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**Report No: 20437**

# PERFORMANCE AUDIT REPORT

## INDIA

## VOCATIONAL EDUCATION PROJECT (CREDIT 2008-IN/LN. 3045-IN)
## TECHNICIAN EDUCATION I PROJECT (CREDIT 2130-IN/LN.3195-IN)
## TECHNICIAN EDUCATION II PROJECT (CREDIT 2223-IN)
## ELECTRONICS INDUSTRY DEVELOPMENT PROJECT (LN.3093-IN)

**April 27, 2000**

Sector and Thematic Evaluations Group
*Operations Evaluation Department*

## **Currency Equivalents** (annual averages)

*Currency Unit* = Country Currency: Rupees (Rs)

| | | | |
|---|---|---|---|
| Rs. | 1.00 | = | $0.0229 |
| $ | 1.00 | = | Rs. 43.5 |

## Abbreviations and Acronyms

| | |
|---|---|
| ADB | Asian Development Bank |
| GTZ | Gesellschaft fuer Technische Zusammenarbeit (Germany) |
| ICR | Implementation Completion Report |
| IDA | International Development Association |
| ITI | Industrial Training Institute |
| NGO | Nongovernmental organization |
| NPIU | National project implementation unit |
| OED | Operations Evaluation Department |
| PCR | Project Completion Report |
| PIU | Project implementation unit |
| SAR | Staff Appraisal Report |
| SASED | South Asia Education Department |
| SDC | Swiss Development Cooperation |
| SPIU | State project implementation unit |
| TVET | Technical-vocational education and training |

## Fiscal Year

Government of India: Apri 1 – March 31

| | | |
|---|---|---|
| Director-General, Operations Evaluation | : | Mr. Robert Picciotto |
| Director, Operations Evaluation Department | : | Ms. Elizabeth McAllister |
| Manager, Sector and Thematic Evaluations | : | Mr. Gregory Ingram |
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**The World Bank**
Washington, D.C. 20433
U.S.A.

Office of the Director-General
Operations Evaluation

April 27, 2000

# MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

**SUBJECT: Performance Audit Reports India - Vocational Education Project (Credit 2008-IN/Ln. 3045-IN)**
**Technician Education I Project (Credit 2130-IN/Ln. 3195IN)**
**Technician Education II Project (Credit 2223-IN)**
**Electronics Industry Development Project (Ln. 3093-IN)**

This is a Performance Audit Report (PAR) on four vocational-technical education projects in India:

- Vocational Training Project (Cr. 2008/Ln 3045 for US$280 million), which was approved in FY89 and was completed in December 31, 1998, after a two-year extension; US$146 million were cancelled at the end of the project.

- Electronics Industry Development Project (Ln. 3093 for US$8 million), which was approved in FY89 and was completed on December 31, 1997 after a two-year extension; US$.5 million were cancelled. The Swiss Development Cooperation co-financed the project for US$14.3 million.

- Technician Education I Project (Cr. 2130/Ln. 3195) for US$260 million), which was approved in FY90 and completed on June 6, 1998 after an extension of three months; US$43.6 million were cancelled.

- Technician Education II Project (Cr. 2223) for US$307 million), which was approved in FY91 and completed on time on October 31, 1999; US$51.3 million were cancelled. The audit of the Technician Education II project was carried out jointly with the SASED staff that was to develop the ICR for the project.

**Objectives.** The projects focused on expansion, quality, and management of various parts of the TVET system through increased numbers of student places, modernization of trade curricula, teacher training, development of management information systems. They financed civil works (establishment or additions) to hundreds of institutions, large-scale acquisition of state-of-the-art equipment, local and foreign training for teachers, curricular revisions, tracer studies, foreign and local technical assistance. All but the electronics project also all had sub-objectives to increase female participation.

**Outcomes**. The projects substantially achieved their objectives satisfactorily. Three of the four projects were extremely complex, with large numbers of components at the central and state levels. Despite early delays at a time when government staff were unfamiliar with Bank procedures, implementation was carried out energetically, and a great deal was achieved. Most planned activities were completed, and most physical targets were reached or surpassed.

**Relevance and Efficacy**. The projects have been consistent with a strategy of developing human resources in India and have been relevant to its economic development needs. Despite the lack of Bank sector strategy and priority, project design and use of IDA resources was efficient.

The Operations Evaluation Department (OED) rates projects as follows:

| *Criteria* | *Vocational Training* | *Technician Education I* | *Technician Education II* | *Electronics Industry Development* |
|---|---|---|---|---|
| Outcome – ICR and Audit | Satisfactory | Highly satisfactory | Highly satisfactory | Satisfactory |
| Sustainability- ICR and Audit | Likely | Likely | Likely | Likely |
| Institutional Development – ICR and Audit | Modest | Substantial | Substantial | Substantial |
| Bank Performance – ICR and Audit | Satisfactory | Satisfactory | Satisfactory | Satisfactory |
| Borrower Performance- ICR and Audit | Satisfactory | Satisfactory | Satisfactory | Satisfactory |

**Recommendations for Future Sector Strategy**

There is substantial implementation capacity at the central and state government levels, and the technical-vocational education and training (TVET) sector could be further developed. However, the higher levels of TVET absorb an inordinate amount of money in a country where 95% of the residents lack the education to enter these institutions. Conversely, there is very little investment in vocational education for those who have not graduated from grade 10. Therefore, a two-prong strategy is proposed:

- Maintain involvement and expenditures in industrial training institutes and polytechnics through future lending;
- Help the government gradually decrease expenditure for the degree levels of TVET, for which there is a great deal of social desirability and willingness to pay. Gradually increase fees with the goal of recuperating 50% of recurrent expenditures in degree-granting engineering colleges. To do so:

- Provide to the institutions the methodology to help them obtain alumni donations and build endowment funds that will build up discretionary funds; modify rules if needed to provide the charitable tax deductions that drive alumni donations;

- Modify rules to increase income generation, enable generated funds to stay at the institutions, enable faculty to share in income, and increase financial autonomy;

- Develop loan schemes for students, including early investment loans for parents;

- Pilot means testing schemes to identify reliably the truly poor students, so that they can receive preferential loans and scholarships;

- Maintain seat reservations and reduced fees for women and scheduled castes;

- Compete for research funds on the basis of clearly identified industry needs.

- Expand technical and vocational education investments in the northeastern states, which thus far have not received any inputs (as is scheduled to be done through Technical Education III project).

Develop a strategy to organize and strengthen training provided by many government agencies, donors, and non-governmental organizations (NGOs) to the vast majority of the population that has an educational level below grade 10. Though the Bank cannot directly finance this vast subsector, it can coordinate funding and matching of needs with beneficiaries and funds. The Bank should also continue to support expansion of training programs for the less educated, such as community polytechnics. Lending for this population could be undertaken on IDA terms.

## Lessons for Bank Interventions in TVET

The Bank's experience in India shows that it is possible to implement successful TVET projects. Lessons of experience include:

- Government commitment, ownership, and attention to execution can make it possible to overcome the implementation obstacles of the very complex TVET projects.

- State-level execution authority and accountability is more effective than national-level execution. A team approach would increase effectiveness.

- Instructional methodology of TVET is often neglected, and structured textbooks or materials are few. Projects must deal with instructional effectiveness.

- Training staff is a viable and cost-effective means of equipment maintenance provided that parts are readily available and that staff have an incentive to carry out the work.

- When multiple donors are involved in a sector, coordination becomes essential. Donor meetings should be held and expectations clarified.

Robert Picciotto
by Gregory K. Ingram

Attachment

# Contents

# Principal Ratings

| *Criteria* | | *Vocational Training* | *Technician Education I* | *Technician Education II* | *Electronics Industry Development* |
|---|---|---|---|---|---|
| Outcome | ICR | Marginally satisfactory | Highly satisfactory | Highly satisfactory | Satisfactory |
| | Audit | Satisfactory | Highly satisfactory | Highly satisfactory | Satisfactory |
| Sustainability | ICR | Likely | Likely | Likely | Likely |
| | Audit | Likely | Likely | Likely | Likely |
| Impact to Institutional Development | ICR | Modest | Substantial | Substantial | Substantial |
| | Audit | Modest | Substantial | Substantial | Substantial |
| Bank Performance | ICR | Satisfactory | Highly satisfactory | Satisfactory | Satisfactory |
| | Audit | Satisfactory | Satisfactory | Satisfactory | Satisfactory |
| Borrower Performance | ICR | Unsatisfactory | Satisfactory | Satisfactory | Satisfactory |
| | Audit | Satisfactory | Satisfactory | Satisfactory | Satisfactory |

# Key Staff Responsible

| | *Task Manager/Leader* | *Division Chief/ Sector Director* | *Country Director* |
|---|---|---|---|
| ***Vocational Education Project (Credit 2008-IN/Loan 3045)*** | | | |
| Appraisal | Nat Colletta | Richard Skolnik | Dan Ritchie |
| Completion | Shashi Shrivastava | Ralph Harbison | Edward Lim |
| ***Technical Education I Project (Credit 2130-IN/Loan 3195)*** | | | |
| Appraisal | Richard Cambridge | Richard Sholnik | Dan Ritchie |
| Completion | Shashi Shrivastava | Ralph Harbison | Edward Lim |
| ***Technical Education II Project (Credit 2223-IN)*** | | | |
| Appraisal | Richard Cambridge | Richard Sholnik | Dan Ritchie |
| Completion | Shashi Shrivastava | Ralph Harbison | Edward Lim |
| ***Electronic Industry Development Project (Loan 3093-IN)*** | | | |
| Appraisals | G. Gowen | Michael Gould | |
| Completion | N. Hadjitarkhani | Louis Derbez | Edward Lim |

# Preface

This Performance Audit Report (PAR) covers four vocational-technical education projects in India:

- Vocational Training Project (Cr. 2008/Ln. 3045 for $280 million), which was approved in FY89 and completed in December 31, 1998, after a two-year extension; $146 million of project funds were cancelled.

- Electronics Industry Development Project (Ln. 3093, Manpower Development component for $8 million), which was approved in FY89 and completed on December 31, 1997, after a two-year extension; $500,000 was cancelled. The Swiss Development Cooperation cofinanced the project for $14.3 million.

- Technician Education I Project (Cr. 2130/Ln. 3195 for $260 million), which was approved in FY90 and completed on September 30, 1998 after an extension of six months; $43.6 million was cancelled.

- Technician Education II Project (Cr. 2223 for $307 million), which was approved in FY91 and completed on time on October 31, 1999; $51.3 million was cancelled. The audit of the Technician Education II project was carried out jointly with the SASED staff that was to develop the ICR for the project. Ratings were decided collaboratively.

The audits were conducted to study the effectiveness of the Bank's vocational-technical education assistance to human resource development strategy of India. The PAR is based on the following sources: Implementation Completion Reports (ICRs), Staff Appraisal Reports (SARs), Credit Agreements for the projects; and project files, particularly the supervision reports. An OED mission visited India in October 1999 to collect other pertinent information. The author thanks the many government officials and researchers for their extensive cooperation.

Following standard OED procedures, copies of the draft PAR were sent to the relevant government officials and agencies for their review and comments. Comments received from the Government of India have been attached as Annex B.

# 1. Why Technical and Vocational Education?

1.1 Wandering in the corridors of the information technology department of the World Bank one gets the impression of being miraculously transported to some Indian university or software company—most office doors have Indian names on them. Similarly, the rosters of the top companies in Silicon Valley have enough Indian names to be confused with those of companies in the Sensex, the Indian stock exchange. News articles discuss how software companies extensively employ Indian programmers for a fraction of U.S. salaries to do the time-consuming and tedious tasks of writing program code. Sometimes it looks as if the Indians and the Chinese have split the computer world between them in the past decade: the Indians develop the software and the Chinese the hardware.[1]

1.2 How is all that possible in a country where the literacy rate is 64 percent?[2] India's long-term policy of self-reliance has promoted the development of heavy industry and technological know-how to reduce its dependence on foreign imports. To develop skilled craftsmen after independence in 1947, the government financed industrial training institutes.[3] It also opened many engineering colleges and polytechnic institutes. For the past 30 years, the ever-increasing members of the middle and upper socioeconomic classes have been sending their sons (and more recently their daughters) to engineering schools. The institutions that produce high-level craftsmen have had less demand. Many engineers go on to obtain graduate degrees in industrialized countries and stay there, accounting for the large numbers of Indian engineers in the United States. The overabundant software programmers who stay at home are now able to work by telecommunications for wages much below those paid in industrialized counties. Yet, there is a net oversupply of engineers, and pertinent jobs are unavailable for many graduates.[4] Nevertheless, the engineering degree proves advantageous in all areas, because graduates are considered professionally qualified and eligible for business loans. Many people do not practice engineering, but go into management or work in their family businesses. Therefore, technical qualifications increase overall income generation potential, and inevitably, status.

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1. "IC Means Indians, Chinese." Times of India, Sunday October 30, 1999.

2. National Literacy Mission. Literacy Rates: An analysis based on NSSO Survey. 1998.

3. The polytechnics and industrial training institutes straddle secondary and post-secondary education for students aged 16–20. Students enter after completing grade 10 and passing the Secondary School Leaving Certificate with grades satisfactory to each institution. The best students usually go on to grade 11, which leads to university; the second best may go to polytechnic schools (administered by the Ministry of Education), from which entrance to engineering college is possible under certain circumstances; and the least qualified, and often poorer school leavers may go to industrial training institutes (administered by the Ministry of Labor), which give terminal certificates. Some secondary institutions also offer a higher secondary school vocational track, which also leads to higher studies. In addition to diploma programs, some polytechnics train the less educated people in "community polytechnics."

4. Manpower Profile – India. 1999. Institute of Applied Manpower Research, New Delhi, 110002, India. Employment grew at annual rate of 5.5 percent from 1991–95, but in the large public sector it decreased by 2.3 percent annually. Electronics engineers would have a surplus of 54,000 if admissions remain at current levels, as well as mechanical, civil, and electrical engineers. There are small shortages for paper, metallurgy, and petrochemicals. There is a large shortage of computer engineers: 15,735 for degree level and 27,488 for diploma level. For example, in Karnataka, 20 percent of degree holders in the above disciplines waited for three years to get a job.

1.3 As a result, engineer education is socially highly desirable and often functions as general higher education for the well-to-do and the better students. Overall, there is high demand for studies that lead to technical degrees; entry in the apex institutions such as the Indian Institutes of Technology is highly prized. The large number of engineers available may have made India better prepared for industrialization than other lower-income countries. Aside from the traditional areas of electrical, mechanical, and electronic engineering, a great deal of emphasis is being placed on information technology. Demand for electronics has been increasing in India in a policy environment that has traditionally protected local industry from imports, but there have been few trained people to work in the industry and limited capital with which to develop it. However, the government has specifically guided and stimulated development in the software industry through the Department of Electronics (currently Ministry of Information Technology). Desirability and the prospect of increased industrialization drive the government to invest more in the higher levels of technical education.

1.4 The investments benefit very few people. Only 8.34 percent of adults (286 million) and only 2.5 percent of women are grade 10 graduates and eligible for formal technical and vocational education and training (TVET).[5] Yet, the number of TVET institutions is large; According to the All India Council for Technical Education, in 1997 there were 549 degree-granting technical institutions, of which 353 were private. The number of degree-granting engineering colleges is about the same as for medical colleges but has increased faster than these, by 300 percent since 1961.[6] The institutions have produced 800,000 degree holders in the country, while degree-level engineering college enrollments were 343,000 in 1998.[7] Below-degree-level vocational and technical institutions (private and public) have increased from about 4,200 in 1961 to 7,000 in 1998. Of these, there were 1,088 diploma-granting polytechnics, 438 of them private.[8] Enrollments in post-grade-10 programs of polytechnic institutions were about 750,000 (200,000 female), while there were 1.25 million engineering diploma holders in the country. There are about 3665 industrial training institutes, with an approximate capacity of 573,500 students per year.[9] As the numbers show, there is a tendency for more engineers and fewer technicians to be produced. Even though the proportion of people eligible in principle for TVET is small, openings are fewer. In general, demand exceeds supply, and most institutions can be selective.

1.5 However, Indian technical institutions have traditionally faced major quality problems. With India's limited resources, they have been perennially underfunded. Laboratory equipment costs a lot to buy and maintain, so many classes are conducted by "chalk and talk." Low teacher salaries have been coupled with very low student fees and limited means to generate income. Limited teacher motivation has also meant very limited linkages with local industry and unprepared graduates. Institutions have had no power to change their curricula to increase the employability of graduates nor much knowledge on how to go about it. In a country where female education and mobility have been low, women initially constituted about 11percent of the students. To deal with these problems, India instituted in 1989 a 10-year program of

5. Manpower Profile, p. 493.

6. Manpower Profile, pp. 75, 469; there were about 120 engineering colleges in 1961.

7. Manpower Profile, pp. 83, 87.

8. Manpower Profile, p. 74.

9. Manpower Profile, p. 140.

strengthening its technical human resource base (NPG-N86). As a result, the World Bank was invited to finance four projects in technical and vocational education (TVET) in 1990-1999.

1.6 What benefits has India received for its investment in TVET and its partnership with the World Bank? To find the answer, all four projects were audited in October 1999. The OED mission joined a SASED implementation completion mission for the Second Technician Education Project and carried out a joint "learning" audit. In coordination with SASED, the OED audit mission visited approximately 20 institutions throughout the country that had benefited from one or more of the TVET projects. This document presents results for each project and evaluates past sectoral strategy and future prospects.

**Bank Experience in TVET**

1.7 Since the 1970s, the Bank has financed many TVET projects worldwide, expecting that technically trained manpower would promote economic development. Results have often been mixed. Building vocational-technical institutions requires much attention to building, equipment, and procurement issues, often leaving little time or attention span for curricula, textbooks, testing, and instructional delivery. In many low-income countries, students possessing the level of education deemed necessary to enter institutions below the degree level often aspire to university studies and are unwilling to do manual work for prevailing salaries. Technical education institutions are expensive; and, as in India, they charge low fees, generate very little income, and rarely interact with the local industry. Competent teachers who have industry experience and who are willing to work for the available salaries are hard to find. Private-sector training is more targeted towards employment, and many students are willing to pay for it. However, the poorest are left out.

1.8 A World Bank–International Labor Organization (ILO) study specific to vocational education and training[10] found that the countries most likely to benefit from TVET are emerging economies, such as China, Indonesia, Malaysia, Korea, Chile, and Mexico, where there is high employment growth. With its high rates of economic growth and labor force participation in industry, India shares some of the same characteristics[11] and may be benefiting from the investment. But the labor picture is mixed. Unemployment among young adults is relatively high,[12] only 31 percent of organized-sector employment is private, while about 92 percent of employment is in the informal sector.[13] Traditionally, TVET has benefited formal-sector employers; it has been less suited for the informal sector and for income generation. The limited utility of vocational education is also evident by the low percentage of trainees who get employment. A project tracer study showed that without Bank intervention, only 25 percent of students in industrial training institutes were employed within a year.

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10. Skills and Change: A Synthesis of Findings of a Multi-Country Study of Vocational Education and Training Reforms. World Bank-ILO. Human Development Department 1999 (synthesis).

11. Manpower Profile, p. 511; labor force participation in the industry is 16 percent for India, 14–15 percent in China and Indonesia, though it is 23 percent for Malaysia and 35 percent for Korea.

12. Manpower Profile, p. 415; 1993–94; 10.9 percent for men and 19.5 percent for women ages 15–29.

13. Manpower Profile, pp. 246, 269.

**Ten Years of Lending and Policy in Profile**

1.9 In the 1980s, the World Bank repeatedly offered to help India finance primary education. The government at that time hesitated to finance a subsector of education that was seen as nation-building, an activity for which the country should use its own funds rather than borrowed funds. On the other hand, the development of technical human resources was seen as a more justifiable occasion for borrowing money.

1.10 The end of the 1980s was a time of internal economic difficulties for India, when it became obvious that the country was underusing the industrial potential it had built up by training engineers. The National Policy of Education of 1986 emphasized access to technical and higher education on the basis of merit, institutional autonomy with accountability, research quality, excellence, and responsiveness of curricula to market needs. Through the impetus of the national policy, many government studies, deliberations and workshops were carried out to shape the content of the Bank projects, and the process was planned in detail.

1.11 Aside from some ideological concerns about borrowing, there were concerns that the Bank might impose objectionable conditions. The government strategy to develop technical human resources was coupled with the intention to make these projects Indian schemes, which could be implemented through Indian means. Therefore, the projects were formulated with a great deal of government ownership and involvement, much state and local teamwork, and with very little international technical assistance.[14] Bank conditionalities were limited, and partly due to centralized decisionmaking, Bank staff were discouraged from making unannounced visits to various project sites.

1.12 The Bank's strategy was to help the government bring about the much-desired industrialization of the country, particularly in high-technology areas, in order to produce human and material resources that would compete in the world market. In addition to civil works and equipment, the Bank focused on improving the quality of instruction and the ability of institutions to carry out by themselves the tasks needed to train students who would be valuable to industry: curricular revisions, updating teacher skills, self-maintenance of equipment, improved linkages with industry, income generation, financial, and academic autonomy (Table 1). It also focused on increasing female participation in TVET (Annex Table 1). By financing TVET and attending to government priorities, the Bank was also hoping to establish itself as a credible interlocutor in education (Annex Table 2).

1.13 The projects concentrated on the lower levels of the formal TVET system, which train technicians and craftsmen to support the work of degree-level engineers. They also focused on states and institutions that were most willing to make much-needed changes. IDA financed a vocational training project in 1989 to support the mainly public industrial training institutes that provide craftsmen training under the Ministry of Labor. It financed two overlapping technician education projects in 1990 and 1991 to support public and some NGO-run polytechnic schools operated under the auspices of the Ministry of Education. (For-profit private schools were not included.) Bank loan funds also financed an Electronics Industry Development Project in 1989-

14. Two very committed Indian Administrative Service officers led the preparation of the vocational training project. They were transferred when it became effective, and subsequently implementation suffered.

1996. This project, administered by the industry and finance division (SASFP), supported the development of state-of-the-art training in electronics and computer science for selected engineering colleges and polytechnics. It also had investment and technical assistance components, which were eventually cancelled. The Vocational and Technical Education I projects had IBRD loan components (shown in Annex Table 2 as separate project numbers) for equipment, which were cancelled when the rupee was devalued.

1.14 Overall, the World Bank committed a total of $855 million over 10 years and disbursed $534 million for TVET. Although considerable, this amount was minuscule compared to the TVET budget of the country. As the report presents, however, the partnership proved fruitful. The two parties developed a productive working relationship, and the Bank established itself as a credible interlocutor in education. In 1993, it was invited to finance primary education, and a series of successful interventions has ensued in this subsector.

**Table 1.1. Project Objectives**

| | ***Modernization/ Quality*** | ***Access*** | ***Management/ Efficiency*** | ***Women/Poor Populations*** |
|---|---|---|---|---|
| Vocational Education Project | (i) modernizing craftsman and apprenticeship training through re-equipping selected Industrial Training Institutes (ITIS) and developing related training systems, extending trade coverage of the National Apprenticeship Training Scheme. | (ii) expanding the Advanced Training Programs by introducing new trades at the advanced skill level in existing national and regional Vocational Training Institutes, establishing new Advanced Vocational Training System Centers and extending existing centers, and developing one new High Technology Training Center | (iii) improving NVTS management and planning at the Directorate General of Employment and Training and corresponding State Directorates of Training through the strengthening of the monitoring and evaluation system, improvement of the testing process, reorientation of management /supervisory training, and strengthening of research on vocational training. | Increasing women's access to training in modern sector trades by constructing new ITIs for women and adding women's wings to existing ITIs |
| Technician Education I | Quality improvement (modernizing the equipment and facilities of Polytechnics, expanding teacher training, and development of career development system for teaching staff ) | capacity expansion which would expand and diversify programs in about 50 percent of the Polytechnic system (including improving training opportunities for women, rural populations and the handicapped ); | Efficiency improvement which will strengthen the Bureau of Technical Education, granting academic autonomy to selected Polytechnics. | Special attention to expanding opportunities for women (see below). |
| Technician Education II | Modernizing the equipment and facilities of Polytechnics, expanding and improving the quality of training of Polytechnic teachers and undertaking curriculum development activities. | Expanding and diversifying programs in about 240 new and existing institutions, so that they can undertake with flexibility, courses in new and emerging technologies, conventional and advanced technician engineering, and continuing education diploma courses. | Strengthening State Directorates and Boards of Technical Education, granting academic autonomy to selected Polytechnics, undertaking industry-institute interaction programs in each Polytechnic, encouraging internal revenue generation in Polytechnics and establishing equipment and facility maintenance systems. | Special attention given to expanding training opportunities for women, rural populations and the informal sector by establishing new women's residential polytechnics, upgrading coed polytechnics to increase women's opportunities, and expanding the number of community polytechnics. |
| Electronics Industry Development Project | Provide technical and financial support to assist the two largest Development Finance Institutions improve their capability to identify, appraise and finance sound projects | Assist in upgrading the training of technical and professional Manpower | Help to lay the basis for continued improvement in the policy environment for electronics. | No specific emphasis of women |

1.15 The government continues to be greatly interested in developing competent scientific and technical human resources. Officials place much emphasis in developing centers of excellence and financing of regional and national engineering colleges. It has been proposed that follow-on operations encompass:

- Technician Education Project III to cover polytechnics in states left out of the recently completed Technician Education I & II. The project will aim at capacity expansion, quality improvement, modernization, improved female participation, and better linkages with industry and community.

- A subsector program for technical education to carry out long-term systemic reforms to foster and propagate quality and excellence in the entire technical education subsector in India through: (i) development of some 200 engineering colleges and polytechnics as nodal centers of self-sustaining excellence; (ii) synergistic networking of neighboring institutions; (iii) providing service to society through active linkages of institutions with surrounding industry and community (with extension programs for rural and urban poor). The program may extend up to a decade or more with two or three overlapping five-year operations.

**Donor Interactions in TVET**

1.16 India has received technical and financial assistance from several bilateral agencies, notably Canada, Germany, United Kingdom, Denmark, Japan, and Switzerland. There are also many foreign nongovernmental organizations (NGOs) that provide training in various trades to people of limited education in specific areas.

1.17 IDA is by far the largest contributor of TVET. (The Asian Development Bank does not lend for education in India.) Most donors have offered relatively limited help in specific professions and institutions. For example, Germany has conducted teacher training and has helped the Central Staff Training and Research Institute of the Ministry of Labor develop materials. The British Council has also offered fellowships and supported certain polytechnics. The largest bilateral donor has been the Swiss Development Cooperation (SDC), which cofinanced the Electronics Industry Development project with the Bank. The partnership between SDC and the Bank has been uneasy, due to differing expectations, priorities, and philosophies (see para. 2.11).

1.18 The government has coordinated donor inputs to various institutions, and informal discussions have taken place regularly with Canadian and German bilateral agencies involved in equipping polytechnic schools. More systematic donor coordination has not been seen as necessary for TVET. However, there may be a need to do so for strategy development in issues such as the training of people with limited education.

# 2. Implementation of Sectoral Strategy

2.1 *Relevance*. The projects arose to some extent because of IDA's initial inability to work on primary education rather than as a result of the institution's careful study and setting of sectoral priorities. Nevertheless, they have been consistent with a strategy of developing human resources in India and relevant to the country's economic development needs. In an environment of extreme sectoral complexity, it is not justified to assign the highest priority to a single area and to concentrate on it.

2.2 There has been no study of the TVET sector as a whole. (A study was finalized towards the end of 1999 mainly on higher technical and scientific education.) The Electronics Industry Development Project was carried out by SASFP with little coordination with the human development division; task managers of the two divisions rarely communicated, and two different projects gave uncoordinated inputs to some of the same schools.

2.3 The lack of a detailed sectoral strategy in the Bank is not surprising. The mixed performance of TVET in other countries contributed to ambivalence towards this sector and hesitation to plan investments for the long term. Also, after IDA started implementing large primary education projects in India, most of the divisional energy was devoted to that subsector. Only one task manager is occupied with TVET projects.

2.4 The lack of a clear sectoral strategy was also related to unclear linkages with *industrial strategy*. Although improvements in the condition of industrial training institutes and polytechnics were clearly needed, the project documents showed almost no underlying rationale for supporting specific industrial initiatives at the state or central government levels. Efforts were made to survey local conditions and expand training in the areas where a need was found. However, there was apparently no larger-scale or holistic planning regarding human resource investments to bring about more globally desired changes. Only the electronics project was developed to fulfill a specific industrial need.

2.5 *Efficiency*. Despite the lack of sector strategy and priority, project design and use of IDA resources was efficient. All four projects were very complex multistate operations. As is usually the case with TVET, they demanded much government expertise in procurement, civil works, equipment acquisition, and complex planning of coordinated inputs. There seemed to be little wastage of resources or defective civil works. A large majority of project inputs was completed, a remarkable achievement. The impact of these inputs on the supply of trained human resources is likely to be economically efficient and substantial in the long run.

2.6 *Efficacy*. The projects focused on expansion, quality, and management of various parts of the TVET system through increased numbers of student places, modernization of trade curricula, teacher training, and development of management information systems (Annex Tables 3 and 4). They financed civil works (establishment or additions) to hundreds of institutions, large-scale acquisition of state-of-the-art equipment, local and foreign training for teachers, curricular revisions, tracer studies, and foreign and local technical assistance. All but the electronics project also had sub-objectives to increase female participation. The four projects mainly focused on the larger states, and on those with the greatest potential for industrial development. Although Assam

was included, the northeastern states received only some equipment for the industrial training institutes through the vocational project.

**Implementation Experience**

2.7 Implementation of the projects had several common characteristics:

- There was a strong commitment and design by central and state government officials to make a difference in the system; the concerned agencies organized in detail the work and stood up to the complexities of the tasks. Despite some delays in staff appointments, much energy was devoted to the projects.

- The strong commitment was mitigated by the uninspiring performance of the state departments of public works; due to competing assignments, delays were lengthy and the quality of some construction was deficient. Project implementation units relied less on them and more on other construction agencies in subsequent years, but the states that had committed to using these departments suffered delays.

- The devaluation of the rupee made it possible for all projects to carry out more activities than initially planned. A substantial amount of the vocational education project was cancelled, but project proceeds were largely used (Annex Table 2).

- The government was willing to spend IDA funds mainly for hardware and local training. Foreign technical assistance and foreign fellowships were underused. Some bilateral technical assistance was used, but otherwise, international expertise was not used very much. Essentially, the projects were implemented only with the level of knowledge India could muster.

- Supervisions were intensive and frequent, particularly after task management moved to the field. The national project implementation units supervised state agencies and progress in institutions by meeting several times a year, discussing problems, and reviewing progress. Authorities insisted on prior notification, citing security reasons. But announced visits may have helped obscure problems that could have been remedied.

- Myriad procurement problems arose. Procurement guidelines of the various states and the central government were different from the Bank's guidelines, and much confusion ensued until people learned. About 1,100 institutions were involved all over the country, each requesting from state and national agencies the local or international procurement of many and varying pieces of equipment. Large-scale acquisition and installation of various kinds of sophisticated equipment also meant extremely complicated logistics, with contractors overpricing equipment or sometimes preferring to lose the warranty money rather than install in unfavorable areas. Sometimes the Bank provided satisfactory resolution, but other times its rules prevented changes.

- Project monitoring was overall satisfactory, highly satisfactory in the case of the two technician education projects. Many implementation-related statistics were collected and presented graphically for the decisionmakers. However, the data were used mainly

descriptively; the mission was informed that evaluations (including tracer studies) were taking place but were still incomplete.

**Implementation Experience for Individual Projects**

2.8 *Vocational Education Project* (Annex Table 3). The government was unprepared for this first IDA project and rules. IDA had underestimated implementation complexities and had designed a centrally administered project that gave some inputs in most states. The PIU had limited control over state agencies and, thus, limited ability to implement. Lengthy delays occurred before the Ministry of Labor and state agencies assigned PIU staff and trained them to Bank procurement guidelines. As a result, the project had to be extended for a total of two years. The Bank hesitated before granting extensions, and this prevented the government from determining the course of implementation. But the biggest problem of this project was the limited authority of the PIU to spend money. Expenditures required approval by the Ministry of Finance, which delayed approvals and ultimately disallowed many items, such as foreign fellowships. Many others were cancelled when a a dispute arose with a contract GTZ (German Technical Cooperation). Nevertheless, most physical targets were met, and inputs were provided.

2.9 *Technician Education I-II Projects* (Annex Tables 4 and 5). These were essentially the same project, carried out in two phases. The first project supported polytechnics in Bihar, Gujarat, Karnataka, Kerala, Madhya Pradesh, Orissa, Rajasthan, Goa, and Uttar Pradesh. The second project started a year later and supported polytechnics in Andhra Pradesh, Assam, Haryana, Himachal Pradesh, Maharastra, Punjab, Tamil Nadu, West Bengal, Pondicherry, and Union Territory of Delhi. Although there was a national PIU, the states took the main role in implementing in their jurisdictions and in supporting the institutions that they chose. The national PIU helped the state PIUs to implement, while setting performance targets and supervising intensely. The pressure to implement helped the states and the supported institutions organize the resources needed and rise to the occasion.

2.10 *Electronic Industry Development Project* (Annex Table 6). The devaluation of the rupee and liberalization of market restrictions meant that Bank support of the development finance institutions became expensive and unnecessary. The Department of Electronics, which administered the project, found that technical assistance in the form of seminars had little appeal to software producers and also cancelled that component. Only the human resource component of this project was implemented (called Project Impact), which amounted to $8 million by the World Bank and $16 million by the Swiss Development Cooperation. All physical inputs to the supported institutions were provided as planned.

2.11 However, the Bank and SDC disagreed regarding supervision methods. The Bank was the executing agency, but the task managers (who changed frequently) almost all of the project duration were based in Washington and had very limited budgets to supervise what had become an education project. On the other hand, SDC had a presence in the field and was much more interested in intensive supervision. To complicate things further, personality conflict arose between Bank staff and SDC. The Department of Electronics was caught between the two agencies, in a difficult and stressful position. Missions often did not coincide in the field, thus creating work for the government, which had to accommodate them separately and remain on good terms with both parties. Ultimately, the project was completed, and SDC helped the

government organize a "self-sustainability scheme" to help supported institutions become independent. (See Box 1.)

**Project Outcomes**

2.12 The ambitious projects brought about many changes in the industrial training institutes, polytechnics, and engineering colleges that benefited from them. More specifically:

2.13 *Capacity was expanded.* Altogether, about 1,100 institutions were constructed or received additions, equipment, and furniture (Annex Tables 3–6). Overall, their capacity increased more than 50 percent, by roughly 100,000 student places. Expansion often exceeded targets. For example, the advanced vocational training scheme was to benefit 17,000 students but benefited 84,000.

2.14 However, these government institutions are unusually expensive. They operate on a single shift and have a student-teacher ratio of only 1:15 (as specified by the All India Council for Technical Education.) Continuing education programs take place in the evening, and some institutions now run part-time programs. On the other hand, NGO-run institutions (many of which received project inputs) are much more likely to use their installations all day long. For example, St. Xavier's polytechnic in Mumbai did not just teach students various trades, it also operated evening study halls for the students of the nearby slum. Clearly, better use of the government buildings is needed.

2.15 *Curricula were developed.* Curriculum development centers were established under the projects and revised curricula for students as well as for teacher training, often on the basis of industry surveys. For the electronics project, engineering institutions acted as resource centers. Study visits also helped define useful equipment. The curricular process greatly increased awareness of the need to revise curricula frequently, every six months to two years. Academic autonomy for institutions has been key to this process, since state boards may revise and disseminate curricula much less frequently than needed. As a result of these processes, graduates in focus groups stated that in earlier years they had often studied material that employers found obsolete but that recent curricular revisions had made their skills more marketable.

2.16 *Extensive teacher training took place.* The projects productively supported technical teacher training institutes and some foreign fellowships. The vast majority of teachers in the beneficiary institutions (roughly 23,000) received some form of training in updating their subject matter knowledge, or learning to operate and maintain equipment. Courses were developed by resource centers, which received financing from the project. These teacher training centers also developed materials that were used in the courses. Training seems to have been effective. Students in focus groups stated that they could see differences in the teachers' state of knowledge regarding specific items, and teachers themselves reported satisfaction with the training. Since training was usually related to the operation of specific pieces of equipment, it tended to be concrete and performance-oriented, in contrast to more general teacher training that did not impart useful skills. In addition to teacher training, about 3,000 temporary positions were made permanent, enabling teachers to establish careers.

2.17 *Equipment is used and maintained.* Committees selected equipment systematically, and the ability of students to handle state-of-the-art equipment used by the industry improved. In the case of large industrial equipment, curricula were structured around the models used by local industry. Some of the equipment was used by private firms for income generation, as in the case of photographing and printing integrated circuits as well as in film and television production. Use for production was occasional, but it generated income for some institutions. Much more frequent was the use of laboratory facilities to teach classes for pay to individuals or firms (e.g., marine telecommunications). The *self-maintenance* principle promoted by the projects was effective, and staff received training in fixing damaged equipment. This increased the probability that equipment would remain in working order and used by students. Only 50 percent of the equipment in industrial training institutes was usable before the vocational project, but 92 percent was operational after the project.

2.18 *Textbooks are not used as expected.* The projects financed instructional materials, which enriched the libraries of the institutions. Technical teacher training institutes developed series of materials needed for teacher and staff training in various specialties. Also the electronic industry development project placed much emphasis on developing modules for sale and use by students. However, production and use have been uncoordinated. The electronics project materials were produced without consultation with the teacher training institutes, and to some extent overlap. Despite much development effort, they were not pilot-tested with students and teachers; some of those used by engineering colleges are considered too simple and therefore not very useful to students. Furthermore, distribution and sale has thus far been limited, though efforts are being made in this direction. This is unfortunate, because private institutions could purchase them and thus generate income. Also, the textbooks become obsolete quickly, and the expense to develop them may be wasted. Furthermore, commercial textbooks may be available.

2.19 *Most students lack textbooks.* For most efficient use of time and structure of information, students should have a single textbook or a concrete set of learning materials assigned and available at affordable prices, which they can take home and study. Instead, textbooks are optional. All institutions visited consistently assign homework through the traditional method of recommending various textbooks that are in the library. Though many students may study reference books consistently, most visit the library occasionally and study from notes they take in class. This limits the amount of information students can acquire to the most basic facts. Inquiries about rental schemes brought to the fore the issue that most institutions still cannot charge their students various fees. A few institutions mentioned that they have book banks for students of scheduled castes. In general, textbooks have been developed at considerable expense, but are not in the hands of every student who needs them and they are not generating income that may keep textbook production going.

2.20 *Linkages with the industry are stronger but still limited.* An apprenticeship law and strong support in all projects has increased opportunities for students to get industry experience before they graduate; 30–100 percent of polytechnic graduates got industry exposure, depending on the state. The vocational training project supported the employment of staff to help with this function as well as with placement of graduates. However, there are problems. Institutions rely on large-scale industry, which can absorb many students year-round with relatively little effort. Large employers exist in sufficient numbers mainly in industrial areas, as in Maharashtra and Haryana. Elsewhere, institutions must convince the many micro-industries, a tedious and time-consuming task which

often does not get done. In states like Himachal Pradesh, for example, very limited opportunities exist for industry interaction. Also, despite the law, many employers hesitate to receive apprentices and to spend time on them; many industry leaders still do not understand why they must support training efforts, and only about 67 percent of potential apprenticeship positions were used in 1997.[15] The students most likely to get apprenticeships are those in labor-intensive specialties, who in effect provide the industry with free labor. Local advisory boards were expected to guide institutions and create better understanding with industry, but few have operated consistently. Clearly, this task needs more work in all institutions involved.

2.21 *Income generation is improving but still limited.* All projects emphasized the importance of financial autonomy and income generation capacity. Student fees have gradually increased in all institutions without much protest from students. This showed that students are willing to pay for VTET of good quality. (Jordan and Chile have been charging students 30 percent of operating costs.)

2.22 However, the financial autonomy that will enable institutions to make decisions about building maintenance, updating equipment, and providing incentives to teachers, has been elusive; states are still wary about allowing it. The main exception has been for the departments that manage the electronics industry development project, where coordinators in institutions can spend money with limited need for approvals. Therefore, income generation must still considerably improve.

2.23 *Student performance has improved.* The projects resulted in dropout decreases and improved achievement. The pass rate under the Technician Education II project improved from 57.5 percent before the project to 76 percent (target was 79 percent). Dropout in Technician Education I institutions was 3.4 percent. Students are accepted based on their grades in science and math. It is of some concern that they enter the various technical institutions based on academic performance rather than vocational skill. Certainly science knowledge is valuable, particularly for information technology, but the more academically skilled students are more likely to go on to higher education rather than work in the industry after graduation. So, to some extent, the wrong students, those who may acquire fewer skills as craftsmen, may be gaining admission.

2.24 A tracer study showed that 45 percent of students in IDA-aided industrial training institutes found employment in their field as compared to 25 percent in non-aided institutions; 80 percent of instructors and principals also agreed that improvement in employability has been significant. The tracer study for the Technician Education II project showed about 40 percent of polytechnics graduates finding employment in one year, though results varied by state. These placement rates reflect in part the numbers of students who go on to higher education and the choices of families with enough means to be able to wait for the right job. Tracer studies did not show the extent to which students took up their family occupations after graduating in a different area. A rate-of-return calculation, which took into account project costs, potential and real student expenditures, and earnings, came up with a modest rate of 13 percent.

2.25 *Women's participation has increased substantially.* The projects greatly succeeded in opening opportunities for women in technical fields, in women-only as well as in coeducational institutions. Several measures were taken: many girls' hostels were built, fees were eliminated and

15. Manpower Profile, p. 138.

scholarships were instituted in certain states, and reservations for girls were instituted in others. As a result, female participation exceeded targets and overall more than doubled, from about 11–15 percent to 30 percent. This was a major accomplishment.

2.26 Many women choose traditional fields such as fashion design, but most others study office technology, architectural drafting, and computer programming. In the mechanical industrial trades, most classes visited had two or three students in automotive repair, computer repair, machinist shops, leather technology, and other nontraditional trades. In focus groups, female graduates reported being able to find jobs; many employers stated that they were willing to hire women because they were conscientious and not as concerned about leaving for better-paying jobs. But they were concerned about their mobility to client sites and mainly used them in offices. Many women from poorer backgrounds lack the self-confidence to present themselves positively to employers and may end up with lower-paying jobs. The need to train women to present themselves and project self-confidence was raised in focus groups, particularly in industrial training institutes.

2.27 *Some of the training goes to the poor.* About 50 percent of industrial training institute students are poor or very poor, and for those who manage to graduate from grade 10, these institutions represent economic opportunity. Along with reservations for women, state governments instituted reservations for scheduled castes and tribes. In some areas, specific polytechnics were built for scheduled castes due to the large number of first-generation learners in the area. Thus, government strategy ensured that the less advantaged sectors of society had some access to TVET. Also, two polytechnics were built for the handicapped (Box 2).

2.28 In addition to training grade 10 graduates, many polytechnics have taken on the administration of *community polytechnics.* These offer short courses to people who lack the education or time to enter formal TVET. Participants are often adults, illiterate women, persons wanting to acquire basic computer skills, etc. The Technician Education I and II projects supported development of about 24 community polytechnics. (Several others were built through government funds.) Usually one or two staff members from the polytechnic are involved. However, polytechnics do little research to assess needs; skills are taught according to what is available.

2.29 Community polytechnics may post notices in the *panchayat* office of a village announcing that a certain course will be taught and inviting registration. This is an excellent innovation and initiative, but there is a concern that the material taught may not help much in income generation. In theory 90 trades are available, but most courses for illiterate women involve sewing. However, the skills observed by the OED mission were rudimentary and did not prepare women for income generation (though it may transmit spatial perception skills and dexterity). Very poor women may make this choice because they do not know about income opportunities and may be concerned about their marriageability. But the community polytechnics gave few choices. In another case, the audit mission was shown bamboo artifacts made by tribals. These were of limited utility and had little decorative value. They clearly would not sell at rates that would compensate tribals for their work. Clearly, this concept needs additional support and strategy development. Industrial training institutes might also have staff suitable for involvement in it.

**Box 1. A Model Polytechnic for the Handicapped**

The handicapped make up about 85 million people in India. Very few programs accommodate their educational needs, and no special access arrangements are made for those who are mobility-impaired. Most, therefore, end up uneducated and unable to earn a living.

The Jagatguru Shivarath Ishwara Polytechnic in Mysore is run by a religious organization and has received funding through the government of Karnataka from the Technician Education II project. It serves about 250 physically handicapped and deaf students, about 40 percent of whom come from outside Karnataka. The campus was designed on one level with ramps for access. In addition to dormitories, students have a health center and facilities for physical therapy. They receive medical attention, which many lack. About 30 percent of the physically handicapped are polio victims. The institution also runs a community polytechnic, which trains the disabled in rural crafts.

Students study for three-year diploma courses in architecture, secretarial skills, and information technology. There are remedial courses to deal with the frequent educational limitations of the students. To build confidence in the disabled, psychology courses are also included. To make students functional despite limitations, the school pioneered the use of special devices: large-size keyboards and mice, on-screen and voice-operated keyboards for those who cannot use their hands well. For deaf students, the school has studied extensively and adapted sign language for various Indian languages; it has brought in specialists from Gallaudet University in the United States, who recorded sign language on videotape for students to study.

About 120 students graduate per year, and many receive jobs in local industries. There is a placement facility for graduates, many of whom are preferred by employers because they are dedicated and work hard.

## Project Outcomes

2.30 Overall, physical targets of the four projects were met or surpassed. Performance-related outcomes include improved academic performance and considerable improvement in issues that elsewhere have proved hard to deal with, such as linkages with industry and use of appropriately trained teachers. The large efforts made by these projects produced sizeable results. OED rates the outcomes of Technician Education I and II as highly satisfactory and outcomes of Vocational Education and Electronics as satisfactory.

2.31 Though many features can improve, the Indian experience in some ways constitutes best practice. It showed that it is possible to carry out successful projects in TVET if there is ownership and commitment in government as well as in schools. India has done better than many countries possibly because in the large population and limited supply of any kind of post-secondary education, there are qualified students willing to enroll. At the same time, the industrialization efforts under way require craftsmen and production supervisors; despite some problems, there is an ongoing need for the skills that are imparted and at least a partial match between the skills taught and those needed in the workplace.

*Management - Institutional Development Impact*

2.32 Discussions with officials made it evident that a great deal of continuous planning had taken place in all projects. The planning involved coordination and teamwork at the central, state, and institution level. Without it, clearly the goals would not have been achieved. Accordingly, officials and institution authorities were quite proud of their achievements. The fact that three of

the four projects completed their large and complex set of activities within the original project period speaks volumes about the government's commitment and desire to implement.

2.33 In their efforts to implement, beneficiary institutions and state agencies greatly increased their institutional strength. During the first years of implementation, state offices and institutions lacked even fax machines to receive messages. By the time of the audit mission, the capacity to undertake complex activities was evident. All institutions visited made PowerPoint presentations of their activities and were eloquent about their accomplishments. There was much discussion of sustainability and industrial linkages, as well as inclusion of women in discussions.

2.34 OED rates institutional development impact as modest for the vocational education project (which experienced much more difficulty in implementation) and substantial for the other three.

*Sustainability*

2.35 Sustainability of all projects is rated as likely. The physical facilities have been training increasingly large numbers of students, while the equipment is sustainability maintained by faculty. Hopefully, income generation schemes can help maintain faculty motivation in order to keep the curriculum renewal process under way.

2.36 The electronics project constitutes a best practice. Following its completion, SDC proposed a Self-Sustainability Scheme. Despite earlier agreements, the Department of Electronics (now Ministry of Information Technology) has financed it. It consists of a gradual withdrawal of support over five years, while engineering colleges and polytechnics are expected to fill the void with ever-increasing amounts of generated income.

**Box 2. The Self-Sustainability Scheme – A Best Practice**

When the electronics project was completed in 1996, SDC was concerned about the abrupt loss of funds to the supporting institutions. A follow-on project was established to ensure that the 37 participating institutions would gradually become self-supporting, while maintaining project benefits. A carefully managed and delicately nurtured transition is taking place from mere project management to institutionalization of methods and practices that use the assets towards sustainable revenue generation.

- Award of Rs. 800,000 to each institution per year
- Requirement (after consultations) that each institution generate Rs. 160,000 the first year (mainly through contracts with the industry and teaching courses for pay)
- Reduction of the award in the second year by Rs. 160,000 and addition of the generated money of the first year; the institution still has Rs.800,000 to spend on electronics activities
- Gradual reduction by Rs. 160,000 over five years and commensurate increase of income generation.

The money is spent on:

- Continuing engineering education, instructional enhancement for faculty, and eight weeks of industry attachment for students
- Motivating activities for teachers (workshops to attend in India, short courses)
- Maintenance contract money used to continue training staff and students to maintain the equipment and to buy parts
- Awards to various institutions for greatest improvement.

The sustainability project is continuing very satisfactorily. The Ministry of Information Technology has a tightly run unit in charge of this activity. The staff were recruited outside the civil service and receive professors' salaries. They are knowledgeable in electronics and have close relationships with the participating institutions. Thus, the government of India is ensuring that project benefits continue to work to increase the software advantage that the country has obtained.

*Borrower Performance*

2.37 Borrower performance is rated as satisfactory for all projects. The state and federal levels of the government showed much commitment and a strong desire to improve the status of beneficiary institutions. The Bank-financed projects served to focus the staff. Expectations of supervision missions were reasons for much preparation activity and review, and the deadlines of the action plans greatly helped to complete the work. The government is financing many other schemes of educational construction and equipment. But external financing and review may have been the most important aspect of project implementation.

*Bank Performance*

2.38 Overall, Bank performance was satisfactory. Nevertheless, the Bank underestimated the complexity of the three IDA projects and the amount of effort needed to implement them. Arguably, the Bank could have given more attention to the TVET projects in the crucial earlier years. Task managers changed often, and these large projects were supervised from headquarters. (Supervision shifted in the field in 1997.) The electronics project, which benefited throughout its life from a technical educator, was supervised infrequently due to lack of funds, an issue that resulted in friction with SDC. Finally in 1996, the Bank assigned a knowledgeable task manager in the field full-time in charge of the TVET projects, and supervision intensified.

2.39 Currently, the Bank has very limited expertise in TVET, and it can be argued that it has no comparative advantage in lending for this subsector of education. Most of the vocational educators retired and were not replaced. (At any rate, many of these older specialists had no expertise in instructional TVET issues.) At the same time, the mixed performance of TVET projects has resulted in less investment in this area and in fewer lessons that can be reliably transmitted. The Indian experience may be a positive turning point.

2.40 India can benefit from expert advice in this area but needs to be convinced that it is worthwhile. Future project preparation missions might include world-class experts working with the Bank to provide respected advice on strategy and methodology. Alternatively, the Bank may form a partnership with a bilateral that has more technically knowledgeable staff in this area, such as GTZ or SDC.

# 3. Issues for Future Sectoral Strategy

3.1 The money that the Bank has available for TVET in India is minuscule compared to the size of the sector. How could it be placed in the future so that it has a maximum effect? Below are some suggestions for reforming the higher, middle, and lower levels of TVET in the long run.

**Engineering Colleges: Let Users Finance Most Costs**

3.2 Because of income generation potential and social desirability, there is much private desire to invest in engineering colleges. Many parents pay hundreds of thousands of rupees to send children to private schools and to tutor them so that they can pass examinations that will get

them into the best schools. This means that the government could substantially reduce its financial expenditures for public institutions and let parents pay a much bigger share.

3.3 Like the self-sustainability scheme of the Department of Electronics the government might gradually decrease outlays to engineering colleges while enabling and stimulating them to find funds elsewhere. OED suggests the following strategy elements for the government's consideration:

- *Abolition of rules that limit student fees.* Regulations could be changed to permit substantial increases in tuition fees, book rentals, and other fees. Gradual and substantial fee increases would cover percentages of institutional expenditure similar to those covered by fees in Malaysia, Singapore, Hong Kong, or Korea. In the long run (15–20 years), student fees might rise to cover 50 percent of recurrent expenditures.

- *Incentives to generate income.* Institutions might be allowed to keep the income they produce and faculty should be allowed to take its share. As in other countries, staff should have the incentive to compete for research funds. (Income generation and grant activity might be a criterion for faculty evaluations.) Academic and financial autonomy would increase the ownership and commitment of staff, but strong accountability is also needed.

- *Systematic donations.* Most engineering alumni (in India or abroad) are well to do and could potentially contribute considerably. Appeals can be made to them for creation of endowment funds and operational support. In the United States, fundraising has been honed to a highly sophisticated methodology. A bilateral donor which has access to fund-raising experts, such as USAID, could provide technical assistance for establishing alumni fundraising offices in all engineering colleges. To make this system workable, institutions should acquire the power to give tax deduction certificates to donors.

3.4 Students whose parents are unable to pay high fees should continue to be able to enter engineering colleges. Means to consider might be:

- Continued seat reservations for women and various scheduled castes, tribes, minorities according to government policy.

- Scholarships and fee waivers to women and members of scheduled castes who are first-generation learners. Means testing has been difficult in India, where people can easily be declared poor. The government might pilot-test means-testing schemes in hopes of finding some that are workable.

- Student loans for the poorer high-caste students; graduates are clearly able to generate respectable income, and can repay them. To help middle-class parents, the government could establish loan funds, like the "529 funds" available in the United States, that allow tax-free investments while children are young.

3.5 Should the government of India spend more to build up engineering "centers of excellence" as planned in current strategy? Middle-income countries justify their financing as a means to compete equally with the world in access to the information pool and for research

projects. The Bank has been quite cautious about financing science and technology centers of excellence in poor countries. In India, centers of excellence might be the Indian Institutes of Technology and other well-known engineering colleges. Aside from reservations for scheduled castes, though, these high-status schools serve mainly the students who have resources to be tutored so as to graduate from good schools and get the best grades. In addition, 17–30 percent of the graduates go overseas for advanced study and stay there, effectively giving to the industrialized world the resources that India has spent on them. Certainly, excellence in performance must be supported, but supporting these apex institutions may make the rich even richer.

3.6 A future Bank project might finance the implementation of a "self-sustainability" system for gradual reduction of support along with gradual fee increases, income generation, development of endowments, and loan schemes. Institutions, including those considered centers of excellence, may receive civil works or other highly desired inputs in exchange for reduced dependence on government money. This model may also be applicable to general higher education, particularly the more socially desirable schools, such as medicine. Any lending for the higher levels of TVET should be in World Bank loan terms.

3.7 Reduced government support may not be easy to accept. Engineering schools are used to getting priority in financing, professors have secure positions, and some may be unwilling to do the extra work necessary to generate extra income. Pressure will probably continue from influential special interest groups. Ultimately, change depends on the government's political will—and the implementation of the four past projects shows that there is a measure of political will.

**Polytechnics and Industrial Training Institutes: Maintain Current Investment Levels**

3.8 Future investments should continue to support the institutions that produce the country's technicians, in efforts to increase their instructional quality, linkages with industry, and income-generation capacity. Many polytechnic graduates go on to engineering colleges, and they may be a loss to the system. On the other hand, the doors of the industrial training institute graduates to higher education are closed. Closing this door usually discourages the better students from attending. Students in the industrial training institutes tend to be from lower castes and may be punished doubly. Perhaps limited access to engineering colleges should also be allowed from this group.

3.9 *Attention to less-developed states.* In some respects, Bank projects financed the states and institutions that were easiest to develop. Though the strategy paid off in developing industrial capacity where it was needed, attention must also be given (as already planned) to areas with less capacity. None of the projects provided any support to institutions in the northeastern states where school graduates may languish with little to do and join antigovernment organizations. Rather than teach traditional TVET courses for which there may be little employment in these states, careful research is needed to identify appropriate income generation activities that will also be socially acceptable for the middle-class students eligible to attend. For example, food processing and package businesses may be viable. Since these states are largely rural, coordination must take place with various rural development agencies.

**Training for The Poor: Increase Financing and Organize**

3.10 Both the Bank and the government have concentrated their strategy on students aged 16–22 who have at least obtained the secondary school leaving certificate at the end of grade 10.

3.11 There has been very little strategy development or TVET investment for the vast majority of adults and youth who have a lower level of education. The disorganization and limited financing for training of the less educated starkly contrasts with the organization and large-scale financing of TVET for students who have graduated from grade 10. This is not merely a problem in India. The less educated are in many respects harder to teach. Training for them requires less use of academic concepts, is often short-term, and usually does not involve high technology. Also, governments have moved away from the model of providing primary- or secondary-level vocational education. However, vocational needs as well as suitable professions continue to exist. For example, there are always shortages of trained plumbers or carpenters, but the people willing to do the work are often ineligible to enter the relatively formal programs that teach them. In reality, in very poor countries, children learn these trades through unpaid and often exploitative apprenticeships. What is needed is a training model to respond effectively to the various needs.

3.12 Considerable training is already available for the less educated in India. Various ministries, agencies, and NGOs conduct courses in health, rural development, and other areas (including those conducted by community polytechnics). Private schools provide training for professions such as commercial drivers and workers for the hotel industry. However, the field is vast and disorganized, and there is no coordination among providers to permit easy information about them and access to them. As discussed earlier, many times these courses are supply-based—someone's hunch about what is useful. Like the informal sector for which these courses prepare students, there is relatively little understanding about what works and how training can help maximize incomes.

3.13 One must listen to the "voices of the poor." The Bank cannot finance everything and has no comparative advantage in vocational education for the less well off. But it can help coordinate providers and identify gaps. A useful reference system might be the Comprehensive Development Framework that was promulgated in 1999 by the President of the World Bank (Table 2 is an example.)

3.14 The Bank, along with donors active in TVET, could organize and finance a vocational training stimulation project. The project could organize strategy conferences in various states and identify providers of all types of non-formal courses along with their clientele, needs, and degree of effectiveness. A management information system of providers could be developed, surveys might be conducted regarding what various people consider feasible to learn as well as options that may have not been considered. Successful programs could be helped to expand to different areas and client groups and funds might be given for such expansion. Thus, potential learners could be connected to providers of effective courses that would respond to their needs and income. Lending for this population could be undertaken on IDA terms.

3.15 To serve the poor, TVET institutions might adopt villages and find solutions to their technological needs, thus transferring their knowledge to areas where it has never been transferred. Thus, they might also increase their income generating potential.

**Table 2. Potential Activities and Donors of Vocational Training through a Comprehensive Development Framework Model**

| *Examples of Learner Groups/Needs* | *Multilaterals* | *Bilaterals* | *UN System (through government)* | *Civil Society (including NGOs)* | *Private sector* | *Financing by various Ministries* |
|---|---|---|---|---|---|---|
| Rural women needing income | IDA? | Various | FAO? | ? | | Various |
| Slum dwellers – income | | | | ? | | |
| Artisans of quality, useful handicrafts | | | | ? | | Social development? |
| Women willing to learn 'male' skills (plumbing, shoe repair, etc.) | | ? | | | Private vendors | Community polytechnics |
| Male adolescents in manual trades (e.g. car repair, carpentry) | | | | | Apprenticeships | Community polytechnics |
| Health-related instruction | IDA? | Various | | | | Health Ministry |
| Agricultural courses for farmers | IDA? | | | | | Rural development |
| Female industrial sewing | | | | | | Community polytechnics |
| Formally educated | | | | | | |
| Grade 10 leavers | IDA | GTZ, etc | ILO assistance | NGO polytechnics | Private polytechnics | Public institutions |
| Grade 12 leavers | IDA | SDC, etc | | | Private colleges | Public institutions |
| Continuing education | | | | | Many | Many |

**Financial Accountability**

3.16 Bank supervisions typically do not have the closeness of contact needed to detect mismanagement, an issue which should certainly interest the government. This is a problem not only in education but in other sectors. OEDCM (an operations evaluation department concerned with dissemination of knowledge and financial accountability) briefly studied the financial accountability of Bank projects in India and concluded that they are not insulated against waste and abuse. An example found pertinent to the TVET sector was the audit certificate of West Bengal for the technician education II project (Cr. 2223-IN). Several items submitted for reimbursement in 1997-98 were deemed inadmissible for various reasons when audited.[16] Though some disallowed expenditures were due to arithmetic errors, there were cases in which expenditures were considered unrelated to the project or made by unauthorized persons. For example, furniture was charged for the offices of technical education officials and conference room of the Technical Education Directorate. Other disallowed expenditures included travel, hired vehicles, and telephone expenses by persons who were not authorized to use them. This raises concerns that accountability within the government is undermined through such uncontrolled expenditures. OED suggests that the government make disbursement policies clearer to state staff in order to minimize the submission of expenditures that will be disallowed.

16 Audit Certificate. Office of the Accountant General, West Bengal, January 4, 1999. CASS-V/1-XXIV/Vol-III/481.

# 4. Lessons for Bank Interventions in TVET

4.1 The Bank's experience in India shows that it is possible to implement successful TVET projects. Contributing factors to the success are as follows:

- Government commitment, ownership, and attention to execution can make it possible to overcome the implementation obstacles of the very complex TVET projects.

- In India, state-level execution authority and accountability proved more effective than national-level execution. Involvement of institution staff in a team approach would also increase effectiveness over a top-down order to implement.

- Classroom delivery of TVET is often neglected in methodological terms, and structured textbooks may be hard to find. Projects must monitor instructional effectiveness rather than assume that it exists.

- Training staff to maintain equipment is a viable and cost-effective means of maintenance provided parts are readily available and that staff have an incentive to carry out the work.

- When multiple donors are involved in a sector, coordination becomes essential. Donor meetings should be held and expectations should be clarified. Disagreements among donors may adversely impact government programs.

**Annex Table 1. Policies Promoted by Technical-Vocational Education Projects**

| Policy | Vocational | Technician I | Technician II | Electronics | Achievement/ Impact |
|---|---|---|---|---|---|
| Improve the incentive system for instructors, particularly in the advanced skill programs | X | | | | Some salary and income generation incentives established, in some states more effectively than in others. |
| Strengthen the links between training institutions and industry through the development of local advisory boards and establishment of industrial liaison officers for each training institution | X | X | X | X | Linkages strengthened in areas near industries. Many employers hesitate to receive apprentices; local advisory boards often not constituted. |
| Expand opportunities for women in modern sector training and employment | X | X | X | | All targets exceeded, and women participate in substantial numbers. |
| Develop a program for the physically handicapped; | | X | X | | Two special polytechnics developed |
| Establish and budget an equipment maintenance system for the life of the project. | X | X | X | X | Self-maintenance of equipment extensively promoted and functional |
| Improve income generation in the financed institutions | | X | X | | Improved but in many areas still low |
| Develop flexibility in entrance and curriculum requirements | | X | X | | Most institutions acquired autonomy and flexibility |
| Train teachers and introduce a career development system. | X | X | X | | Extensive teacher training has taken place, quality varied |
| Foster an electronics industry that will become internationally competitive | | | | X | Trade liberalization greatly stimulated electronics |

Note: The effectiveness of addressing issues was rated on the basis of statistics available.

## Annex Table 2. IDA education projects in India ($ million to December 1999)

| *Project name* | *FY* | *Credit /Loan no.* | *Approval Year* | *Final Closing Date* | *Credit amount ($ million)* | *Disbursed ($ million august 1999)* | *Cancelled or undisbursed ($ million)* |
|---|---|---|---|---|---|---|---|
| Completed Projects | | | | | | | |
| Education Agric.Univ | 1973 | 342 | 1973 | 12/31/82 | 12 | 12 | 0 |
| Tech Educ II | 1991 | 2223 | 1991 | 10/31/99 | 307.1 | 174.64 | 51.36 |
| Tech Educ I | 1990 | 3195 | 1990 | 06/30/98 | 25 | 0 | 25 |
| Tech Educ I | 1990 | 2130 | 1990 | 09/30/98 | 235 | 231.15 | 18.6 |
| Vocational Training | 1989 | 3045 | 1989 | 12/31/96 | 30 | 0 | 30 |
| Vocational Training | 1989 | 2008 | 1989 | 12/31/98 | 250 | 121.42 | 116.14 |
| Electronics Industry Development | 1989 | 3093 | 1989 | 03/31/97 | 8 | 7.47 | 0.527 |
| Total | | | | | 855 | | 534.67 |
| Projects Under Implementation | | | | | | | |
| Uttar Pradesh Basic | 1993 | 25090 | 1993 | 09/30/00 | 165 | 143.46 | |
| District Primary Ed | 1995 | 26610 | 1995 | 03/31/02 | 260 | 122.31 | |
| District Prim Educ 2 | 1996 | 28760 | 1996 | 06/30/03 | 425.2 | 96.2 | |
| District Primary Ed. III (Bihar) | 1998 | 30120 | 1998 | 09/30/03 | 152 | 13.73 | |
| Rajasthan District Primary Education | 1999 | N0440 | 1999 | 12/31/04 | 85.7 | 0 | |
| Uttar Pradesh Basic Ed II | 1998 | 30130 | 1998 | 09/30/00 | 59.4 | 29.23 | |
| Andhra Pradesh Basic Education | 1999 | | | | | | |
| Total | | | | | 1,141.1 | 951.61 | 776.3 |
| Total for all Lending | | | | | | | |

## Annex Table 3. Vocational Education Project Activities

| *Components/ Subcomponents* | *Activities* | *Targets to be Achieved* | *Outputs* | *Outcomes* |
|---|---|---|---|---|
| (a) Modernizing craftsman and apprenticeship training | | | | |
| | re-equipping selected Industrial Training Institutes (ITIs) | 400 Industrial Training Institutes | 487 new trades at 268 ITIs, 378 trades revised | Curricula more in line with market needs |
| | Developing related training systems | Establish 44 related training centers<br>24 basic training centers | 44 related and 18 basic centers built<br>Trained 95,000+ industrial workers | Opportunities to attend it is have considerably increased |
| | Extending trade overage of the National Apprenticeship Training Scheme to existing 131,500 apprentices | 34 apprendiceable trades<br>7800 additional apprentices | Numerical targets largely achieved | Modest impact. Often students cannot find many willing employees to give apprenticeships |
| Increasing women's access to training in modern | Constructing new ITIs for women<br>For 1-2 year courses | 100 in 15 states<br>increase capacity by 9000 in 22 trades | Achieved<br>Total 24,000 women | Women have much greater access to ITIs, including nontraditional |

| *Components/ Subcomponents* | *Activities* | *Targets to be Achieved* | *Outputs* | *Outcomes* |
|---|---|---|---|---|
| sector trades | | | trained | trades |
| | Adding women's wings to existing it is | 18 nontraditional trades in about 72 institutes, for additional 3010 women | 6500 women trained | Women better able to attend it is. |
| | Increasing numbers of female instructors, establish regional vocational institutes | Training for 16 trades in 4 new centers, annual capacity for 656 | Largely achieved | Female instructors present in many trades |
| (b) Expanding the Advanced Training Programs | | | | |
| | New trades in existing Regional Vocational Training Institutes (RVTIs) and National Vocational Training Institute (NVTI) | 17 new trades | Curricula developed | Curricula more in line with market needs |
| | Establishing new Advanced Vocational Training System Centers and extending existing centers | Establish 34<br>22,000 trained in 40 centers | 33,000 trainees trained | Opportunities to attend have considerably increased |
| | Developing one new High Technology Training Center | 67 foreign fellowships<br>136 local fellowships | Civil works dropped; training cells were established in 10 ITIs<br>Local and international training | Capacity created for training in selected high tech areas |
| | Training instructors for advanced programs | 7000 | 10,000 trained | Instructors better able to teach about new equipment |
| | Appointing instructors | 4200 | 3784 appointed | Though staff are available, recruitment process is lengthy. |
| (c) improving NVTS management and planning at the General and State Directorates of Training | | | | |
| | Strengthening of the monitoring and evaluation system | Collect info on costs, trainee employment | Systems designed, not yet implemented | Limited impact |
| | Improvement of the testing process | Foreign fellowships<br>Local training | Little activity<br>One seminar, two item banks tested | No impact |
| | Reorientation of management /supervisory training | 31,500 staff days of management training | | Impact uncertain |
| | Strengthening of research on | Financing 4 major studies | Studies completed<br>Fellowships, TA | Impact uncertain |

| *Components/ Subcomponents* | *Activities* | *Targets to be Achieved* | *Outputs* | *Outcomes* |
|---|---|---|---|---|
| | vocational training<br>Strengthen Central Staff Training and Research Institute | Foreign fellowships, TA | unused | |
| | Developing a management information system | Computerized monitoring in 18 states | Partly accomplished | Impact uncertain |
| | Strengthening women's training unit at the DGET | Equipment and facilities | 10 staff appointed | Staff follow up with institutions |
| **Policy actions** | | | | |
| | Improve the incentive system for instructors, particularly in the advanced skill programs; | | Vacancies are close to targets | Staff available to teach new courses |
| | Strengthen the links between training institutions and industry | Development of local advisory boards in 400 training centers | Many boards established in name | Continuity and impact are limited thus far |
| | | Establishment of industrial liaison officers in 400 industrial training institutions | Many institutions have them | Where operational, they are effective in placing apprentices and graduates |
| | Establish and budget an equipment maintenance system for the life of the project | 1-month equipment maintenance training to 550 staff | System established in 19 states | The system reportedly is functional |
| Technical assistance | Foreign fellowships<br>(apprentice advisors)<br>Local consultants | 656 staff months<br>198 staff months | Local training extensively used, instead | Staff available to teach new courses |

**Annex Table 4. Technician Education I Project Activities**

| *Components/ Subcomponents* | *Activities* | *Targets to be Achieved* | *Outputs* | *Outcomes* |
|---|---|---|---|---|
| (a) Capacity expansion ($133 million) | Increase capacity from 112,335 places to 145,240 | 24,665 new places; 47 percent in new tech, 31 percent for women | 100 percent met | Substantial increase in capacity |
| | Programs in new technologies | 239 new diploma and post-diploma courses; 15,600 places | 215 (revised target met) | Substantial increase in new programs |
| | New coeducational polytechnics | 19 | 18 | Women have increased access |
| | Polytechnics for handicapped | 1 | 2 | Handicapped have increased access |
| | Continuing education programs, required by industry | 68; centers in 6 of 8 state boards | 93 | Workers can improve their marketability |
| | Programs for rural and informal sectors | 21 new cells to be added, from 108 to 133 community polytechnics | 11 (revised target) remainder financed elsewhere | Effective, but serve limited numbers of people |
| | Programs for women (11 percent women in project polytechnics) | 22 wings, workshops, scholarships; 175 percent increase | 28 new wings 30 percent women in project polytechnics | Women have increased access, make up 30 percent of students |
| | Student and faculty housing | Dorms for 6530 boys, 3660 girls; 4040 staff | Boys 5609, girls 4199, staff 2155 | Women have increased access |
| | Updating-creating labs | 1384+234 | 983 (vs. modified 1014) +236 | Labs largely used; students are trained in updated facilities |
| (b) Quality improvement ($170 million) | Teacher education | Double capacity to 500 annually, train 7800 untrained teachers | 7901 trained | Teachers better able to teach about new equipment and new technology courses |
| | Curriculum development | Set up 9 curriculum centers | 9 established, all curricula revised | Curricular updating easier |
| | Equipment and facilities improvement in 230 polytechnics | 147 computer centers | 236 computer centers | Students get more computer-related courses |
| | Maintenance cells | 17+162 | 16+238 | Equipment stays in order |
| | Hiring additional staff | 2698 | 1937 (2124 modified) | Staff hired, teaching |
| | Vehicles | acquired | acquired | Largely used for project purposes |
| | Books and materials | | | Textbooks available mainly in libraries |
| | Fellowships | 431 | 356 | Specific impact unknown |
| | Technical assistance | | 83 percent of funds used | Specific impact uncertain |
| | Diploma pass rate | 77.5 percent | 76 percent | Internal efficiency |

| *Components/ Subcomponents* | *Activities* | *Targets to be Achieved* | *Outputs* | *Outcomes* |
|---|---|---|---|---|
| | | | | improved |
| | Dropout rate | 5.8 percent | 3.4 percent | Internal efficiency improved |
| | Time to publish test results | 5 weeks | 6 weeks | Too much time still passes |
| (c) Efficiency improvement ($47.27 million) | Bureau of Technical Ed. and State Directories of Technical Ed. | Fellowships<br><br>TA | Results declared with same delay | Additional staff in Boards, results declared in 6 rather than 12 weeks |
| | Autonomy to 24 Polytechnics | Additional funds | 30 | Only academic, limited financial |
| | Industry-institute interaction | Advisory cells in each school | | Interaction rather limited |
| **Studies** | 16 | 16 | 16 | Some recommendations implemented |
| **Policy actions** | | | | |
| | Expanding opportunities for women in modern sector training and employment | | Increased places in institutes and hostels exceeded expectations<br>Dropout decreased | |
| | Training the physically handicapped | | Implemented | |
| | Increasing linkages between polytechnics and the industry | | Gradually increasing | |
| | Emphasizing equipment maintenance | | Implemented | |
| | Improve income generation in the polytechnic system | | Improving; Rs. 310 million generated | |
| | Flexibility in entrance and curriculum requirements in what is a rigid three-year program | 21 institutes | 53 institutes | Flexibility generally achieved |
| | Creating curriculum development centers in the state boards of technical education | | All centers have been established and all curricula revised at least once with the help of Technical Teacher Training Institutes | |
| | Teacher training and introduction of a career development system. | | Recommendations partly implemented | |
| Technical assistance | | | | Local assistance used |

**Annex Table 5. Technician Education Project II Activities**

| *Components/ Subcomponents* | *Activities* | *Targets to be Achieved* | *Outputs* | *Outcomes* |
|---|---|---|---|---|
| (a) Capacity expansion (US$133 million) | Increase capacity in financed institutions | About 20000 | 24350 | Substantial increase in capacity |
| | Programs in new technologies | 235 new diploma, 57 post diploma courses | 234 new diploma, 58 post diploma courses | Substantial increase in new programs |
| | New coeducational polytechnics | 9 | 9 | |
| | Polytechnics for handicapped | 2 | 2 | |
| | Continuing education programs, required by industry | 7 centers, 94 cells | 8 centers, 111 cells | Substantial creation of capacity |
| | Programs for rural and informal sectors | | | |
| | Women's training | Female enrollment 15% | Female enrollment 28.4% | |
| | Student and faculty housing | Unknown | 7266 hostel spaces for girls 3077 for boys | More women able to live away from home |
| | Updating-creating labs | 2468 | About 2500 | |
| (b) Quality improvement (US$170 million) | Teacher education | 11 staff development centers, 43 cells; train about 5800 teachers | 11 staff development centers, 115 cells | |
| | Curriculum development | Establish 15centers | 13 centers established | |
| | Maintenance cells | 8 polytechnics 229 cells | Target achieved | |
| | Hiring additional staff | 2298 | 79% of target | Recruitments slow |
| | Vehicles | | | Reportedly used for official purposes |
| | Books and materials | Procured for libraries | Target met | Students often lack textbooks |
| | Fellowships | Foreign and local | Mainly local | |
| | Graduate employment rate | 40% | About 60% | Final tracer results awaited |
| | Diploma pass rate | 46% | 75% | |
| | Dropout rate | 8% | 4.6% | |
| | Time to publish test | | Somewhat | |

| *Components/ Subcomponents* | *Activities* | *Targets to be Achieved* | *Outputs* | *Outcomes* |
|---|---|---|---|---|
| | results | | shorter | |
| (c) Efficiency improvement (US$47.27 million) | Bureau of Technical Ed. and State Directories of Technical Ed. | | | |
| | Autonomy to 24 Polytechnics | Curricular flexibility, academic and financial autonomy | Curricular flexibility and academic autonomy | No financial autonomy |
| | Industry-institute interaction | | | Some improvement |

**Annex Table 6. Electronics Project Activities**

| *Components/ Subcomponents* | *Activities* | *Targets to be Achieved* | *Outputs* | *Outcomes* |
|---|---|---|---|---|
| (a) Investment credit in electronics industry (US$420 million) | Loans by development finance institutions under a single window | US$202 million in loans | 108 subprojects approved; US$72 used; ended 1993 | Development finance industries found other means of lending |
| (b) Skilled manpower training (US$26.8 m) | | | | |
| | Participating institutions | 25 | 25 | Improved expertise in electronics |
| | Institutional enhancement programs | 57 | 57 | Improved expertise in electronics |
| | Electronics and software training (equipment, books, journals, some civil works) | 14 universities, 12 polytechnics, 6 centers for technology 42 programs | 51 | Improved expertise in electronics |
| | Establish or modernize laboratories | 32 | 51 | Improved expertise in electronics |
| | Learning materials developed for 60% of electronics courses | 56 | 53 | Many unsuitable, students do not receive them |
| | Industrial attachment participants for 6 weeks | | 1500 students benefited per year since 1994 | Mainly functional |
| | Teachers trained | | 700 | Increased expertise in electronics |
| | Support staff training | | 51 | Staff able to use |

| *Components/ Subcomponents* | *Activities* | *Targets to be Achieved* | *Outputs* | *Outcomes* |
|---|---|---|---|---|
| | | | | software |
| | Continuing engineering education program | | 2500 staff days in 1997 | Staff able to teach advanced courses |
| | Model curricula | 3 | 3 | Curricula developed |
| (c) Technical assistance (US$3 million) | | | | Very limited impact |
| | Software industry study | | Revealing findings of potential | Ultimately recommendations were not followed |
| | Seminar series | 7 | Abandoned after 3 seminars | Limited interest |
| | Training program for development finance institute staff | 32 participants | Study visits | Some institutional development |

# Basic Data Sheet

**Annex A**

## Key Project Data *(amounts in $ million)*

***INDIA (Credit 2008-IN/Loan 3045-IN)***

| | *Appraisal estimate* | *Actual or current estimate* | *Actual as percent of appraisal estimate* |
|---|---|---|---|
| Total project costs | 429.8 | 163.5 | 2.63% |
| IBRD/IDA Loan amount | 280.0 | 121.42 | 43% |
| Cofinancing | - | - | - |
| Cancellation | - | - | - |
| Date physical components completed | | | |

## Cumulative Estimated and Actual Disbursements

| | *FY90* | *FY91* | *FY92* | *FY93* | *FY94* | *FY95* | *FY96* | *FY97* | *FY98* | *FY99* |
|---|---|---|---|---|---|---|---|---|---|---|
| Appraisal estimate ($M) | 11.20 | 42.00 | 98.00 | 140.00 | 196.00 | 224.00 | 266.00 | 280.00 | 280.00 | 280.00 |
| Revised estimate | 29.68 | 30.07 | 45.00 | 57.00 | 69.00 | 84.00 | 100.00 | 114.00 | 126.00 | 138.00 |
| Actual ($M) | 27.82 | 30.07 | 44.41 | 53.73 | 64.67 | 80.80 | 94.04 | 111.38 | 122.31 | 121.42 |
| Actual as percent of appraisal | 93.73 | 100.00 | 98.69 | 94.26 | 93.72 | 96.19 | 94.04 | 97.70 | 97.07 | 87.42 |
| Date of final disbursement: | | | | | | | | | | 5/24/99 |

## Project Dates

| | *Original* | *Actual* |
|---|---|---|
| Identification | Sep-87 | Sep-87 |
| Preparation | Jan-88 | Feb-88 |
| Appraisal | Sep-88 | Nov-88 |
| Negotiations | Jan-89 | Apr-89 |
| Board Presentation | Feb-89 | Jun-89 |
| Signing | Mar-89 | Jun-89 |
| Effectiveness | May-89 | 8/8/89 |
| Project Completion | 12/31/96 | 12/31/98 |
| Closing date | 4/30/99 | 4/30/99 |

## Staff Inputs (staff weeks)

| | *Planned* | | *Revised* | | *Actual* | |
|---|---|---|---|---|---|---|
| | Weeks | US $K | Weeks | US $K | Weeks | US $K |
| Through Appraisal | NA | NA | NA | NA | 105 | 240.00 |
| Appraisal -- Board | NA | NA | NA | NA | 15 | 35.00 |
| Board -- Effectiveness | NA | NA | NA | NA | 12 | 28.00 |
| Supervision | 25 | 550.00 | 302 | 675.00 | 283 | 643.40 |
| Completion | 17 | 43.50 | 19.1 | 44.00 | 15 | 30.00 |
| Total | | | | | 430 | 976.40 |

# Mission Data

| | | | | | *Performance Ratings*[a] | | |
|---|---|---|---|---|---|---|---|
| | *Date (month/year)* | *No. of persons* | *Staff days in field* | *Specializations represented*[b] | *Performance rating*[c] | *Rating trend* | *Types of problems*[d] |
| Through Appraisal | 9/87, 2/88<br>5/88, 8/88 | 7 | 60 | GEd, Arch, Ec.<br>TE, VTS, Mec, Pre | | | |
| Appraisal through Board approval | 3/89 | 5 | | EDd, Con, Arch, DS, TE | | | |
| Supervision | 9/89 | 3 | 7 | TE, IS, IRS | 1 | 1 | |
| | 1/90 | 3 | 7 | TE, IS, Con | 1 | 1 | Staff appointments and creation of infrastructure for implementation |
| | 2/91 | 3 | 16 | TE, IS, TS | 2 | 2 | CPIU Staffing |
| | 4/92 | 3 | 20 | TE, IS, TS | 2 | 2 | Women's cell in CPIU understaffed |
| | 1/93 | 2 | 17 | VTS, IS | 2 | 2 | Procurement delay |
| Mid-Term | 5/93 | 3 | 18 | VTS, IS, TE | 2 | 3 | Delay in Staff appointment. Delay in use of TA |
| | 9/93 | 3 | 19 | VTS, IS, TE | 3 | 3 | Delay in filling of staff post. |
| | 6/94 | 3 | 12 | As above | U | U | Disbursement suspended due to unsatisfactory progress |
| Supervision | 2/95 | 3 | 20 | TE, MTE, Arch | U | U | Slow progress in Central components |
| | 10/95 | 3 | 26 | TE, MTE, Arch | U | U | Implementation progress not satisfactory. |
| | 5/96 | 3 | 32 | TE, MTE, Arch | U | U | As above |
| | 11/96 | 3 | 21 | M, MTE, ES | S | S, S, U | Slow implementation of Central components |
| | 5/97 | 3 | 24 | TE, MTE, Arch | S | S, S, U | As above |
| | 1/98 | 3 | 17 | ES, Arch, MTE | | | |
| | 6/98 | 3 | | MTE, ES, TE | S | S, S, U | Procurement |
| | 11/98 | 3 | | MTE, ES, TE | S | S, S, U | |
| Completion | 1/99 | 3 | 15 | MTE, ES, TE | | | |

*Abbreviations:* *GED - General Educator, Arch – Architect, Ec - Economist*
*TE – Technical Educator, VTS – Vocational Training Specialist*
*MEc – Manpower Economist, PrE – Procurement Engineer*
*TTS – Technical Training Specialist, Con - Consultant*
*DS – Disbursement Specialist, IS – Implementation Specialist, IRS – Industry Relations Specialist*
*TS – Training Specialist, MTE – Management & Technical Educator*
*ES – Education Specialist, M - Management*

## Other Project Data

Borrower/Executing Agency:

| *FOLLOW-ON OPERATIONS* | | | |
|---|---|---|---|
| *Operation* | *Loan no.* | *Amount ($ million)* | *Board date* |
| None ready for implementation | | | |

# Basic Data Sheet

## INDIA TECHNICIAN EDUCATION PROJECT (CREDIT 2130-IN/LOAN 3195-IN)

## Key Project Data *(Amounts in US$ million)*

| | *Appraisal estimate* | *Actual or current estimate* | *Actual as % of Appraisal estimate* |
|---|---|---|---|
| Total project costs | 382.71 | 270.03 | 70% |
| Loan amount | | 25.0 | |

## Cumulative Estimated and Actual Disbursements

| | *FY91* | *FY92* | *FY93* | *FY94* | *FY95* | *FY96* | *FY97* | *FY98* | *FY99* |
|---|---|---|---|---|---|---|---|---|---|
| Appraisal estimate | 11.00 | 38.57 | 78.96 | 125.24 | 170.15 | 211.03 | 245.04 | 260.00 | 260.00 |
| Actual (US$M) | 14.79 | 30.45 | 52.80 | 77.62 | 104.66 | 128.49 | 166.14 | 193.76 | 225.63 |
| Actual as % of appraisal | 6.56 | 13.50 | 23.40 | 24.40 | 46.39 | 56.95 | 73.64 | 85.88 | 100.00 |
| Date of final disbursement: | | | | | | | | | 3/8/99 |

## Project Dates

| | *Original* | *Actual* |
|---|---|---|
| Identification | 6/4/88 | 6/4/88 |
| Preparation | 10/88 | 4/89 |
| Appraisal | 10/89 | 1/15/90 |
| Negotiations | 1/90 | 3/9-12/90 |
| Board Presentation | 3/90 | 5/1/90 |
| Signing | 6/90 | 8/13/90 |
| Effectiveness | 9/90 | 12/05/90 |
| Mid Term Review | Second Half 1994 | 9/20/94 – 10/20/94 |
| Project Completion | 6/30/98 | 9/30/98 |
| Closing date | 9/30/98 | 12/31/98 |

## Staff Inputs (staff weeks)

| | *Actual Weeks* | *Actual US$000* |
|---|---|---|
| Through appraisal | 126.5 | 230.2 |
| Supervision | 302.5 | 609.36 |
| Completion | 20 | 38.1 |
| Total | 449.0 | 877.66 |

## Mission Data

| | *Date (month/year)* | *No. of persons* | *Staff days in field* | *Specialization represented*[a] | *Performance rating*[b] Implementation Status | Development objectives | *Types of Problems* |
|---|---|---|---|---|---|---|---|
| Through appraisal | 6/88<br>4/89<br>8/89<br>10/89<br>1/90<br>3/90 | 5 | 75 | Mg, Arch, TE, EP, EqSp | | | |
| Appraisal through Board Approval | 5/90 | 4 | - | Mg,Arch,TE, EP | | | |
| Supervision 1 | 10/90 | 5 | 10 | Ec, Arch (2), TE, EP | 2 | 1 | |
| Supervision 2 | 5/91 | 4 | 7 | Ec(2), TE | 1 | 1 | |
| Supervision 3 | 10/91 | 4 | 12 | Ec, TE, HRE, Arch | 2 | 1 | Staff vacancies |
| Supervision 4 | 7/92 | 4 | 13 | Ec, TE, HRE, Arch | 2 | 1 | Procurement delays |
| Supervision 5 | 10/92 | 5 | 14 | Ec, TE(2), HRE, Arch | 2 | 1 | Minor staff vacancies |
| Supervision 6 | 1/93 | 3 | 13 | Ec, TE(2) | 2 | 1 | Staff vacancies |
| Supervision 7 | 5/93 | 3 | 13 | Ec, TE(2) | 2 | 1 | Recruitment delays |
| Supervision 8 | 7/93 | 3 | 17 | Ec, TE(2) | 2 | 1 | Admission delays in Bihar |
| Supervision 9 | 11/93 | 5 | 5 | Edu(2), Ec, TE, Arch | 2 | 2 | Recruitment delays |
| Supervision 10 | 3/94 | 4 | 6 | Edu(2), TE, Arch | 2 | 2 | Inadequate system monitoring |
| Mid Term Review | 10/94 | 6 | 30 | Edu(2), TE, Arch | S | S | Slow implementation in four States |
| Supervision 11 | 2/95 | 5 | 8 | Edu(2), TE, Arch | S | S | Teacher vacancies |
| Supervision 12 | 9/95 | 3 | 3 | TE(2), Arch | S | S | Delays in Procurement |
| Supervision 13 | 3/96 | 3 | 10 | TE(2), Arch | S | S | Staff vacancies |
| Supervision 14 | 9/96 | 4 | 0 | Mg, TE,Edu, Arch | S | S | Inadeuate Financial monitoring |

| | Date (month/year) | No. of persons | Staff days in field | Specialization represented[a] | Performance rating[b] | | Types of Problems |
|---|---|---|---|---|---|---|---|
| | | | | | Implementation Status | Development objectives | |
| Supervision 15 | 3/97 | 3 | 22 | TE, Edu, Arch | S | S | Procurement delays |
| Supervision 16 | 9/97 | 4 | 13 | Mg, TE, Arch, EqSp | S | S | Procurement delays |
| Supervision 17 | 5/98 | 4 | 7 | Mg,TE(2), Arch,TE | HS | S | Procurement delays |
| Completion | 8/98 | 5 | 12 | Mg,TE(2), Arch, EqSp | HS | HS | |

*a. EC= Economist; Edu=Education Specialist; TE=Technical Educator; Arch=Architect; HRE=Human Resource Economist; EP=Education Planner; Mg=Management; EqSp=Equipment specialist.*

*b. 1=No significant problems, 2=Moderate problems.*

**Other Project Data**

| *FOLLOW-ON OPERATIONS* | | | |
|---|---|---|---|
| *Operation* | *Credit no.* | *Amount (US$ million)* | *Board date* |
| Vocational Training | 2008 | 429.8 | 1989 |
| Second Technician Training | 2223 | 362.10 | 1992 |
| Agricultural Human Resource Development Project | 2699 | 74.2 | 1995 |

**Annex A**

**Basic Data Sheet**

**INDIA ELECTRONICS INDUSTRY DEVELOPMENT PROJECT (LOANS 3093-4-5-IN))**

## Key Project Data *(Amounts in US$ million)*

| | *Appraisal Estimate* | *Actual or current estimate* | *Actual as % of Appraisal estimate* |
|---|---|---|---|
| Total project costs | 450 | 737.3 | |
| Loan amount | 210 | | |

## Cumulative Estimated and Actual Disbursements

| | *FY90* | *FY91* | *FY92* | *FY93* | *FY94* | *FY95* | *FY96* | *FY97* |
|---|---|---|---|---|---|---|---|---|
| Appraisal estimate | 19.6 | 80.2 | 151.4 | 192.8 | 207.5 | 209.7 | 210.0 | 210.0 |
| Actual (US$M) | 20.5 | 55.0 | 76.9 | 81.7 | 72.1 | 74.4 | 75.9 | 79.1 |
| Actual as % of appraisal | 104.6 | 68.5 | 50.8 | 42.4 | 34.8 | 35.5 | 36.2 | 38.0 |
| Date of final disbursement: | | | | 9/93 | 10/93 | | | |

## Project Dates

| | *Original* | *Actual* |
|---|---|---|
| Identification | | 3/12/86 |
| | | 10/6/87 |
| Preparation | - | - |
| Preappraisal | 11/87* | 11/25/88 |
| Appraisal | 4/88* | 1/23/89 |
| Negotiations | 5/1/89** | 5/2/89 |
| Board Presentation | 6/27/89** | 6/15/89 |
| Signing | | 7/7/89 |
| Effectiveness | | 9/14/89 |
| Project Completion | 6/30/95 | |
| Closing date | 6/30/95 | 3/31/97 |
| Loan Closing | 12/31/95 | 3/31/97 |

* Formal revision as of FY94; FY95 figure is interpolated, not given in formal revision.

** Loans 3094-IN and 3095-IN were closed as of December 31, 1993, with final disbursements 9/93 and 10/93 respectively.

**Staff Inputs** (staff weeks)

| State of project cycle | *Planned* | | *Revised* | | *Actual* | |
|---|---|---|---|---|---|---|
| | Weeks | US$ | Weeks | US$ | Weeks | US$ 000s |
| Through appraisal | N/A | N/A | N/A | N/A | 271 | $648.5 |
| Appraisal-Board | N/A | N/A | N/A | N/A | 3 | 7.6 |
| Board-effectiveness | N/A | N/A | N/A | N/A | - | - |
| Supervision | N/A | N/A | N/A | N/A | 192 | 577.7 |
| Completion [a] | 8 | 31.5 | 43.0 | 10 | 40.0 | |
| Total | - | - | - | - | **476** | **$1,273.8** |

## Mission Data

| | Date (month/year) | No. of persons | Staff days in field | Specialization[b] represented[c] | Performance rating[d] | | Types of Problems |
|---|---|---|---|---|---|---|---|
| | | | | | Implementation Status | Development objectives | |
| Through Appraisal | 2/86 | 3 | 28 | Ec,Fin,Eng | - | - | - |
| | 4/86 | 1 | 11 | TE | - | - | - |
| | 9/87 | 3 | 13 | Ec,Ec,Eng | - | - | - |
| | 12/87 | 2 | 19 | Ec,Fin | - | - | - |
| | 3/89 | 8 | 31 | Eng,TE,TE,Sf, Sf | - | - | - |
| Supervision 1 | 10/89 | 3 | 27 | Ec,Ec,Sf | 2 | 2 | Delays |
| Supervision 2 | 3/90 | 3 | 21 | Ec,TE,Sf | 1 | 1 | Minor |
| Supervision 3 | 10/90 | 4 | 18 | Ec,TE,CS,Sf | 1 | 1 | Minor |
| Supervision 4 | 11/91 | 1 | 7 | TE | - | - | Procurement |
| Supervision 5 | 6/92 | 3 | 12 | Ec,Sf,TE | 3 | 3 | Macro;Proc. |
| Supervision 6 | 10/92 | | | | | | |
| Supervision 7 | | | | | | | |
| Supervision 8 | 2/93 | 2 | 5 | Ec,Sf | 1 | 1 | Macro;Audit |
| Supervision 9 | 4/93 | 1 | | Ec | - | - | Course Materials; Monitoring |
| Supervision 10 | 7/93 | 2 | 7 | Ec,Sf | 2 | 2 | Monitoring |
| Supervision 11 | 8/93 | | | | | | |
| Supervision 12 | 12/93 | 2 | 19 | Ec,Sf | 1 | 1 | Minor |
| Supervision 13 | 4/94 | 1 | 5 | Ec | 1 | 1 | Minor |
| Supervision 14 | 4/95 | 1 | 10 | TE | S | HS | Extension; course matl; seminar qlty |
| Supervision 15 | 6/96 | 2 | 7 | Op,TE | HS | HS | Extension; course matl; studies |
| Supervision 16 | 1/97 | 2 | 10 | Op,TE | S | S | Curriculum; course matl; SOE audit |
| Completion | 5/97 | 1 | 17 | Ec,Fin,Eng | | | |

*a. Estimate.*

*b. E=sanitar Engineer; EC=Economist; EE=Environmental specialist; F-Financial Analyst, IN-Institutional Specialist; ME=Municipal Engineer; RE=Resettlement; TS-Tunnel Specialist*

*c. Borrower involved in two Bank-supported follow-on investments (Loans 3711 and 3987) both of which supported expanded wastewater infrastructure. Considerable indirect supervision through cost-effective Borrower dialogue as part of project preparation benefited both direct supervision of SP and formulation of follow-on investments.*

*d. 1-No significant problems, 2-Moderate problems.*

*Abbreviations:* Ec = economist; Eng = engineer; Fin = financial analyst; Op = operations officer; Sf = software specialist; TE – technical education specialist.

Annex B

8(2)/99-HRD/SSS
Government of India
Ministry of Information Technology
Project Implementation Division
Electronics Niketan, 6 CGO Complex,
Lodi Road, New Delhi – 110 003

Dr.S.C.Mehta
Senior Director
Tel.No.4363123

April 28, 2000

Sub: Electronics Industry Development Project (Loan No.3093-IN) Project Performance Audits - Comments on Draft Report.

Dear Mr.Ingram,

Please refer to your letter dated March, 22, 2000 sending comments on the draft World Bank Performance Audit Report. This Ministry agrees with the Report on EIDP, except for certain factual corrections in the figures as indicated in Annexure Table 6. A copy of the duly corrected version of that Annexure is enclosed for inclusion in the Report.

2. As you are aware, on conclusion of the Project IMPACT, the Sustainability Support Scheme was started jointly by MIT and SDC, (SDC later withdrew). As part of implementation of SSS activities several new initiatives have been/are being taken, such as, enabling SSS PIs to get ISO 9000 Certification, Web-based Education & Training and Project IMPACT for the North East. A copy of the write-up on new initiatives taken is also enclosed for your consideration for inclusion in the final report. Also enclosed is the Sustainability Support Scheme Annual Progress Report 1999 for kind information.

3. We also take this opportunity of conveying our thanks for the visit of the World Bank Audit Mission to Ministry of Information Technology, Resource Centre: IIT, Delhi and the Participating Institutes of the Project IMPACT - SSS. The interaction of the concerned PIs with Ms.Helen Abadzi and Prof. Shashi Srivastava has been quite fruitful. It is expected to help in strengthening the momentum of SSS activities in all the Impact PIs

to absorb, adopt and institutionalize the Project IMPACT gains, besides, implementation of new initiatives.

4. I would appreciate your kindly sending a copy of the Final Report of the Mission.

With regards,

Yours sincerely,

(Dr.S.C,Mehta)

Encls: As above

Mr.Gregory K.Ingram
Manager,
Sector and Thematic Evaluation Group,
Operations Evaluation Department,
The World Bank 1818 H Street N.W.
Washington D.C. 20433 U.S.A.

Copy for kind information to:

1. Prof.Ashok Chandra, Special Secretary, Department of Education, Ministry of Human Resource Development, New Delhi

2. Prof. Shashi Srivastava, World Bank, 70, Lodi Estate, New Delhi - 110003

3. Prof.R.K.Mani, Central Project Advisor, National Project Implementation Unit, New Delhi.

**Enclosure-2**

# NEW INITIATIVES UNDERTAKEN UNDER SUSTAINABILITY SUPPORT SCHEME-POST IMPACT

## 1.0 Revenue Generation through Continuing Engineering Education Programme (CEEP)

1.1 Objectives of SSS are well defined and are broadly consistent with the goals and objectives of the current IT Policy of the Government of India. The SSS programme in this regard is unique. The Participating Institutions (PIs) have so far been able to achieve targets pertaining to various activities, such as, CEEP, Instruction Enhancement Programme (IEP), Industry Attachment Programme (IAP), Laboratory upgradation and Self-Maintenance Cells (SMCs) beside other activities, including targeted revenue generation. The revenue generation by each PI during 1999 (2nd year) was targeted to be RS. 3.2 lakhs (40% of RS. 8 lakhs). Against the targeted revenue generation of RS. 124.8 lakhs, the total revenue generation by all Participating Institutions (PIs) was RS. 125.93 lakhs.

## 2.0 Quality System (ISO 9000 Series) in Education Sector

2.1 In order to sustain the advancements made and integrate the improved practices and systems for quality education and training with their day to day practices, PIU has undertaken the establishment of a formal quality management system in PIs on the lines of ISO 9000 series of international standards which will greatly help in achieving these objectives by ensuring consistent and continuously improve quality of education and training process by providing built-in auditing and self-corrective mechanism and a well documented and transparent education system. For this purpose, PIU has entered into an MOU with STQC. Already, training on ISO 9000 has been completed at all the PIs. One PI, namely, Murugappa Polytechnic, Chennai has already been awarded ISO 9001 Certificate, while TIET, Patiala and MEI, Polytechnic, Bangalore are in advanced stage of obtaining the award. All the 25 PIs are targeted to obtain their ISO 9000 by December 31, 2000.

## 3.0 Web Based Education and Training

3.1 Many of the PIs have already set up Local Area Network (LANs) on their Campuses. Efforts are also being made to sensitize the PIs to start offering CEEP Programs through the web-based education. To begin with, 6 web-based learning materials have been identified to be prepared under the Scheme, by the RCs and the PIs by September 30, 2000. The titles of these Learning Materials are as follows:-

i) Electronics Circuits and Design
ii) Software Engineering
iii) Computer Networking
iv) Micro Processors and Programming
v) Data Communication

vi) Digital Signal Processing

## 4.0 IMPACT Proposal for North Eastern Region (India)

4.1 A dedicated proposal for educational institutions in the North Eastern Region with an estimated outlay of RS. 33 Crores for 12 PIs and 5RCs has been prepared. North East Council has agreed in principle for their matching contribution.

## 5.0 Annual Progress Report 1999 of SSS Scheme-Project IMPACT

5.1 For the first time, Project Implementation Unit (PIU), MIT has prepared the annual Progress Report 1999, which provides the performance of each PI as assessed by the RC and PIU towards their efforts to achieve self-sustainability and establish interaction with industry and a quality learning environment.

## 6.0 Financial Autonomy in Educational Institutions

6.1 In view of the declining Government grants to the Engineering Colleges/Polytechnics and realizing the need of sustainability the issues relating to financial and technical autonomy were discussed during the Annual Planning Workshop during December 1999. Salient features of the discussion are given below:

### 6.1.1 Financial Autonomy - What is it?

6.1.2 **Autonomy of an institution: (I) academic, (ii) Financial and (iii) Administrative pertains to the ability of PIs to earn revenue on a continuous basis so as to support the department financially without support from a fixed grant such as the university and the Government.**

### 6.2 Expenditure in Institutions

- Working expenses: Recurring expenses of academic programs, consumables, travel, attending conferences, etc.
- Capital expenditure: Equipment, Building, Furniture
- Student scholarships, salaries of short term staff
- Salaries of permanent staff and faculties
- Welfare measures

### 6.3 Levels of sustainability

- Level 1 : Earning recurring expenses of academic programs
- Level 2 : Level 1 + capital expenses of academic programs
- Level 3 : Level 2 + student scholarships
- Level 4 : Level 3 + staff and faculty salaries

### 6.4 A work out for sustainability I

- About 33% overheads for the parent organization (college or university) : Often negotiable if revenues are large, non-negotiable if revenues are small

- About 33% for financial rewards for faculty and staff (before taxation)
- About 34% available revenues for the department
- For 1 Re., required for the departments earn 3 RS.

## 6.5 A work out for sustainability II

- Decide on phasing the level of self sustainability starting at level 1 and progressing to level 4 over a suitable period of time
- For the first two levels compute the revenues to be earned
- Plan the financial gains for the faculty, staff and the students
- Initiate an administrative reform to provide for the scheme, if one does not exist
- Launch suitable sustainability schemes