through training and Technical Assistance (TA), has strengthened these institutions and will therefore have a lasting impact. It is recognized by the Borrower that in the case of agricultural research, extension and seed services, and for FMCs to strengthen their capacity to sustain irrigation and mechanization services, further institutional support beyond the project will be needed.

5. Major Factors Affecting Implementation and Outcome

5.1 Factors outside the control of government or implementing agency:

Two extraneous factors had an important impact on implementation and outcome, *viz.*: (i) security and law and order; and (ii) GoI rice procurement policy. The extremely difficult security and law and order situation that prevailed for a significant part of the project period constrained field activities, and in fact was one of the main reasons for the slow progress during the initial years. Assam receives rice from the GoI to support various rural development program like Food For Work (FFW) program. The rice procured in surplus states when brought into Assam depresses the local market price. This problem can be avoided only if the rice procurement policy of GoI is changed and procurement takes place from the local market for distribution under the FFW schemes in Assam.

5.2 Factors generally subject to government control:

Initial problems in the release of funds to the line agencies and inadequate staffing of the PIU. Although the Bank informally issued a suspension threat as early as September 1996, these problems were not adequately addressed until after the MTR in June 1998.

5.3 Factors generally subject to implementing agency control:

The project had a very slow start and was not elevated out of being a problem status project until after the supervision mission of May 1999, nearly four years after project effectiveness. Some of the issues that contributed to this very slow pace of implementation could perhaps have been resolved earlier if the PIU had adopted a more proactive response to problem resolution. Apart from the law and order conditions, the other main issues that initially constrained the project and were largely under the control of the government/ implementing agencies, were: (i) the complex and time consuming procedures for clearing project proposals submitted by the line departments; (ii) an initial reluctance to appoint adequate full time staff to the PIU and to recruit consultants to supervise road construction; (iii) delay in establishing the M&E procedures; (iv) delay in initiating policy reforms; (v) slow procurement and delay in submission of claims for reimbursement (due to a lack of understanding of Bank procedures); and (vi) a delay in the submission of audit certificates. To the credit of the implementing agency, when GoA adequately resourced the PIU staff and it was established as a registered society (in November 1998) giving it a clearer management role, most of the administrative issues were resolved and project implementation improved significantly largely due to the active coordination and management of procurement by the PIU, and timely release of funds to line agencies.

The supervision mission of March 1997 indicated the deficiency in M&E process, and although subsequent missions highlighted this issue, the M&E activities were not effectively implemented until October 2000 when external M&E consultants were engaged. The project was designed to target its benefits to the poorest of rural population, and it was envisaged that the intended beneficiaries would be identified through baseline surveys. A project-wide baseline survey was carried out at the on-set of the project; however, no follow on detailed surveys were done to specifically identify the target groups in rural districts. Consequently, the subsequent project impact assessments have not been able to satisfactorily quantify the benefits flowing to the target poor rural families. Also, the impact of activities other than those under the

Poverty Alleviation component on the incomes of poor farming communities was not specifically captured by the M&E studies. This issue was identified by the supervision mission of March 2003 that indicated that the M&E needed to adequately capture the impact of all project activities on the intended beneficiaries.

5.4 Costs and financing:

Total project cost was estimated at the time of appraisal at Rs. 5,676.5 million (M) inclusive of contingencies, equivalent to US$ 146.6 M. IDA Credit of SDR 81 M (US$ 126.0 M equivalent) was to finance about 90% of total project costs (see Economic and Financial Analysis Working Paper for details). Actual total project cost was Rs. 5,660.9 M (nearly 100% of the SAR estimate). Corresponding cost in US dollar was approximately US$ 127.05 M which is about 87% of the SAR estimate. The lower cost in US dollar terms is due to exchange rate fluctuations between US dollars, SDR and Indian Rupees, as also due to the diversion of the equivalent of SDR 7.7 M to Gujarat Emergency Earthquake Reconstruction Project. The IDA actual financing for the project was equivalent to US$ 109.25 million.

The breakdown in costs by component, at appraisal and project end, is tabulated below. The infrastructure share of total costs increased from 61% to 81%, mostly because of the increase in costs of rural roads (58% at ICR compared to 48% at SAR) and irrigation (from 13% at SAR to 23% - including farm mechanization component). The poverty alleviation component costs decreased from 19% to 9% primarily due to change in designs after MTR when physical improvement of *beels* were reduced in favor of support to the communities dependent of *beels* by better technology, stocking etc. Similarly, cost of infrastructure and international consultancies / training etc. under the institutional development component were reduced which lowered the overall component cost from 18% to 7%.

While expenditure on irrigation was (including farm mechanization) nearly doubled, the area irrigated increased impressively over three-folds (from 49,000 ha to 161,000 ha) due to the shift during project implementation from public investment in deep tube wells and river pumping schemes, to privately owned and operated shallow tube wells. The increased costs of rural roads were mainly due to change in technical specifications (from gravel to black top) as most of these roads were feeder to state highways and district roads and had significant heavy traffic. However, the higher unit costs resulted in shorter road lengths that could be funded through the project, and also reduced the number of benefited villages. The delay in taking decision in this regard also delayed the benefits.

Project Costs by Component a/

Project Component	SAR (%)	ICR (%) b/
A. Poverty Alleviation	19	9
B. Institutional Development	18	7
C. Infrastructure		
Irrigation	13	23 c/
Rural Roads	48	58
D. Project Implementation	2	2

a/ For details see Financial and Economic Analysis Working Paper
b/ Project costs as of June 30, 2004
c/ Includes mechanization

6. Sustainability

6.1 Rationale for sustainability rating:

Project sustainability is **likely**. All project activities have been implemented through existing line department units under the guidance of the PIU, and the capacity of these units to carry out their normal

development activities has generally been enhanced by their involvement in the project. Agricultural extension activities have been extended to 8 additional sub-divisions. The services of the project road consultants have assisted the Public Works Department (PWD) to improve its capacity to design and implement road and bridge construction activities throughout the state. Under the influence of the project, a policy for road construction and maintenance has been established, a State Road Board formed, and a road maintenance fund created with a dedicated allocation of funds to the Rural Board for road maintenance, with a budgetary allocation of Rs. 600 million (about 3 times the normal allocation) during FY 2004-05. This will make the investments in the road sector sustainable. The main investments under the irrigation component are the STWs which are owned, maintained and operated by the farmers at their own costs. There appears no risk to the sustainability of this sub component. Field level implementation has mainly been through FMC's that existed prior to the project, but were largely inactive. The STW program and other project activities have played a key role in reactivating these FMCs and making them a focal point for rural development and for coordinating farmer participation in local development activities. Revised Fishery Acts and Rules have been drafted. The increase in the lease period of *beel* fisheries is attracting investments, and also will help in formation of beneficiary cooperatives for sustainable resource use.

6.2 Transition arrangement to regular operations:

The Bank has initiated the preparation of a follow-on project. The current project has made significant investments in improving the capacity of GoA institutions that are involved in rural development, but much of this capacity remains to be fully utilized, and effectively utilizing this capacity is a challenge for the future. In particular, the strengthening of the agricultural research and extension system has not yet yielded satisfactory outputs, and there continues to be a strong need by farmers for guidance on appropriate farming systems including crop diversification. Project activities have resulted in significant increases in the production of some crops with some local surpluses, and greater attention needs to be given to the marketing of produce. The current project correctly recognized the severe problem of the fragmentation of agricultural land holdings in Assam. The problem of fragmentation will become more critical in the future, and the follow-on project needs to consider this issue despite the difficultly in developing practical solutions. There is a need to give greater attention to effective M&E to ensure that the impacts of project investments are adequately documented.

7. Bank and Borrower Performance

Bank

7.1 Lending:

Banks performance in project preparation and lending is rated as **satisfactory**. The Project design was consistent with the CAS that was current at preparation, with its focus on investment leading to policy reform, increased involvement of the private sector, and beneficiary participation in design, operation, financing and ownership of the assets being created, and cost recovery of publicly supplied goods to ensure accountability and sustainability. The project also relates strongly to the 2001 CAS with poverty reduction as its overarching objective. The SAR did identify delays in project mobilization, implementation and disbursement as common problems with earlier Bank supported agricultural projects. The design could have had a more clearly articulated strategy for avoiding these problems, such as having the activities to be completed during the first year of the project fully identified, and to have assessed these during project appraisal. The guidelines for the selection of beneficiaries and ensuring equity was not very clear, leading to a conflict of situation between demand driven development options and poverty targeted development - requirements of beneficiary contribution vis-à-vis poverty as the criteria for the selection of beneficiaries.

7.2 Supervision:

The overall supervision quality is rated as **satisfactory**. In retrospect, there should have been greater attention at the launch of the project to ensure that Bank procedures on the preparation of Statement of

Expenses (SOE), and audit and procurement requirements were fully understood, and that the Bank and the government fully agreed on the initial field activities to be completed, and on implementation responsibilities. The Bank took appropriate action when initial progress was unsatisfactory, and even during the first year, the project was classified as a problem project, and the Bank threatened to suspend the Credit. The MTR was brought forward by one year in an attempt to identify and develop solutions to the major issues constraining implementation progress of the project. A positive factor was the flexibility shown by the Bank to reallocate additional resources to the STW program, which has had a very significant and positive impact on increasing the area under irrigation, equitable distribution of resources, increase in productivity and production of rice, crop diversification, and substantial increase in rural income at all levels. Security was a risk particularly during the initial 3-4 years, and this did impact on the field activities and field visits by supervision missions. Nevertheless, supervision missions were generally regular. The quality of supervision advice was generally sound.

7.3 Overall Bank performance:

The overall Bank performance is rated as **satisfactory**. The project design was generally appropriate although it has some weak points, and the Bank was firm but supportive of the Borrower during the initial three years when very little progress was made with implementation. Bank supervision teams, particularly after the MTR, also assisted the government to improve performance under various component activities.

Borrower

7.4 Preparation:

Overall Borrower performance during preparation is rated as **unsatisfactory**. Due to the inexperience of the GoA in the preparation of Bank supported projects and also in handling complex agricultural projects, the Bank largely led project preparation activities. This resulted in some lack of ownership of the project design by the counterpart agencies. When implementation commenced, it became apparent that the strategy for a number of activities were not clear to the implementing agencies, and additional technical inputs were required. For example, the livestock activities was not clarified until consultants reported on sector strategies (in July 2000), and the fisheries development strategy for *beel* and OWF was not satisfactorily clarified and implementation focus modified until fisheries expertise was added to supervision missions in May 1999.

7.5 Government implementation performance:

The overall government implementation performance is rated **satisfactory**, although the performance during the initial three years of the project was generally unsatisfactory. There were no physical achievements during the first year of the project, and early project achievements were severely constrained because of the inadequate provision of staff and equipment for the PIU, and staff that were made available were on additional charge with other non-project responsibilities. Project implementation prior to the MTR was also constrained because of the slow release of funds, complex and time consuming procedures for clearing line departments proposals, slow progress with procurement due to a lack of understanding of Bank procedures, and delayed submission of claims for reimbursement. Project implementation performance improved significantly when the PIU was established as a registered society giving it a clearer management mandate. The physical targets for the project have been largely fulfilled.

7.6 Implementing Agency:

The project implementation was initially unsatisfactory due to inadequate arrangement and staffing. After GoA established the PIU up as an autonomous registered society in November 1998, its performance improved significantly. PIU played the key role in identifying the early success of the STW program, and was instrumental in proposing substantially larger targets for this very successful activity. Although the implementation of policy studies started slowly, a considerable amount of policy work has been completed.

The FMC training that was arranged utilizing the services of MANAGE, was an activity that has had a very positive impact on the ability of FMCs to manage resources provided by the project. The PIU was very proactive during the second half of the project, and resolved many implementation bottlenecks which helped the project implementing agencies to satisfactorily complete all activities. The project has largely complied with the financial covenants through out its life. However, delay in submission of audit reports resulted in temporary suspension of SOE based disbursements (in 1998 and 1999). Audit disallowances aggregating to Rs. 98 million were adjusted by the Bank with other withdrawal claims. ARIASP has since obtained revised audit certificates and reclaimed a large part of these expenditures. No audit report remains outstanding as of now. Overall, the performance of PIU was very **satisfactory**.

7.7 Overall Borrower performance:

Overall Borrower performance is rated as **satisfactory**. The performance of the project until the MTR indicated some what a lack of commitment, although it is necessary to recognize that the security situation that was prevailing prior to the MTR would have meant that project implementation was often very difficult for the line department staff responsible for field activities.

8. Lessons Learned

- Clearly defined implementation modalities and first year activities should be a part of project design and preparation. Fully appraised and staffed project activities ready for implementation should be available for review at project appraisal, and should cover at least the first year of project implementation.
- Project design should provide a clear strategy on how the intended beneficiaries will be identified, and how they will be involved in planning and implementing project activities.
- Innovative and institutionally complex projects such as ARIASP need to give high priority to M&E and ensure observations are evaluated quickly and feedback is used effectively to modify project design and/or implementation arrangements, as and when necessary.
- Supervision team should adopt a flexible and process approach and take corrective measures based on findings of M&E reports.
- Good project management and financial management are key facilitating factors for successful implementation of a project. Towards this, a dedicated and efficient PIU can improve the project performance dramatically.
- More radical reform of the extension system is needed if farmers are to make best use of new infrastructure, including decentralized planning and funding, collaboration between line Departments and partnerships with the private sector.
- The ability of small farmers to join farm mechanization groups is constrained if access to commercial bank loans is not facilitated.
- Privately owned and operated shallow tube wells are by far the most efficient and cost effective irrigation method in most areas of Assam.
- Fish production is a potentially good source of income for marginal farmers and the landless, but well targeted and appropriate market-linked extension and follow-up training is essential to nurture participants and ensure sustainability of both groups and investments.
- Without adequate attention to animal nutrition and health, and to milk marketing, upgrading of cattle will bring only limited benefits to livestock producers.
- Building a constituency for community participation takes time and project design must plan for this, ensuring adequate attention is given to incentives for participants, as individuals and as a group, during implementation and in the post project period.
- NGOs are essential partners when community mobilization is required, but nurturing and training of these same NGOs is needed if the maximum benefit is to be obtained from their involvement.

- To promote growth of the rural economy, road networks need to be better planned with agricultural potential in mind, incorporating well placed market-yards, to ensure maximum convergence between project activities and impact.

9. Partner Comments

(a) Borrower/implementing agency:
See Annex 8 and Annex 9

(b) Cofinanciers:
NA

(c) Other partners (NGOs/private sector):
NA

10. Additional Information

See Annexes

Annex 1. Key Performance Indicators/Log Frame Matrix

Annex 1(a) Impact Indicators		
Indicator	**Projected in SAR**	**Actual/Latest estimate**
Direct Beneficiaries		
From irrigation	300,000 households	202,020 households
From all project activities	No SAR target	460,381 households /a
Increase in net income	From 72% to 85%	From 85% to 103% /b
Increase in annual employment	3 million work days	12.5 million work days
Roads constructed	1,400 km	723 km
Area irrigated	49,000 ha	161,000 ha
Increase in cropping intensity	From 140% to 210%	From 150% to 195%
Increase in annual paddy production	132,000 tons	409,170 tons
Increase in milk production	140 M litres/year	57 M litres/year
Increase in fish production	3,000 tons per year	3,110 tons per year
Increase in horticultural production	85,000 tons per year	46,500 tons per year
Key commodities	**Pre-project Yield**	**Post-project Yield**
Rice yield	1.5 t/ha (Ahu)	4.8 t/ha (Boro)
Milk yield (ltr./lactation)	200 (local)	1500 (cross bred)
Fish yield	0.4 t/ha	1.23 t/ha
a/ Excluding training activities b/ Increases in net farm income from farm models (see Financial and Economic Analysis Working Paper for details)		

Annex 1(b) Output Indicators

Activity	Unit	SAR Target	Revised Target	Project Achievement
A. Poverty Alleviation Component				
1. Horticulture				
Progeny orchards	no.	23		23
Staff training	no.	126		312
Farmer training	no.	13,000		20,450
Demonstrations	no.	22,092	14,245	7,407
2. Fisheries development				
Farm ponds	ha.	200	602	602
Community tanks	ha.	300	822	822
Beels	ha.	5,000	5,000	2,139
Open water fisheries	ha.	500		164
Laboratories	no.	4		2
Training hall	no.	8		8
Demonstrations	no.	625	925	962
Staff training	no.	215		331
Farmer training	no.	1,400		5,904
NGO training	no.			121
3. Livestock development				
Semen stations	no.	3		3
Semen banks	no.	6		7
Diagnostic laboratories	no.	7		10
AI centres	no.	515		512
Staff training	no.	2,711		2,173
Overseas training	mm	16		0
Women's courses	no.	10,200		5,638
Self-employment training	no.	4,400		2,052
Farmer training	no.			604,342
Procurement frozen semen	no.		750,000	497,144
Semen doses distributed	no.		210,000	498,000
Artificial insemination	no.		400,000	495,619
Fodder demonstration	no.		2,824	1,250

Activity	Unit	SAR Target	Revised Target	Project Achievement
B. Institutional Development Component				
1. Technology generation				
Regional Research Stations	no.	6		6
Livestock Research Centre	no.	1		1
Horticultural Research Centre	no.	1		1
Fisheries Research Centre	no.	1		1
2. Education and training				
Women's training centre	no.	1		1
Women's training	no.			2,082
VLEW Cluster training	no.	14,688		14,535
AEO refresher course	no.	1,600		203
Workshops	no.	528		640
Farmer training	no.	5,760		8,820
3. Extension				
Sub-divisional office	no.	8		8
Farm demonstrations	no.	9,600	6,509	7,976
4. Seed multiplication				
Godowns	no.	6		6
5. Land administration				
Pilot project	ha.	2,400		0
C. Infrastructure				
1. Irrigation				
Shallow tube wells	no.	15,000	70,000	70,450
Deep tube wells	no.	320	156	138
River pumping schemes	no.	150	86	54
Irrigation tanks	no.	5		0
Training	no.			228
Micro lift irrigation schemes	no.		23	10
2. Rural Roads				
Roads	km.	1,400	800	723
Bridges	no.	285	210	209
3. Mechanization				
Tractors			550	554

Power tillers			1,300	1,500
Threshers			300	300
Activity	**Unit**	**SAR Target**	**Revised Target**	**Project Achievement**
D. Project Implementation				
1. Studies				
Policy studies				6
Evaluation studies				4
Soil and water study				1
Marketing study				1
Fertilizer and Insecticide Use Study				1
Bio-Diversity Survey of Wetland				1
Environment Impact Assessment AACP				1

Annex 2. Project Costs and Financing

Project Cost by Component (in US$ million equivalent)

Component	Appraisal Estimate US$ million	Actual/Latest Estimate US$ million	Percentage of Appraisal
A. Poverty Alleviation	24.13	11.99	43.1
B. Institutional Development	22.92	9.07	35.5
C. Infrastructure	74.74	103.27	114.5
D. Project Implementation	2.20	2.72	104
Total Baseline Cost	123.99	127.05	
Physical Contingencies	13.37		
Price Contingencies	9.28		
Total Project Costs	146.64	127.05	
Total Financing Required	146.64	127.05	

Project Costs by Procurement Arrangements (Appraisal Estimate) (US$ million equivalent)

Expenditure Category	Procurement Method[1] ICB	NCB	Other[2]	N.B.F.	Total Cost
1. Works	0.00 (0.00)	67.00 (67.00)	10.60 (8.00)	0.00 (0.00)	77.60 (75.00)
2. Goods	20.00 (20.00)	0.00 (0.00)	9.90 (6.00)	0.00 (0.00)	29.90 (26.00)
3. Services	0.00 (0.00)	0.00 (0.00)	39.10 (25.00)	0.00 (0.00)	39.10 (25.00)
4. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
5. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
6. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Total	20.00 (20.00)	67.00 (67.00)	59.60 (39.00)	0.00 (0.00)	146.60 (126.00)

Project Costs by Procurement Arrangements (Actual/Latest Estimate) (US$ million equivalent)

Expenditure Category	Procurement Method[1]				Total Cost
	ICB	NCB	Other[2]	N.B.F.	
1. Works	0.00 (0.00)	69.83 (62.85)	11.87 (6.75)	0.00 (0.00)	81.70 (69.60)
2. Goods	27.86 (22.29)	0.64 (0.51)	0.00 (0.00)	0.00 (0.00)	28.50 (22.80)
3. Services	0.00 (0.00)	0.00 (0.00)	16.85 (16.85)	0.00 (0.00)	16.85 (16.85)
4. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
5. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
6. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Total	27.86 (22.29)	70.47 (63.36)	28.72 (23.60)	0.00 (0.00)	127.05 (109.25)

[1/] Figures in parenthesis are the amounts to be financed by the Bank Loan. All costs include contingencies.

[2/] Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

Project Financing by Component (in US$ million equivalent)

Component	Appraisal Estimate			Actual/Latest Estimate			Percentage of Appraisal		
	Bank	Govt.	CoF.	Bank	Govt.	CoF.	Bank	Govt.	CoF.
A. Poverty Alleviation	23.70	3.90		10.29	1.70		43.4	43.6	
B. Institutional Development	22.70	3.70		7.77	1.30		34.2	35.1	
C. Infrastructure	77.40	12.60		88.87	14.40		114.8	114.3	
D. Project Implementation	2.20	0.40		2.32	0.40		105.5	100.0	
Total	126.00	20.60		109.25	17.80		86.7	86.4	

Annex 3. Economic Costs and Benefits

Refer to Financial and Economic Analysis Working Paper for full details of the financial and economic analysis undertaken at project implementation completion.

Cost Benefits Analysis - Overall Project

Present Value of Flows /a				
	Economic Analysis		Financial Analysis	
	Appraisal	Latest Estimates	Appraisal	Latest Estimates
Benefits	8,334	6,485		
Costs	4,940	4,190		
Net Benefits	3,394	2,296		
NPV				
ERR /b	20.2%	21.0%		

a/ NPV is Rs Million, Dec 2003 prices discounted at 12%
b/ Base ERR reported in SAR is 24% while the actual ERR of base case flow reported on p. 178 of the SAR is 20.2%
c/ No financial analysis undertaken in SAR at overall project level

Cost benefit Analysis of Project Component

Project Component	Present Values, Rs Million			ERR (%)
	Benefits[1]	Costs[1]	NPV[1]	
Appraisal[3]				
Irrigation	2,236	751	1,485	60
Livestock	1,774	626	1,147	20
Fisheries	590	452	138	18
Horticulture	1,296	137	1,159	58
Rural Roads	2,438	1,424	1,014	25
ICR, Latest Estimate[2]				
Irrigation	4,032	971	3,061	64
Livestock	248	191	56	16
Fisheries	204	204	0	12
Horticulture	905	69	836	65
Rural Roads	1,097	967	130	14

[1] Discounted at 12% rate and end-2003 prices, For details see Financial and Economic Analysis Working Paper Table 23 and 24.

[2] Derived from Financial and Economic Analysis Working Paper Table 2

[3] Based on re-estimation of SAR by inflating the costs and benefits to end-2003 prices by applying the deflator from Financial and Economic Analysis Working Paper, Table 1

Financial Analysis

ICR, Latest Estimate				
Farm Size (Ha)	**Net Farm Return (Rs.)[a]**		**Net farm family income (Rs)[a]**	
	Per farm	**Incremental**	**Per farm**	**Incremental**
Small (0.39)	6,556	3,323	9,620	4,781
Medium (1.37)	21,814	10,455	30,212	14,340
Large (3.45)	52,814	24,209	70,725	32,176
[a] End 2003 prices				

Percentage Change in Net Family Income (%)		
Farm Size	**SAR**	**ICR**
Small	72	103
Medium	85	92
Large	nc	83
nc = Not Calculated		

Increased Agricultural Output

Crops/ Commodities	Unit	SAR	ICR
Paddy	tons	132,000	409,174
Mustard	tons	5,000	4,650
Cabbage	tons		46,497
Cauliflower	tons		46,497
Brinjal	tons		69,746
Tomato	tons		116,243
Potato	tons	9,000	10,849
Pulses	tons		775
Fruits	tons	85,000	46,497
Fish	tons	3,000	3,110
Milk	Million liters	140	57

Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating	
			Implementation	Development
Month/Year	Count	Specialty	Progress	Objective
Identification/Preparation				
1992	*3*	AGRICULTURIST (1), ECONOMIST (2),		
1993	*7*	PROCUREMENT (1), ECONOMIST (4), AGRICULTURIST (2)		
1994	*17*	FISHERIES SPECIALIST (2), PROCUREMENT (1), ECONOMIST (3), AGRICULTURIST (3), HORTICULTURE (1), RURAL ROADS SPECIALIST (2), GROUND WATER ENGINEER (2), SOCIAL & GENDER SPECIALIST (1), ENVIRONMENTAL SPECIALIST (1), LIVESTOCK SPECIALIST (1)		
Appraisal/Negotiation				
1995	*9*	IRRIGATION ENGINEER (2), FISHERIES SPECIALSIT (1), PROCUREMENT (1), AGRICULTURIST (1), ECONOMIST (2), Sr. LEGAL COUNSEL (1), Sr. DISBURSEMENT OFFICER (1)		
Supervision				
11/09/1995	*3*	SR. ECONOMIST (1); PROJECT ADVISER (1); AGRICULTURIST (1)	S	S
02/21/1996	*2*	HIGHWAY ENGINEER (1); SR. ECONOMIST (1)	S	S
06/10/1996	*5*	AGRICULTURIST (1); ROADS ENGINEER (1); ECONOMIST (1); ENVIRONMENTAL SPECIALIST (1); IMPLEMENTATION SPECIALIST (1)	U	U
03/20/1997	*6*	MISSION LEADER (1); ROADS ENGINEER (1); AGRICULTURIST (1); PROCUREMENT SPECIALIST	U	U

		(1); FISHERIES SPECIALIST (1); IMPLEMENTATION SPECIALIST (1)		
11/14/1997	*6*	MISSION LEADER (1); AGRICULTURALIST (1); PROCUREMENT SPECIALIST (1); FINANCIAL ANALYST (1); PROCUREMENT SPECIALIST (1); IRRIGATION ENGINEER (1)	U	U
06/29/1998	*5*	TEAM LEADER (1), RURAL ROAD SPECIALIST (1), AGRICULTURIST (1), PROCUREMENT SPECIALIST (1), FISHERIES EXPERT (1)		
05/22/1999	*7*	TEAM LEADER (1); ROADS SPECIALIST (1); PROCUREMENT SPECIALIST (1); AGRICULTURIST (1); SENIOR AQUACULTURIST (1); IRRIGATION EXPERT (1); FINANCIAL SPECIALIST (1)	S	S
01/10/2000	*6*	TEAM LEADER (1); IRRIGATION ENGINEER (1); RURAL ROADS SPECIALIST (1); FINANCIAL MANAGEMENT (1); SOCIAL SCIENTIST (1); FISHERIES EXPERT (1)	S	S
08/31/2000	*6*	MISSION LEADER (1); IRRIGATION ENGINEER (1); AGRICULTURIST (1); FISHERIES CONSULTANT (1); RURAL ROADS ENGINEER (1); PROJECT OFFICER (1)	S	S
08/03/2001	*7*	TEAM LEADER (1); SENIOR ROADS EXPERT (1); SENIOR AGRICULTURIST (1); SOCIAL DEVELOPMENT SPECIALIST (1); FISHERIES EXPERT (1); IRRIGATION EXPERT (1); ENVIRONMENTALIST (1)	S	S
03/27/2002	*7*	TEAM LEADER (1); ROADS SPECIALIST (1); AGRICULTURIST (1); PIM EXPERT (1); IRRIGATION EXPERT (1); LIVESTOCK EXPERT (1); FISHERIES EXPERT (1)	S	S
10/03/2002	*9*	MISSION LEADER (1); AGRICULTURIST (1); RURAL ROADS SPECIALIST (1); SOCIAL DEV. SPECIALIST	S	S

			(1); PROCUREMENT SPECIALIST (1); FINANCIAL MANAGEMENT SPECIALIST (1); ENVIRONMENTALIST (1); IRRIGATION & FARMER SPECIALIST (1); FISHERIES SPECIALIST (1)		
	03/29/2003	*7*	TEAM LEADER/IRRIGATION (1); AGRICULTURIST (1); RURAL ROADS (1); ENVIRONMENTALIST (1); SOCIAL DEVELOPMENT (1); PROCUREMENT SPECIALIST (1); FINANCIAL MANAGEMENT (1), FOT SPECIALIST (1)	S	S
	11/14/2003	*10*	TEAM LEADER (1), RURAL ROADS SPECIALIST (1), SOCIAL DEVELOPMENT (1), ENVIRONMENT SPECIALIST (1), PROCUREMENT SPECIALIST (1), FINANCIAL MANAGEMENT SPECIALIST (1), FOT SPECIALIST (1), AGRICULTURE SPECIALIST (1), LIVESTOCK SPECIALIST (1), FISHERIES (1).	S	S
	06/14/2004	*1*	TASK TEAM LEADER	S	S
ICR					
	12/19/2003	*4*	TEAM LEADER/ IRRIGATION (1), AGRICULTURIST (1), AGRICULTURAL ECONOMIST (2)		

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US$ ('000)
Identification/Preparation	69.70	132.70
Appraisal/Negotiation	11.70	28.90
Supervision	234.47	369.93
ICR	11.55	63.53
Total	327.42	595.06

Annex 5. Ratings for Achievement of Objectives/Outputs of Components

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	Rating				
☐ *Macro policies*	○ *H*	○ *SU*	○ *M*	○ *N*	● *NA*
☐ *Sector Policies*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☐ *Physical*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☐ *Financial*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☐ *Institutional Development*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☐ *Environmental*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
Social					
☐ *Poverty Reduction*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☐ *Gender*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☒ *Other (Please specify)*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
Equity					
☐ *Private sector development*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☐ *Public sector management*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☐ *Other (Please specify)*	○ *H*	○ *SU*	○ *M*	○ *N*	○ *NA*

Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

6.1 Bank performance	*Rating*			
☐ *Lending*	○ *HS*	● *S*	○ *U*	○ *HU*
☐ *Supervision*	○ *HS*	● *S*	○ *U*	○ *HU*
☐ *Overall*	○ *HS*	● *S*	○ *U*	○ *HU*

6.2 Borrower performance	*Rating*			
☐ *Preparation*	○ *HS*	○ *S*	● *U*	○ *HU*
☐ *Government implementation performance*	○ *HS*	● *S*	○ *U*	○ *HU*
☐ *Implementation agency performance*	○ *HS*	● *S*	○ *U*	○ *HU*
☐ *Overall*	○ *HS*	● *S*	○ *U*	○ *HU*

Annex 7. List of Supporting Documents

1. Financial and Economic Analysis Working Paper.
2. Staff Appraisal Report, India Assam Rural Infrastructure and Agricultural Services Project, World Bank Report No. 13888-IN, April 26, 1995.
3. Mid Term Review Aide Memoire, ARIASP, World Bank, July 22, 1998.
4. Supervision Mission Reports ARIASP, World Bank, (12 in total from November 1995 to March 2003).
5. Development Credit Agreement (June 1995) and the details of two amendments (May 2000 and May 2003).
6. ARIASP Society, Detailed Status Report – October 31, 2003 (Financial), September 30, 2003 (Physical).
7. ICR briefing material provided by:
    a. Public Works Department
    b. Department of Agriculture
    c. Irrigation Department
    d. Animal Husbandry and Veterinary Department
    e. Fisheries Department
8. Final Report of ARIASP activities at Assam Agricultural University.
9. ARIASP Quarterly Monitoring Report (January to March 2003), Indian Institute of Management, Lucknow and Assam Institute of Management, Guwahati.
10. Rules and Procedures of Panthar Parichalana Samity (Field Management Committee), by the Department of Agriculture (undated).
11. Livestock Sector Strategies and Integrated Livestock Development Plan for Assam, by N.K. Chawla and M.P.G. Kurup (July 2000).
12. Vision – Nagaon District, by Nagaon District Development Committee (August 2003).
13. India – Country Assistance Strategy, World Bank, June 2001.
14. Detailed Status Report as on Oct. 31, 2003 (Financial) and September 30 (Physical), ARIASP Society, Project Implementation Unit.
15. Detailed Status Report on Fisheries Component under World Bank Aided ARIASP for ICR Mission, Directorate of Fisheries, Assam.
16. Economic Survey, Assam, 1997/98, 1998/99 and 2002/03 Directorate of Economic and Statistics, Assam, Guwahati.
17. Final Impact Assessment Report, 2003, ARIASP, Assam Institute of Management, Guwahati.
18. India-Eastern India Poverty Reduction Programme, Sub-Programme 4: Assam State, Concept Preparation Report (Volume 3 Working Papers 3-7), FAO, Rome, July.19, 2002.
19. Package of practices for Kharif crops of Assam, 1995, Department of Agriculture, Assam and Assam Agricultural University.
20. Package of practices for Rabi crops of Assam, 1999, Department of Agriculture, Assam and Assam Agricultural University.
21. Report of the Expert Group on Identification of Households Below Poverty Line (BPL Census 2002), Ministry of Rural Development, Government of India, August, 2002.
22. Reports of the Commission for Agricultural Costs and Prices for the Crops sown during 2002/03 Season, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, New Delhi, 2003.
23. Report on Baseline Survey, 1997/98, Assam Rural Infrastructure and Agricultural Services project, Monitoring and Evaluation Cell, Directorate of Agriculture, Assam.
24. Statistical Hand Book, Assam 2001 and 2002, Directorate of Economic and Statistics, Guwahati, Assam.

Additional Annex 8. Borrower's Evaluation Report

Prologue:

8.1 While green revolution changed the face of Indian Agriculture, it did not positively impact the agriculture sector in Assam and hence the agriculture scenario remained virtually unchanged and continued to be based on traditional methods and subsistence farming. Majority of the farmers, being the small and marginal with high degree of poverty, poor resource-base, lack of risk-bearing capacity and devoid of entrepreneurial skills, could not play active role in adoption of new technology in agriculture. This called for a multi-pronged intervention plan for alleviating poverty among them and relieving the necessary infrastructural and technical constraints.

8.2 Despite the State bestowed with abundant natural resources, the agriculture growth potential remained unexploited due to lack of sustained and strategic investments in focused areas. The enormous ground water potential for irrigation was not utilized limiting the agriculture to a predominantly mono-cropping and rain-fed. This warrants critical interventions to address the constraints of irrigation and other allied infrastructure along with by technological and institutional development for increasing cropping intensity, raising crop productivity, and diversification into more profitable activities such as horticulture, fisheries, and dairy production.

8.3 In the light of above, Assam Rural Infrastructure and Agricultural Services Project (ARIASP) was conceptualized in the year 1994 with the assistance of the World Bank. The Project was executed successfully and closed on June 30, 2004. Our observations as Borrower are detailed below on the Project design, appraisal, implementation and project results along with lessons learnt at various stages and our perspective on the performance of International Development Association (IDA) and Implementing agencies.

Project Objectives and Components

8.4 The principal objectives of the project were to (a) improve equity and alleviate poverty by offering better opportunities for poorer farmers and women to contribute to agricultural growth and income generation; (b) improve the nutrition of the rural poor; (c) accelerate agricultural growth through improved use of resources, relieving infrastructural and technical constraints, and providing an enabling environment to facilitate the growth of private sector investments; (d) encourage sustainability of resource use and quality of the environment; and (e) improve the GoA's long-term capacity for strategic agricultural planning. To achieve these objectives the project supported a number of policy and institutional changes and financing investments in (a) the Department of Agriculture's activities, including the extension services for horticulture, fisheries, and livestock to poor rural communities aimed at increasing their production; (b) institutional development (technology development and extension, seed multiplication and land administration, and planning and coordination); and (c) rural infrastructure (small scale irrigation and rural roads).

8.5 The components of the project were (a) Poverty Alleviation (covering sectors under Fisheries, Horticulture, Livestock); (b) Institutional Development (technology generation, education and training, extension, seed multiplication, and land administration (dropped in MTR); (c) Infrastructure Development (Irrigation, Rural Roads and Mechanization (included after MTR)

Project Design:

8.6 The principal objectives of the Project were suitably incorporated into the project design. The size and scope of the Project was well thought out and focused on the project objectives. Nevertheless, since this was a multi-sectoral project and several other components are also inter-related, the scope of the project design could also have covered farm mechanization and market support.

8.7 While some of the aspects of the design like the STWs were effectively implemented and positively encouraging as farmer contributed upfront very enthusiastically, the implementation of the rehabilitation of Deep Tube Well and River Pumping Stations was relatively found to be difficult. In case of Technology Generation, the project design helped in creation of infrastructure for research. However, the requirements of the research activities and outcomes thereof could have been equally emphasized in the design and supported in the project. The project design had also enabled a quality rural road up-gradation by following a prudent contract management and by engaging an independent Supervision Consultant. Further, the project design in case of beel fisheries was found to be less practical as the investments were planned only on infrastructure development without considering the other vital aspects like management/community involvement and fingerlings/input supply leading to difficulties in implementation. Further, the project design did not provide for marketing and therefore, fish farmers did not get a fair price for their produce on account of poor market infrastructure. While the project design had adequately supported the existing extension infrastructure, the qualitative changes for broad-based extension were not focused enough.

8.8 The project design has immensely benefited the State by inducing various institutional policy reforms initiatives. Further, it built the capacities of various implementing agencies – Public Works Department, Agriculture, Fisheries, Animal Husbandry, Irrigation and PIU - through training, and institutional development. It may be mentioned here that 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 implementation of any other externally aided project in addition to the regular departmental projects.

8.9 In some of the departments like irrigation, the officials for the first time re-oriented for stakeholder involvement and community mobilization. This led to a shift in the total paradigm of the operation of the irrigation projects. So was in case of the stakeholders, who for the first time, attempted to take the ownership responsibility through WUA for the departmentally-run irrigation projects.

Project Appraisal

8.10 The Developmental Objectives were not changed during the project. However, the changes that were effected in the scope and size of the project in some of the components like STWs, farm mechanization, rural roads, community tanks, beels and farmers ponds in fishery, pilot CMLIS, etc were essential and appropriate. Similarly, it was also logical to drop the sub-component of pilot land administration. However, it is felt that the degree of investments in farm mechanization could have been enhanced proportionate to the expanded command area under up-scaled STWs.

Project Implementation

8.11 The project, being a multi-sectoral, was primarily implemented by the departments of Agriculture, Animal Husbandry & Veterinary, Fisheries, Irrigation, and PWD and Assam Agricultural University with

a dedicated Project Implementation Unit (PIU) to supervise, monitor and evaluate project activities. In addition, NGOs, consultants and other partners were involved as per requirements during the project period.

8.12 Since the implementing agencies and other partners were too many with diversified activities and the coordination had become Herculean task the progress of the project at initial stages was not as per the milestones. But, the project implementation was later speeded up due to the concerted efforts of the Bank and implementing agencies and completed successfully.

8.13 In order to ensure participation of stakeholders and community, NGOs were involved for fishery and irrigation sectors in developing community tanks, beel fisheries and formation of CMLIS/WUAs respectively. During this process the capacities of the NGOs were developed to undertake similar activities in future.

8.14 ***Performance of IDA:*** Regular supervision / review missions always helped in providing guidance and direction to achieve project objectives. They had always been pro-active and held wrap-up discussions with Government functionaries at various levels after every important mission/visit. Field visits by mission members and Aide Memoirs provided objective and useful feedback to track the project progress and initiate corrective actions. Task Managers and team members have always been very cooperative. Task Manager has been following up the progress through emails / phone, and has expeditiously provided concurrence to proposals forwarded to the bank. Overall performance in project identification, preparation assistance, appraisal, and supervision has been highly satisfactory especially in the later stages.

8.15 The MTR mission of the World Bank had sorted out many deficiencies of the SAR / Project design by objectively assessing the status. It may be worth-mentioning that since the Project had received a more focused attention from the IDA since the year 2002 onwards, many micro level implementation issues were sorted out. Close review of Social Sector & Environmental issues by the Bank Mission members and ample guidance in this regard ensured better community involvement and adequate environmental mitigating measures. While about 59% of the project cost was incurred during the period from inception till March 2002, the balance 43% cost was incurred during the last two and a half years only. This was on account of capacity building and closer monitoring and supervision.

8.16 ***Performance of the Implementing Agencies:*** After the initial constraints, performance of the borrower and implementing agencies improved considerably. The Project Implementation Unit played an important and meaningful role in coordinating with the Bank, government and executing agencies, and also ensured smooth fund flow across all the project locations.

8.17 Problems, bottlenecks, constraints are inevitable in a multi-sectoral projects. The coordination among seven departments was an uphill task. GoA's resolution to make ARIASP a success and invite a follow-on project, ensured placing of an efficient staff in the PIU. The dedication and determination of the implementing officials of the line departments & more particularly the efficiency and expertise developed during the project period by the PIU officials in project management and procurement procedures made the project implementation smooth. Continuous efforts by the PIU brought a fair level of synergy and unity of purpose amongst implementing department /officials.

Project Results

8.18 The project had covered poor farming communities in the entire state (23 districts) and the intensity of activities in each district varied on the basis of the production potential. The Rural Road component,

however, covered only six targeted districts of Assam.

8.19 The project had successfully induced key policy reform initiatives, better utilization of ground water potential, crop diversification and better rural connectivity. The Final Impact Assessment Report revealed that the Project has (a) increased productivity of agriculture, livestock and fisheries sectors together with improved agricultural income of farmers by more than 34%; (b) Because of STW intervention for assured irrigation, farmers started shifting from food grains to cash crops and the cropping intensity went up to 213% and the crop productivity in case of paddy enhanced to 163%; (c) improved fish productivity at farmers and community pond level and improved per capita fish consumption of fish beneficiaries; (d) changed composition of the Livestock herd to more productive cross bred animals with better milk productivity, lactation period and per capita milk intake for beneficiary farmer; (e) Improved productivity of livestock herd resulted in 109% increase in income from dairying for livestock beneficiary farmer; (f) introduction of tractor under mechanization component of project also have positive impact on agriculture; (g) road rehabilitation and timber bridge conversion activities have helped in increasing year round accessibility of villages, improved market access, increased fuel use efficiency (17-50%) and brought down transportation and travel cost and increased accessibility of health, education and market facilities located outside the village.

Key Achievements:

8.20 ***Fisheries***: Better access to fish health services to fish farmers, increased availability of quality fish feeds and seeds, increased opportunity for fish production with better extension services. Development of Farmers Pond (602 ha), Community Tanks (822 ha), Beels (2180) ha supplemented with demonstrations, capacity building schemes resulted in (a) production of disease free fish; (b) higher fish productivity by 199% and 177% in farmers pond and community pond respectively; (c) increased income from fishery to the farmers; and (d) adoption of innovations in fish production by fish farmers. Quality of fish feed had also improved significantly.

8.21 ***Livestock*****:** Increased Artificial Insemination (AI) activity together with better breeding, feeding, management and health care practices resulted in enhancement of milk production in Project Areas. Efficient AI done (511,208) resulted in (a) higher milk productivity by 301% in benefited areas; (b) birth of 166,771 cross breed cows; and (c) improved health of livestock. Proportion of crossbred animals in total herd increased from 3.1% to 5.1%. Strengthened AI Centers and Diagnostic facilities reduced disease free farm animals.

8.22 ***Horticulture:*** Increased area under horticultural crops resulted in enhanced production of horticultural crops. 7407 demonstrations in various horticulture crops resulted in increased productivity in the range of 5% to 70%.

8.23 ***Agriculture:*** Assured Irrigation increased cropping intensity, crop productivity, and thereby generation of rural employment and increased farm income to rural poor. Improvement in cropping intensity coupled with increase in crop productivity improved the overall income of not only STW beneficiaries particularly in case of marginal and small farmers but also the agricultural labourers. Special attention was given to develop capacity of poor small and marginal farmers. This positive discrimination in favour of poor farmers was evident from very high proportion of marginal and small farmers in total STW beneficiaries. Profile analysis of sampled STW beneficiaries done by IIM, Lucknow revealed that proportion of marginal, small, medium and large farmers in STW beneficiaries are 77%, 13%, 8% and 2% respectively. Thus, poor farmers emerged as major beneficiary group under the Project. Installation of 70,450 Shallow Tube wells, distribution of 554 Tractors & 1,500 Power Tillers (together with efficient

extension services) resulted in (a) enhanced cropping intensity to 213% in Project area from 150% state average (b) farmers shifting to high value crops, (c) increased crop productivity, (e) raised employment and income by 34% and improved efficiency in water utilization.

8.24 ARIASP emerged as a pioneer in irrigation through STW in the state. Following the results demonstrated by ARIASP, the State was absolutely convinced and taking it as an example, it went very confidently for installation of 99,000 STWs through NABARD with a similar pattern of project design of irrigation component. It is worth mentioning that this project under NABARD was also completed in a record time of three years. Crop productivity data reveals that productivity of paddy for STW beneficiaries increased from 25 qtl./hectare to 46 qtl./hectare which is significantly more than expected level of 40 qtl./hectare (SAR).

8.25 ***Rural Roads*****:** Upgradation of 723 Km Rural Roads and conversion of 209 Timber bridges to RCC in six districts has: (a) reduced Transportation cost; (b) 17- 58 % fuel saving; (c) Saving in travel time; (d) accessibility of public services; (e) improved literary through better access to educational facility and above all; and (f) better remunerative price to the farmers for the produce, due to better market connectivity and accessibility. These roads were constructed/up-graded according to the specifications of the Indian Road Congress. An independent agency was the construction supervision consultant who apart from supervising the contracts as 'engineer' also regularly checked the quality of roads. These roads ensured connectivity to 539 villages covering a population of 845,448. Further, under the Road Maintenance scheme, 2,013 km was repaired covering all the districts of the State.

Policy Reform Initiatives

8.26 The overall progress under this has been highly satisfactory. ARIASP had initiated various Policy reform initiatives in the State, which are briefly stated below:

- ***Fishery Sector:*** (a) increased in the lease period of Beels from 3 to 7 years; (b) adoption of 'Fish Seed Policy'; (c) a "Fish Seed Act" was drafted which is now ready for Cabinet approval; and (d) amendment to Fishery Rules following review of the legal framework governing fishery sector to facilitate community development of beels, which is now ready for Cabinet approval.
- ***Irrigation (Minor):*** Irrigation Act, 1992 was promulgated for recovery of the full cost of water from beneficiaries.
- ***Livestock:*** (a) An autonomous body "Assam Livestock Development Agency"(ALDA) has been formed to implement developmental tasks and for generation and supply of breeding inputs. The functioning of this Agency in the field of Artificial Insemination services would ensure re- investment of generated funds into the same sector, which in turn will give an impetus to better quality veterinary services by encouraging the private players to compete in the veterinary services delivery systems; (b) a Breeding Policy for small animals & birds was drafted which would provide a direction for growth of all kinds of livestock in Assam; (c) a "Livestock Policy" was drafted and which will play an all-encompassing role in shaping the destiny of the livestock sector.
- ***Agriculture:*** (a) The agricultural policy was adopted; (b) private sector involvement in seed production and seedlings; (c) enhancement of farm machinery hire charges.
- ***PWD:*** (a) A "Road Maintenance Policy" was adopted for sustainable road maintenance and (b) a State Road Board (SRB) was formed and (c) a road maintenance fund was created with dedicated allocation of funds to the Road Board for road maintenance of core road network from GoA's budgetary resources.

Cost Recovery:

8.27 In order to ensure accountability, quality and efficiency in delivery of public services, cost recovery of the services was introduced wherever possible. Under the Fishery Sector: (a) cost recoveries in Beel / OWF was ensured; (b) in case of Farmers' pond and Community tank the beneficiaries contributed 30% of the cost. Under the Livestock Sector, a charge of Rs. 15/- per Artificial Insemination and the piglets and ducklings were sold at government-approved rates; (c) "revolving funds" were incorporated in the departmental poultry farms to maintain and to generate O&M expenses out of it's own profits for self sustaining. Further it may be mentioned that O&M costs in respect of STW, tractors etc. are fully borne by beneficiaries.

8.28 As regards the cost recovery under the Irrigation sector, 30% upfront cost recovery was ensured in case of Shallow Tube Well (STW) schemes. Incase of Deep Tube Well & River Pumping Schemes, 30% costs were to be recovered from the beneficiaries either in cash or kinds in five equal installments. The first installment was to be paid during the rehabilitation phase and the rest four are to be paid after harvesting of successive crops. The first installment from almost all the WUAs was realized. As regards the Mechanization schemes relating to Tractor, Power Tillers etc., 50% upfront cost recovery was ensured.

8.29 Though Project DOs spoke of the improvement of equity, the above approach brought in a forceful element of demand-driven approach within the targeted poor, small and marginal farmers. This has been proved to be one of the vital corner stones for the success of the project and different from the hitherto implemented Government schemes in these sectors. It helped the implementing agencies to practically get convinced themselves that the demand-driven approach will be more effective than supply-driven and top-driven system. Nevertheless, the equity issues have been successfully addressed as evident from the composition of farmers in STW component.

Community Involvement

8.30 The stakeholder participation and community involvement for a sense of ownership in the community and partnership in the beneficiary was ensured by involving local NGOs in thirteen Districts and through the formation of community groups in the form of Field Management Committees (FMC), Water User Associations (WUAs), Beel Development Committees, Community Managed Micro Lift Irrigation Schemes (CMLIS), Community Tanks management groups, etc. While doing so, the rural women were facilitated to come forward and participate actively in some of the activities like poultry, duckery and fishery sector.

8.31 For the first time, most of the implementing agencies had personally experienced the social and group dynamics in community participation and faced the challenges of conflict-resolution issues and the necessity of flexibility of the schemes to accommodate the feedback from the partners and stakeholders.

8.32 The NGO activities in the State was not adequate and the capacities of the existing local NGOs for the activities like those of proposed in ARIASP was also wanting. The Project gave a momentum to these local NGOs in building up their capacities to handle the issues with the community and stakeholders in the income generating agriculture and allied activities as mentioned above.

Increased Private Sector Involvement and Public/ Private Partnership in Agri-business

8.33 An experiment with the privatization of AI services Private Lay Inseminators was introduced in the Livestock Sector. Another break through in the project was leasing out of the departmental seed farms to private operators. This intervention has been found to be successful in assisting the farmers by providing quality seed.

Sustainability Measures

8.34 The objective of encouraging sustainable resource use and quality of environment has been fully achieved. It can be hardly overemphasized that sustainability of the activities in the Government system need appropriate policy changes, wherever necessary. Therefore, several initiatives for policy reforms have been started during the Project period. Thus, the objective of long term strategic agricultural planning and rural infrastructure development was achieved through policy reforms including (i) formulation of State Agricultural Policy; (ii) formation of Road Board and adoption of Road Maintenance Policy; (iii) privatization of some seed farms and progeny orchards; (iv) formulation of Fish Seed Act; (v) Allotment of the beels to the beel development groups (benefiting poor community groups) etc. The principle governing selection of beneficiaries particularly for the irrigation and the fisheries development components was targeted to small and marginal farmers.

8.35 Environmentally sustainable issues were adequately addressed to studies conducted for arsenic toxicity in ground water utilization and pesticide use, also follow-up monitoring mechanisms was taken up. Integration of environmental concerns was tailored into project implementation plan (roads).

8.36 The main investments under the irrigation component was the STWs which are owned, maintained and operated by the farmers at their own costs. Thus the beneficiaries are fully responsible for STW, operation and maintenance, hence the sustainability of the STWs that have been installed is ensured. This has been perceived by the farmers and implementing agencies a clear case of sustainability vis-à-vis department-run irrigation projects. As regards the mechanization component, ownership of the farm equipments rests with the FMCs who had been imparted training on operation, maintenance and productive utilization of the same. Since the average farm holding is too small and a group of farmers in FMC found the equipment more economical and ensured the farm mechanization component sustainable. Similarly, the private ownership and community involvement made the fishery component very successful with 60% farmers continuing the fish production in individual farmer's ponds by adopting the improved technology achieving higher yields. The upfront contribution of the farmer's / community's share in other than STWs i.e., fishery ponds, community tanks and farm machineries ensured the demand-driven approach which resulted in sustainable use of the investments.

8.37 Repairing of the roads was not given priority due to financial constraints over a period of time. However, as a follow-up of the road maintenance policy, adequate attention has now been given to the issue as evident from the current year fund allocations for road repairs in the State, which is quite substantial. The cost recovery initiated in irrigation, for AI services, etc. would not only ensure the accountable, quality and efficient services, but also provide a level playing fields for private operators so as to ensure that the healthy competition would benefit the clientele and make the investments in this sector sustainable.

Lessons Learned

- As the baseline survey and effective Monitoring & Evaluation was not initially done in this project, it resulted in undue delay in the initial years. The broad objectives such as poverty alleviation need to be viewed holistically from the benefits accrued directly and indirectly in all investments in the Project.

- An independent dedicated agency for coordination could ensure successful implementation of the Project.

- The participation of the stakeholders and involvement of community together with demand-driven approach within the broadly identified poor, small and marginal farmers made the investments development objective-oriented and sustainable.

- Though the initial take off of the project was slow, this project had successfully met the objectives of poverty alleviation by benefiting more than 660,000 households creating 12.5 million work days of employment and by increasing the net income from 85 to 103%.

- The Project DO of acceleration of growth of the farm sector was given a practical and real meaning as the targets of STWs had to be up scaled to 70,000 from 15,000 and introduction of new component of farm mechanization. This has accelerated the growth as crop productivity enhanced coupled with as high as 213% cropping intensity (against 150%) in Project area. Further, farmers were seen shifting to high value crops. This all reflected in raising the levels of employment and income by 34%.

- Though the objective of improved nutrition to the rural poor initially looked insubstantial, the impact of the higher production of cereals, vegetables, horticultural crops, fish and milk on consumption rates of the stakeholders and their superior nutritional status in project area was more than convincing and this project would serve as a case study for other projects with this kind of objective.

- Hither to unattractive agriculture sector for educated unemployed youth of the State has suddenly caught their attention due to high income, intensified and diversified cropping by a 'perceivably dignified' way of cultivation with machines and pumps.

- The important components like marketing and more focused approach in dairy activities could have enhanced the success of the project.

- The extension services, though addressed through infrastructure support and capacity building, market-led extension with high degree of coordination among all agricultural and allied sectors would be the need of the hour at the end of the Project to consolidate the results and further sustainably integrate the farm sector with the markets.

- Supervision by an external consultant in rural roads ensured that the quality of roads was satisfactory.

- Use of Information Technology for prompt clearances and Project Management was not suitably adopted and this could have further improved the quality project management.

- Some more innovative studies on the lines of improved bridge design should have been included in order to reduce the time and cost over runs in creation of rural agricultural infrastructure.

Looking forward – Next Step

8.38 On successful implementation of the ARIASP, the Government of India and the World Bank has come forward to fund a follow-on Project titled 'Assam Agricultural Competitiveness Project (AACP)'. It is a unique and excellent opportunity for both the IDA and Borrower to build on the lessons learned in the ARIASP in every stage of the project beginning from design to results for the new project, AACP, which is virtually phase-II or follow-on of ARIASP. It would not only help in consolidation of the benefits accrued of ARIASP, but also continue some unfinished agendas and cover the hither unaddressed areas and thus it would make the over all investments complementary, synergistic and sustainable.

8.39 Negotiations for the AACP were held in World Bank Head Quarters at Washington DC in the last week of October 2004 and the project would be executed from February 2005 at an estimated cost of Rs.1245.3 million over a period of five years. The sources of funding will be – (a) World Bank (IDA) assistance Rs. 7360.8 million (71.85 % of the total project cost), (b) State Government contribution Rs. 954.5 million (9.32 % of the total project cost), (c) Beneficiaries contribution Rs.1930 million (18.84 % of the total project cost).

8.40 The development objectives of the AACP will be to increase the productivity and market access of targeted farmers and community groups. The over-riding objective is to stimulate growth of Assam's agricultural economy. However, project activities would be predominantly pro-poor, directed primarily at small and marginal landholders, poor fishing communities and the landless.

8.41 The project will (i) support investments by small and marginal farmers in private irrigation and farm mechanization; and by community groups in the development of water resources for fish production; (ii) foster decentralized, pluralistic farm advisory services, upgrade the productive capacity of livestock and fish resources, and improve marketing of milk and other farm commodities; and (iii) upgrade the associated core rural network, along with selected market yards (Rural Haats).

8.42 The main components of the Project are (a) Rural Connectivity (PWD), (b) Agriculture, (c) Irrigation, (d) Management of Local Flood & Water Logging, (e) Fisheries, (f) Veterinary and Animal Husbandry (g) Dairy and (h) Forest & Sericulture on pilot basis.

8.43 Under the Agriculture component it is proposed to provide Tractors, Power Tillers, Shallow Tube Wells, Low Lift Pumps and Micro Watershed drainage activities along with upgradation of 24 rural primary wholesale markets and 50 local Hats. A decentralized pluralistic extension system would be promoted through ATMA approach. Under Fishery component, assistance under project will be provided to small and marginal farmers to rehabilitate existing farm ponds, community tanks and beels.

8.44 Other activities covers (a) upgrading dairy herds of small holders and landless producers through artificial insemination program, (b) improve milk marketing through formation of 500 milk marketing cooperatives/self help groups (SHG) etc.

Additional Annex 9. Borrower's Comments on the Draft ICR

The PIU, ARIASP Society thankfully acknowledge the receipt of your Draft Implementation Completion Report for our comments. We have reviewed the draft report thoroughly. Although the above report has covered all points very succinctly, we have some observations as given below:-

Component 3: Infrastructure (a) Irrigation: (iii) CMLIS: It may also be added that this has been a positive pilot experience where collective action of a WUA with 10-15 members were encouraged for irrigated cultivation in a command area of 10-12 ha. The WUAs have taken full O&M responsibility from the very beginning and the scheme found promising to ensure meaningful participation of small and marginal farmers and future sustainability. Even though the initial investment is little higher, it is cost-effective in long run. Activity achievement was also satisfactory.

Secondly, the overall Borrower's performance during preparation is rated as **unsatisfactory.** The GoA differs with the Bank on this observation since this is to be seen in the light of lack of expertise and enough previous experience in preparation of such projects. Therefore, the agencies depended more on the Bank for guidance. Nevertheless, the implementing agencies together with the Bank prepared the project with a greater coordination and enriching relationships.

Thirdly, the experience of the project has immensely helped the implementing agencies so much in capacity building, the follow-on project could be prepared by the borrower with full participation and responsibility.

Fourthly, the borrower appreciates the degree of flexibility the Bank had shown in modifying and up scaling the better performing components like STW, etc.

Fifthly, the key performance indicators in case of number of households benefited from irrigation was shown as 202,020 in the ICR. But, we feel that this figure is underestimated since each STW is serving 3-5 households meaning even with an average of 4 households per STW, the figure should have been 281,800.

Further, while increase in the Cropping Intensity (CI) has been shown as 150 to 195%, the latest report shows that the CI increased to 213% and the current trend is still increasing.

With regard to the annexure 2a figures, the final figures of the total project cost in Indian rupees are Rs. 5,660.90 million, as per the latest estimates.