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PROJECT ASSISTANCE COMPLETION REPORT

RURAL ELECTRIFICATION PROJECT (386-0462)

INDIA

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PROJECT COMPLETION REPORT AND POST PROJECT CONSIDERATIONS
RURAL ELECTRIFICATION PROJECT (386-0462)

I. SUMMARY

The project has achieved its objective of providing electrical energy for productive and social services in backward areas. The quantitative targets established for electrical load connections were achieved and the loan was fully disbursed a year before the PACD. Recent studies and cost benefit analysis have confirmed the positive impact rural electrification has had on increasing agricultural productivity, improving the quality of domestic life and increasing employment opportunities.

II. PURPOSE:

The purpose of the Rural Electrification Project was to provide electrical energy for productive and social services in "backward" areas by constructing area-based rural electrification schemes. The achievement of this purpose was to contribute to increased incomes among the farm population benefitting from the schemes and to provide employment opportunities through increased labor demands required by increased agriculture. In addition, the electrification was to provide expansion of small scale industries; lighting to households, commercial establishment and streets in rural areas and thus improving the quality of life.

III. PROJECT DESCRIPTION AND STATUS:

A loan of \$58.0 million was provided to support the Rural Electrification Corporation's (REC's) Minimum Need Program (MNP) and Specially Underdeveloped (SU) schemes. The attention was focussed on extending electrifications to India's backward or disadvantaged areas which are generally characterized as having low agriculture productivity, high unemployment and low income levels, in the following nine states: (1) Andhra Pradesh, (2) Assam, (3) Bihar, (4) Gujarat, (5) Karnataka, (6) Madhya Pradesh, (7) Orissa, (8) Rajasthan and (9) Uttar Pradesh. These States, with the exception of Andhra Pradesh, were well below the all-India average of electrified villages.

The project was one of the first projects approved on the resumption of the USAID program in India in 1978-79. It was structured essentially as a resource transfer project; AID's input was limited to the financing of materials such as transformers, conductor, insulators, etc. to be provided to Rural Electrification Schemes in backward areas. No other input was thought at that time to be necessary. It was believed that the institutional capability existed to design, construct and operate rural electrification schemes, and donors such as A.I.D. and the World Bank needed only to finance the necessary material resources.

However, as the implementation of this project progressed, we found that direct financing of procurement of materials tended to cause both USAID/I and the State Electricity Boards (SEBs) to concentrate on the procurement process rather than on the ultimate objective of getting electricity to rural villages. The SEBs had amply proven their capabilities in procurement. Their tender documents were professionally done, material specifications were complete and bid reviews were strictly in accordance with competitive procedures. Detailed monitoring of these procedures by the USAID/I had uncovered no serious difficulties. Such monitoring as well as contract review and approval and voucher review and processing had, however, pre-empted a substantial amount of Mission workforce.

At the same time we observed that the institutional capabilities of the individual states whose rural electrification programs were being supported were not as strong as they could be. For example, while most SEBs were effective in material management and in the design and installation of electric lines in rural areas, they did not have the apparatus to quickly use the resulting electricity. Therefore a significant number of connections were generally not achieved for several years after the line was energized. Consequently, the extremely costly infrastructure which a rural electrification scheme represented was not fully and quickly exploited, and its economic, social and developmental benefits remained underutilized.

We had been sharing with the REC our concerns regarding poor progress on connections. REC had likewise been concerned about this situation in backward areas, and was uneasy with its lack of leverage over SEBs. REC procedures had entailed release of funds to SEBs upon the approval of a Rural Electrification Scheme. An advance of 40% of the total project cost had been made at that time. After such release, construction began. Although REC's Regional Offices had been conscientiously and diligently monitoring the progress of these SEBs, they had little leverage with which to encourage any changes such as increased attention to getting connections completed.

In view of these implementation problems, USAID/I restructured the project in 1984 to finance electrical load development rather than procurement of materials. The objective was to have a significant beneficial impact in institution building, State-Center resource control, load development and rural employment while simplifying USAID/I and REC workload.

Under this restructuring, the key feature was payment against performance criteria. Disbursements were tied, however, not to the simple number of connections achieved in any given period without regard for the nature of or load placed on each. Rather, disbursements were based on the number of kilowatts connected. For example, a household connection powering one or two light bulbs, a radio and perhaps a fan was rated at 0.30

kilowatts; a street light 0.04 kilowatts; an irrigation pump in a tubewell, on the other hand, was rated at 3.75 kilowatts. The principal type of productive connection in the project scheme areas was for irrigation pumps; small scale industries located in those areas such as saw mills, grain mills etc. with low loads. Thus the refinement placed a premium on high kilowatt connections, meaning primarily irrigation pumps. Thus the agriculture farmers and agriculture-based labor were expected to be the main beneficiaries.

The restructuring was confined to schemes sanctioned during the period April 1, 1977 to March 31, 1982, i.e., the period specified on page 2 of Annex I of the Loan Agreement. The final figure on the number of these schemes was 633. An overall target of 380,000 kilowatts of electrical load connection was established.

The basis for reimbursement was as follows: Up through March 31, 1983, connections totaling approximately 190,000 kilowatts were achieved on the 633 project schemes, mainly on those on which construction began in the early project years. \$29.0 million which had been disbursed against equipment procurement for these schemes under the original structure was attributed to 190,000 kilowatts achieved as of March 31, 1983 @ \$ 152.63 per kilowatt. The total GOI cost per kilowatt was \$390.26. AID's contribution was 39.1 percent of the total GOI cost. In discussions with REC, USAID determined that their targets for connections to be achieved in the ensuing four years, i.e. through Indian Fiscal Year 84-87 ending March 31, 1987, entailed connections totaling approximately 190,000 kilowatts for the same 633 schemes. Using the same per kilowatt figure, disbursements were made against the GOI's existing targets for those schemes.

These targets required continued and concerted effort on the part of REC and SEBs if they were to be met. Further, the restructuring of this project provided for a series of annual performance targets and it focused on the institutional development aspects of the rural electrification effort. It also simplified the project's implementation workload and got USAID/I out of the commodity procurement business.

The performance under the restructured project was significant, both physical and financial target had been met every year. Besides, the cumulative target of 380,000 kilowatts which was to be achieved in March 1987 was in fact achieved one year ahead of the schedule, i.e. by March 1986.

The cumulative annual targets and achievements were as follows:

| <u>IFY</u> | <u>Kilowatt Connection Targets</u> | <u>Cumulative Kilowatt Connection Targets</u> | <u>Cumulative Kilowatt Connection Achieved</u> |
|-------------------|--|---|--|
| Up to 03/31/83 | 190,000 | 190,000 | 190,000 |
| 1983- 84 | 30,000 | 220,000 | 222,139 |
| 1984- 85 | 70,000 | 260,000 | 274,088 |
| 1985- 86 | 125,000 | 315,000 | 380,000 |
| 1986- 87 | 190,000 | 380,000 | Project completed |

Other significant accomplishments were as follows:

- (1) SEBs and REC focussed more attention to the load development once the infrastructure was completed and lines were energized. Special units opened by the SEBs made a concerted effort to achieve the yearly as well as LOP targets. In addition, REC's newly created Planning and Development Divisions monitored schemes specially in areas where the rate of connections had been poor.
- (2) SEBs closely coordinated with Development agencies to ensure that the rural population obtained the loans for connections. SEBs officials frequently visited the villages to assist and educate the villagers in obtaining loan and filling in the application forms for electric connections.
- (3) SEBs utilized their costly infrastructure by providing connections thus getting returns from these connections at a faster rate than in the past.

IV. AID INPUTS:

| <u>PLANNED</u> | <u>ACTUAL</u> |
|----------------|---|
| \$58.0 million | \$58.0 million (actual cumulative 380,000 kilowatt connections) |

V. GOI INPUTS:

| <u>PLANNED</u> | <u>ACTUAL</u> |
|----------------|-----------------|
| \$58.0 million | \$148.3 million |

VI. SUMMARY OF LESSONS LEARNED:

A.I.D. should give consideration that financing of the Rural Electrification Projects, in future, should be linked up with the actual kilowatt connections i.e. output rather than with the materials procurement. Our above finding is based on the following reasons:

1. During the implementation of the project, we found that the original project inputs which were limited to the financing of materials for the MNP and SU Schemes resulted in a poor rate of kilowatt connections;
2. The focus of SEBs was more on construction of the infrastructures and energizing the lines without any attention to the next crucial step of initiating action in providing actual connections to the rural population;
3. Although the participating SEBs were professionally competent in preparing the bid documents, specification, bid reviews etc. in accordance with the competitive procedures, the procurement of the materials caused both AID and SEBs to concentrate on the procurement process rather than on actual electric connections;
4. As a result, the extremely costly infrastructure was not fully and quickly exploited, and its economic, social and developmental benefits remained underutilized

VII. POST-PROJECT ACTIONS:

The project was completed one year ahead of schedule (March 1986 against March 1987) and the entire loan has since been fully disbursed, and GOI contribution has been provided. During the course of implementation of the project, USAID officials periodically visited the various SEBs headquarters and project offices/sites. They inspected the project records, ledgers and also made field visits for physical verification of reported connected kilowatt load. They found that the records were satisfactorily maintained and verification of the reported connected kilowatts connections were as per the actual connections.

The final evaluation regarding "Study of Social Cost Benefit Analysis and Load Development" was carried out by National Council of Applied Economic Research contracted by REC. The study was completed in May 1987. The study has revealed that the project objectives have been achieved satisfactorily and benefit stream has been flowing successfully. For details see item VIII below.

Our review of the Project Authorization and Loan Agreement, Project Implementation Letters and other relevant documents shows that the Host Government has met all the conditions, covenants etc. satisfactorily and successfully completed the project.

In view of the above, USAID/I has determined that the post-project monitoring is not required.

VIII. EVALUATION:

REC hired the services of the National Council of Applied Economic Research (NCAER) to conduct "Study of Social Cost Benefit Analysis and Load Development". The study was conducted by NCAER in four states of Haryana, Himachal Pradesh, Gujarat and Orissa. The findings were based on data collected through a survey of 1245 sample households, 250 commercial and industrial establishments in 89 villages electrified under REC schemes covering 20 districts. The AID funded projects/schemes have been adequately represented in this study. The findings of the study are briefly described below:

1. Agricultural Gains:

- a. The positive impact of REC has been on the small farmers (owning up to 2 hectares). The small farmers were able to irrigate their crops more intensively because of the compact size of their farm thereby reaping larger returns per unit of land. It is significant to note that the small farmers were able to derive 50-80% more income per unit of land.
- b. The lower income group farmers were found to own and benefit from about 40% of the electric pumpsets. Besides, the backward population such as Scheduled Caste and Schedule Tribe population owned 25% of the pumpsets which is a significant achievement.
- c. The economic advantage of the electric pumpsets was evident from the increase in overall gross farm production (i.e. 6% over diesel engine using farms, 30% over farms using other means of irrigation and nearly 350% over rainfed farms) and also increase in net farm income in general. The electric pumpsets offered a viable alternative to diesel pump.

2. Domestic Gains:

- a. The value of electrification was evident from its wide acceptance among the rural masses including backward section. Among the total households which used electricity for domestic purposes 40% belonged to the lowest income group (annual income below \$770) and 36% belonged to lower middle income range (annual income between \$770-\$1540). If we quantify the benefits of domestic connections in monetary terms, cost saved by not using kerosene for lighting works out to a minimum of Rs 200/- per household and a maximum of Rs 600/- per household per annum. At the current price of kerosene these figures will be much higher and could be helpful in meeting the annual expenses of a child's education.

- b. It is interesting to note that one-third of the households using electricity had thatched roof showing that the most backward groups in the population were using electricity.
- c. The Schedule Castes and Tribes constituted 20% of the domestic connections which is a significant finding considering that these social groups are generally the last ones to be benefitted by such schemes.

3. Employment Opportunities:

- a. Use of electric pumpsets has given rise to increase in employment levels as evidenced by a higher level of expenses on the labor front.
- b. On the small scale units, 57% in Gujarat reported that more employment has been generated due to electric connections in the establishments. In Orissa 22.5% of the small scale units reported increase in employment opportunities.

4. Improvement in Quality of Life:

A vast majority of electricity users interviewed responded favorably regarding the impact of electricity on quality of life as follows:

- a. Change in reading habits;
- b. Safety and comfort;
- c. Increase in village security;
- d. Cheap energy source;
- e. Reduction in fire hazards;
- f. Increase in water supply;
- g. Increase in general mobility;
- h. Increase in social amenities; and
- i. Increase in household incomes.

Most of these benefits have significant value particularly to rural women and bring about a more equitable distribution of resources and incomes to the poorer areas of India.

Since the project objectives have been achieved and their positive impact has been established, we do not plan to have another evaluation. However, REC will continue to conduct impact study and we will obtain copies thereof as necessary.

IX. CONCLUSIONS AND RECOMMENDATIONS:

- 1. In the restructured project the project objectives were achieved one year ahead of schedule. AID should, in future, consider linking the

financing of Rural Electrification Projects with actual achievements (actual kilowatt connections) rather than with material procurement. However, USAID/I has not been included for Rural Electrification program for additional funding in future considering the greater importance of many other crucial priorities.

2. The study by NCAER has made it evident that with utilization of A.I.D. funds for Rural Electrification Project there has been impact in the backward areas (MNP&SU areas) such as: increase in employment opportunities, enhancement of incomes including that of small farmers, gains in domestic sector and improvement in the quality of rural life. The usefulness of AID funds for this project lies chiefly in the fact that the selected target areas were the most backward ones in many respects, and distinction of benefits to small farmers and large farmers had been marginal.
3. Post-Project USAID monitoring is not required since the project has been successfully completed, its purpose and objectives have been achieved, all funds have been fully disbursed, the GOI contribution has been provided, all covenants have been met by GOI and the benefit stream has been achieved.

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ATTACHMENT A

RURAL ELECTRIFICATION: 386-0462

| Name of States | SU Schemes Nos. | MNP Schemes Nos. | TOTAL Nos. |
|----------------|-----------------|------------------|------------|
| Andhra Pradesh | 7 | 7 | 14 |
| Assam | - | 46 | 46 |
| Bihar | 1 | 70 | 71 |
| Gujarat | 41 | 7 | 48 |
| Karnataka | 4 | 1 | 5 |
| Madhya Pradesh | 58 | 143 | 201 |
| Orissa | 23 | 66 | 89 |
| Rajasthan | 7 | 64 | 71 |
| Uttar Pradesh | 8 | 80 | 88 |
| TOTAL: | 149 | 484 | 633 |
| Percent: | 24% | 76% | 100% |

* Of the total 633 schemes financed by USAID, 484 (76%) schemes were in MNP areas and 149 (24%) schemes were in SU areas.