High Level Committee on
Education and Employment

Volume III

REPORT ON
TECHNICAL EDUCATION

STATE PLANNING BOARD
TRIVANDRUM
MARCH, 1984

High Level Committee on
Education and Employment

Volume III

REPORT ON

TECHNICAL EDUCATION

STATE PLANNING BOARD
TRIVANDRUM
MARCH, 1984

37/3168/MC.

FOREWORD

The primary function of the State Planning Board as detailed in the Government Order of 30th July, 1982 reconstituting the Board is "to study in depth the different aspects of the State's economy and development and on the basis of the assessment of the progress made during the last 25 years, and in the context of the special problems facing the State, suggest the objectives and profiles of future planned effort upto 2000 AD". In order to assist the State Planning Board in the discharge of this function, Government constituted in October, 1982, five High Level Committees on the following subjects.

1. Land and Water Resources
2. Industry and Trade
3. Social Infrastructure and Services
4. Physical Infrastructure and Transport
5. Education and Employment.

The Report of the High Level Committee on Education and Employment is presented in five volumes. This is third volume which deals with Technical Education.

The views and opinions expressed in this Report are those of the Committee and do not necessarily reflect the views of Government or the State Planning Board on the subject

The State Planning Board wishes to place on record their high appreciation of the commendable work done by this High Level Committee.

S. VARADACHARY,

Member Secretary,
State Planning Board and Secretary to Government
Planning & Economic Affairs Department.

Trivandrum
15-7-1984.

37/3168/MC.

CONTENTS

PREFACE

The Government of Kerala reconstituted the State Planning Board by G.O. (P) 42/82/Plg. dated 30th July 1982. Its primary function is "to study in depth the different aspects of the State's economy and development and on the basis of the assessment of the progress made during the last 25 years and in the context of the special problems facing the State, suggest the objectives and profiles of future planned effort upto 2000 AD". By another G.O. MS. 56/82/Plg. dated 4-10-1982 Government constituted six High Level Committees to assist the State Planning Board in discharging this function. One of these is the High Level Committee on Education and Employment consisting of:—

1.	Prof. V. R. Pillai	Chairman
2.	Dr. M. V. Pylee, Former Vice Chancellor, Cochin University.	Member
3.	Shri P. K. Umashankar, Special Secretary, (General Education).	"
4.	Dr. K. Gopalan, Vice Chancellor, Cochin University.	"
5.	Dr. K. N. Pai	"
6.	Dr. S. Vasudev, Chairman, State Committee on Science & Technology	"
7.	Prof. K. S. Lakshmana Panickar	"
8.	Shri N. Gopalakrishnan Nair, Chief (Perspective Planning), State Planning Board.	Convener

As education and employment comprise several subject areas, each requiring specialised knowledge for undertaking the proposed studies, five Sub groups were constituted for the purpose in April, 1983 viz:—(1) General Education, (2) Higher Education, (3) Technical Education, (4) Medical Education and (5) Employment.

The Sub group on Technical Education consisted of:-

1.	Dr. S. Vasudev, Chairman, State Committee on Science and Technology.	Chairman
2.	Dr. P. J. George, Director of Technical Education, Trivandrum.	Member
3.	Dr. S. Narayana Iyer, Principal, College of Engineering, Trivandrum.	,,
4.	Dr. S. C. Gupta, Director (Avionics) VSSC, Trivandrum.	,,
5.	Shri Thomas Philip, Managing Director, Transformers and Electricals Ltd., Angamaly.	,,
6.	Shri T. P. C. Mayan Ali, Joint Director (Training), Directorate of Employment & Training, Trivandrum.	,,
7.	Shri K. Sukumaran, Technical Officer, State Planning Board, Trivandrum.	Convener

The Group held six meetings and submitted its Report on 23-2-1984. It was discussed at length by the High Level Committee as their proposals for the Seventh Plan involving a total out lay of Rs. 29.5 crores were too ambitious to be practical. Nevertheless, these recommendations were substantially accepted as they give a measure of the needs of the sector and the Working Group on Technical Education will be entrusted with the task of tailoring the proposals to match the available resources. The present Report was finalised and passed at its meeting held on 15-3-1984.

The Committee places on record its high appreciation of the valuable assistance rendered by the Sub Group and the dedication with which the Convener Shri K. Sukumaran has discharged his duties.

V. R. PILLAI,

Chairman,

High Level Committee on

Education and Employment.

2.0 INTRODUCTION

The development of technical education in the State has been to a large extent guided by the policies and guidelines set at the national level by the All India Council of Technical Education. Though during the earlier plan periods direct Central assistance for the establishment of the technical institutions in the public and private sector was coming in a big way, the pattern of financing and the quantum of available finances have dwindled to a large extent with the result inevitable expansion has to be curtailed and the consolidation of the existing institutions and the courses could not be given its rightful place.

Statistics at the national and State level as given in the report will reveal that the available facilities for technical education in the State are lesser than in most of the other parts of the nation. That too when we consider the 70 per cent literacy in a population of 254 lakhs. Education is the most vital of all resources and any investment in education is an investment in human resources for the future.

The comparative percentage of amount, being invested in the different sectors of education especially higher education and technical education indicate fundamental disproportions resulting in the present day maladies in our educational system, the important one being educated unemployment. The urge for employment and the craze for higher education drive our girls and boys to the portals of higher education swelling the ranks of the unemployed and resulting in frustration to a large number who desires to enter life with hopes and ambitions. While arts and science education have laudable objectives but have a limited scope in the generation of employment for production of goods and services, much needed for development in all sectors, the facilities for job oriented education at all levels has to be increased. This will lead to generation of employment rather than individual employment and includes education at all levels both formal and informal.

In fact the basic objectives of our national technology Policy are:

(a) attain technological competence and self reliance to reduce vulnerability, particularly in strategic and critical areas, making the maximum use of indigenous resources;

(b) provide the maximum gainful and satisfying employment to all strata of society, with emphasis on the employment of women and weaker sections of society;

(c) use traditional skills and capabilities, making them commercially competitive;

(d) ensure the correct mix between mass production technologies and production by the masses;

(e) ensure maximum development with minimum capital outlay;

(f) identify obsolescence of technology in use and arrange for modernisation of both equipment and technology;

(g) develop technologies which are internationally competitive, particularly those with export potential;

(h) improve production speedily through greater efficiency and fuller utilisation of existing capabilities and enhance the quality and reliability of performance and output;

(i) reduce demands on energy, particularly energy from non-renewable sources;

(j) ensure harmony with environment, preserve the ecological balance and improve the quality of the habitat; and

(k) recycle waste material and make full utilisation of by products.

A perspective planning of technical education should have the objective—direct and indirect of an education system benefiting not only the educated but the larger masses outside also.

We do have a good foundation on which to build our competence both in quantity and quality. The progress we have

achieved and the success stories in the different fields of competitive technologies indicate that with proper feed back and necessary changes that are dynamically suited to the changing needs and demands, technical education will be able to play a more decisive role in all vital sectors connected with socio-economic development.

Technologies are fast changing and emerging areas of technologies are fast coming with specialisation and super specialisation. The educational system should respond to these changing and emerging patterns, such as the recent advances in communication, productivity improving technologies, new energy systems, biotechnology, remote sensing, environment and ecology, impact assessment studies, etc. Though it is impossible to have a general educational programme in these areas, it is vital that the technical education system, should take these developments into account in its programmes for the benefit of the teacher and the taught.

The supply of skilled craftsmen, technicians and engineers is a crucial factor in determining the level to which the industrial production of a country can be raised or at which it can be maintained. In the post 1947 period there has been a phenomenal expansion of technical education at the national level and to a relatively smaller extent at the State level. As the rate of economic growth will be increasingly dependent on the rate of technological development/technical education becomes a prime factor in the growth of GNP and the quality of life.

Technical Education and Craftsmen Training are the twin aspects of the process of technological advancement. However, the technical education in the State comes under the Department of Technical Education and Craftsmen Training Programmes are conducted by the Directorate of Employment and Training. These two sectors are, therefore, separately dealt with in this Report. The priority areas include:

(a) Consolidation of the existing institutions with respect to physical facilities and modernisation of laboratories and workshops.

(b) Quality improvement programmes for the faculty.

(c) Vocational education.

(d) Apprenticeship and other training programmes for students.

(e) Starting of a few centres in the engineering colleges to create the expertise and conduct special studies in specialised areas of importance.

(f) Science and Technology Museum.

(g) Quantitative development in need based areas by starting new institutions, taking into consideration the social demand, advantages of job-oriented education etc.

In addition to the above, proposals for establishment of certain special institutions are also included. These are intended to provide formal and non-formal education to those who do not get an opportunity for technical education in established institutions and for updating technology for inservice technical personnel and faculty.

3.0 REVIEW OF DEVELOPMENT UNDER FIVE YEAR PLANS

3.1 Technical Education

3.1.1 *Development at National Level*

During the first Three Five Year Plans, the major emphasis for development of technical education at the national level has been on quantitative expansion. Consequently there has been phenomenal expansion in the field of technical education in the country. The Indian Institutes of Technology, Regional Engineering Colleges, Engineering Colleges, Polytechnics and other technical institutions were established in the country during the earlier Five Year Plan periods. With the dawning of the Fourth Five Year Plan, the emphasis shifted from physical expansion to the improvement of standards and quality in technical education. Accordingly, the major objectives of the Fourth, Fifth and Sixth Five Year Plans had been to consolidate the existing facilities in the institutions and to improve the standards so as to train the technologists and technicians to meet the felt in needs of the industry.

3.1.2 *Development at State Level*

In the field of technical education, Kerala has gained many achievements during the post-independence period. During the First Five Year Plan there was only one Engineering College in the State with a limited in-take capacity. In order to meet the growing demand for qualified engineers and technicians, facilities for engineering education at the degree, diploma and certificate levels were increased considerably during the Second and Third Five Year Plans. Five more Engineering Colleges and a number of Polytechnics, Junior Technical Schools and Vocational Training Institutes were established during this period.

The policy adopted under technical education during the Fourth and Fifth Five Year Plans was qualitative improvement

and diversification of courses. During this period no significant addition to the number of institutions was made except the starting of a few institutes for certificate level of study.

During the Annual Plan periods (1978-80) three Junior Technical Schools, nine Pre-Vocational Training Centres, eleven Tailoring and Garment Making Training Centres and an Extension Centre of the Food Craft Institute were started. New courses at degree and diploma levels were introduced during this period.

In the Sixth Five Year Plan, the Lal Bahadur Sastri Engineering Research and Consultancy Centre was started and steps were taken to establish the Kerala State Science and Technology Museum. Considering the great demand for admission to technical courses, five Polytechnics, ten Junior Technical Schools six Pre-Vocational Training Centres, ten Commercial Institutes, two Tailoring and Garment Making Training Centres and one Extension Centre of the Food Craft Institute were started during the first four years (1980-84) of the Sixth Five Year Plan. During the period, more stress was given for consolidation and modernisation of engineering education. Consequently new courses were started in certain engineering colleges and polytechnics at post graduate, degree, diploma and post diploma levels. Many special schemes such as Centres of Excellence, Industrial Liaison Industrial Residency, Management Education, Curriculam Development, Faculty Improvement etc. were also introduced

Table 1 shows the number of technical institutions in Kerala at the end of different plan periods.

TABLE 1

Number of Technical Institutions at the end of Five Year Plans and Annual Plans

Year	*Institutions*		
	Engineering Colleges	*Polytechnics*	*J.T.S*
(1)	(2)	(3)	(4)
1955-56	1	4	..
1960-61	5	11	20
1965-66	6	17	20
1968-69	6	18	21
1973-74	6	18	21
1977-78	6	18	21
1979-80	6	18	24
1980-84*	6	23	34

*First four years of the Sixth Five Year Plan.

3.1.3 *Intake and Out-turn of Engineering Personnel*

The actual intake in Engineering Colleges and Polytechnics during 1961-62 was 570 and 1578 respectively. But the enrolments in these institutions have increased considerably by the end of 1966-67. As a result a peculiar situation arose which indicated an imbalance between the supply and demand for engineers and technicians. Inspite of the job oriented programmes implemented during the period the out turn of engineering personnel could not be balanced with the demand for them in public and private sectors. Consequently, the intake of students in Engineering Colleges and Polytechnics was reduced by 20 per cent during 1968-69. But during 1973-74 onwards the intake capacity has been increased and the number of seats among various disciplines

have been changed according to demand. During 1982-83, the total intake was 1960 for engineering degree course and 2842 for diploma course. The sanctioned intake for the year 1983-84 consists of 1960 for regular degree course, 205 for part-time degree, 112 for P.G. course, 3086 for full time diploma and 216 for part-time diploma. The out-turn of technical personnel during 1961-62 comprised 513 engineers and 1262 diploma holders. The figure in 1978-79 was 917 and 1173 respectively. Table 2 shows the intake and out-turn of engineering personnel during different periods.

TABLE 2

Intake and Out-turn of Engineering Personnel

Year	*Actual Intake*		*Out-turn*	
	Engineering Colleges	*Polytechnics*	*Engineering Colleges*	*Polytechnics*
(1)	(2)	(3)	(4)	(5)
1961-62	570	1578	513	1262
1966-67	911	2516	605	1434
1969-70	817	1921	1553	1425
1974-75	943	2336	414	327
1978-79	1253	2777	917	1173
1982-83	1960	2842	..	..

3.1.4 *Plan Expenditure for Technical Education*

During the period from the Third Five Year Plan to the end of the first three years of the Sixth Five Year Plan, the State had invested for technical education an amount of Rs. 1579.69 lakhs as against the outlay of Rs. 1979.80 lakhs. The percentage of expenditure to total outlay is estimated at 80. The Plan-wise outlay and expenditure on technical education is shown in Table 3.

TABLE 3

Plan-wise Outlay and Expenditure on Technical Education

(*Rs. lakhs*)

Period	*Technical Education*		
	Outlay	*Expenditure*	*Percentage of Expenditure*
Third Plan (1961-66)	378.00	391.09	103
Annual Plans (1966-69)	236.80	145.51	61
Fourth Plan (1969-74)	232.00	121.88	52
Fifth Plan (1974-78)	236.00	161.07	68
Annual Plans (1978-80)	197.00	171.19	87
Sixth Plan (1980-85)	700.00	588.95*	84
Total	1979.80	1579.69	80

*Expenditure upto 1982-83.

It is seen that only during the Third Five Year Plan, the expenditure was excess than the outlay. During the successive plan periods, including annual plans, the plan expenditure was below the outlays. During the first three years of the Sixth Five Year Plan, the expenditure was to the tune of Rs. 588.95 lakhs as against the outlay of Rs. 700.00 lakhs for 1980-85.

37/3168/MC.

3.1.5 *Present Status of Technical Education*

3.1.5.1 *Technical Institutions*

In Kerala there are 136 Government institutions, 9 private and 5quasi-government institutions which offer technical education at degree, diploma and certificate levels. Besides, there are 338 private Industrial Schools and 116 private Engineering Institutes for giving training in KGT and KGC Examinations. The present status of technical institutions is given in Table 4.

TABLE 4

Number of Technical Institutions by Management-wise (1983-84)

	Category	*Management*			*Total*
		Government	*Private*	*Quasi-Government*	
	(1)	(2)	(3)	(4)	(5)
1.	Engineering Colleges	2	3	1	6
2.	Polytechnics	12	6	..	18
3.	Womens' Polytechnics	4	..	..	4
4.	Institute of Printing Technology	1	..	..	1
5.	Food Craft Institute	..	..	1	1
6.	Food Craft Extension Centres	..	..	2	2

(1)	(2)	(3)	(4)	(5)
7. College of Fine Arts	1	..	..	1
8. Fine Arts Institutions	2	..	..	2
9. Extension Centre of Technical Teachers Training Institute	..	..	1	1
10.. Junior Technical Schools	34	..	..	34
11.. Pre-Vocational Training Centres	19	..	..	19
12.. Commercial Institutes	14	..	..	14
13.. Tailoring Training Centres	7	..	..	7
14.. Vocational Training Centres	5	..	..	5
15.. T.G.M.T. Centres	31	..	..	31
16.. Tailoring Trade Schools	2	..	..	2
17.. Government Industrial Schools	2	..	..	2
Total	136	9	5	150
18.. Private Industrial Schools	..	338	..	338
19.. Private Engineering Institutes	..	116	..	116

3.1.5.2 *Academic courses*

1. *Engineering Colleges*

(a) *Post-Graduate Course*

There are three Engineering Colleges offering post-graduate degree course in different branches. Facilities are available in Civil, Mechanical, Electrical, Electronics & Telecommunication and Chemical Engineering with 17 specialised electives. The total intake is 112.

(b) *Degree Course—Full time*

All the six Engineering Colleges offer full time degree course in 12 specialisations with a total intake of 1960 students per year, including 125 students from Kerala admitted in the Regional Engineering College, Calicut. The fields of specialisation are Civil, Mechanical, Electrical, Electronics & Communication, Chemical, Architecture, Production, Production-cum-Plant Engineering, Industrial Engineering, Applied Electronics & Instrumentation, Instrumentation & Control and Electrical Communication.

(c) *Degree Course—Part time*

Part-time evening courses are offered for diploma holders in the Engineering Colleges at Trivandrum, Trichur and Quilon with a total intake of 205 per year under the specialisations such as Civil, Mechanical, Electrical, Chemical and Electronics & Communication.

2. *Polytechnics*

(a) *Diploma Course—Full time*

There are at present 23 polytechnics including four Womens' Polytechnics and one Institute of Printing Technology. Full-time diploma courses in Civil, Mechanical, Electrical, Electronics, Automobile, Textile Technology, Chemical, Commercial Practice, Costume Design & Dress Making, Printing, Instrument Technology, Polymer Technology, Wood Technology and

Tool & Die Engineering are offered in the institutions. The total intake in these institutions is 3086.

(b) *Diploma Course —Part time*

Part time diploma courses in Civil, Mechanical, Electrical and Textile Technology are offered in the Polytechnics at Trivandrum, Trichur, Kalamassery and Calicut with a total intake of 216 students per year.

(c) *Post Diploma Course*

Post Diploma courses are offered in Foundry Engineering, Refrigeration & Airconditioning, Television Engineering and Industrial Electronics in the Polytechnics at Trivandrum, Trichur and Kalamassery. The intake is 40.

In addition to the above, certificate course in Textile Technology and Craft and post SSLC course in Building Technology, Highway Engineering and Public Health Engineering are also conducted in the Polytechnics at Trivandrum, Kottayam, Perinthalmanna, Calicut and Cannanore. The total intake is 141.

3. *Junior Technical Schools*

The Junior Technical Schools with an admission strength of 1980 students offer training for J.T.S.L.C. Examinations.

4. *Pre-Vocational Training Centres*

In the Pre-Vocational Training Centres, attached to the Junior Technical Schools, 570 students are trained at upper primary level in general engineering trades with specialisation in some other trades.

5. *Fine Arts Education*

The College of Fine Arts, Trivandrum prepare students for degree courses in Painting, Sculpture, and Applied Arts. The annual intake is 30 for the three branches. Diploma course in Drawing, Painting, Sculpture, Modelling and Engineering are conducted at the Institutes of Fine Arts at Trichur and Mavelikkara with a total intake of 40 per year.

6. *Food Craft Institute*

The Food Craft Institute at Kalamassery and its Extension Centres at Calicut and Trivandrum offer training in Hotel Reception, Restaurant & Counter Services, Cooking, Bakery & Confectionery, Canning, Food Preservation etc. The total intake is 210.

7. *Government Commercial Institutes*

There are fourteen Government Commercial Institutes in the State. Certificate course in Typewriting and Shorthand is being conducted in the institutes.

8. *Vocational and Tailoring Training Centres*

There are 12 Vocational and Tailoring Training Centres where training is given in Tailoring, Composing, Book Binding, Weaving and Rattaning. The total intake is 240.

9. *TGMT Centres*

There are 31 Government institutions where training is imparted in tailoring and garment making. The total intake of the institutions is 620.

10. *Private TGMT Centres*

In the private Tailoring and Garment Making Training Centres the training is imparted for K.G.T.E. in tailoring and garment making.

11. *Private Engineering Institutes*

The private engineering institutions conduct two year certificate course leading to K.G.C. in Engineering in Civil, Mechanical, Electrical and Automobile.

12. *Autonomous Institutions*

(a) *Lal Bahadur Sastri Engineering Research and Consultancy Centre*

The centre provides facilities for consultancy, research and continuing education in engineering and technology.

((b) *Kerala State Science and Technology Museum*

The museum is envisaged as a powerful medium of science and technology education through gallery and mobile educational programmes. It will also serve as a study-cum-recreation centre.

3.2 Craftsmen Training

3.2.1 *Industrial Training Institutes*

During the Second and Third Five Year Plans more Industrial Training Institutes were started in all States, with 100 per cent Central assistance. Later on the Central assistance was reduced to 60 per cent and the institutes were handed over to the State Governments. In Kerala, there are 21 Industrial Training Institutes. Table 5 shows the growth of I.T.Is. in Kerala during different periods.

TABLE 5

Growth of Industrial Training Institutes in Kerala

Year	*No. of I.T.I.*	*Seat Strength*
(1)	(2)	(3)
1955-56	2	264
1970-71	10	4399
1975-76	12	7272
1976-77	12	7492
1977-78	13	7968
1978-79	15	8636
1979-80	15	8652
1980-81	15	8652
1981-82	17	9040
1983-84	21	9656

Of the total ITIs, three institutes are exclusively meant for women. In the ITIs, training is imparted in 25 engineering trades and 4 non-engineering trades. Among the engineering category 10 trades are designated as matric and 15 as non-matric trades. In the category of non-engineering, there are three matric trades and one non-matric trade. Of the total 29 trades 14 trades are of one year duration and 15 trades are of two year duration.

3.2.2. *Industrial Training Centres*

The Industrial Training Centres managed by private sector provide a parallel system of craftsmen training. In the Industrial Training Centres, training is imparted for Draughtsman (Mechanical), Draughtsman (Civil), Mechanic (R&TV), Mechanic (R&AC), Mechanic (Motor Vehicle), Mechanic (Diesel), Wireman, Electrician etc. In Kerala there are 206 Industrial Training Centres with an annual intake of 21,650 students. Among the 206 private ITCs only 14 centres have permanent affiliation in selected trades. 184 centres have temporary affiliation. There are 8 centres without recognition.

3.2.3 *Advanced Vocational Training System*

The advanced Vocational Training Centre at Kalamassery is one of the projects of the collaborating agencies such as the UNDP, ILO, Government of India and State Government. The ILO is the executing agency. The contribution of the UNDP includes supply of sophisticated machinery and equipment and technical expertise. The Central and State Governments provide the necessary infrastructure such as shop-floor facilities, indigenous machinery and equipment, staff etc. The centre provides facilities for Advanced Vocational Training in Tool & Die Making, Indian Standards and Reading of Drawing, Electrical Maintenance, Domestic Appliances (Electrical) Maintenance, Mechanical Maintenance, Marine Diesel Operation & Maintenance and Welding.

3.2.4 *Apprenticeship Training*

The apprenticeship training programme envisages adequate supply of skilled workers trained in efficient methods of production

through the association with the master craftsman on the shop-floor. The system enables to decrease the production cost by reducing wastage and it ensures accuracy and precision of quality of products. Under the scheme apprenticeship training is given to the trade apprentices in selected designated trades through the related instruction centres.

4.0 PERSPECTIVES IN TECHNICAL EDUCATION AND CRAFTSMEN TRAINING

4.0.1 *Introduction*

The preceding pages give the present status of technical education in Kerala comprising the three levels of engineers, technicians and craftsmen. Compared to other Indian States, the quantitative development of technical education in Kerala has been kept rather low and one positive advantage of this has been the many schemes for quality improvement especially in the Department of Technical Education

In a State beset with problems of unemployment of the educated, technical education is one of the important sectors, that offer high hopes for the future and a realistic and perspective planning of the sector is essential in view of the investment involved, demands to be met in the different sectors and as far as possible linking the educational programmes with the developmental needs.

The development of human resources is as important as the development of national resources. Without indigenous S & T the resources of a nation cannot be organised for industrial expansion. Scientists and technologists are required in the industrial infrastructure of an economic society and S & T properly integrated into the educational programmes can improve the whole educational process with a confidence and competent approach to problem solving which has met with extraordinary success in the industrialised countries. Adventure, curiosity and innovation are some of the important aspects that are to be introduced in the educational system so that the

students when they come out of the institutions are better able to participate in the problems of social and economic development.

Whereas in industrial countries, society itself is a training ground for technical skills, in developing countries like ours technical skills have to be deliberately acquired in the institutions.

Elsewhere in the introduction, extracts from the National Technology Policy Statement set the guidelines for a perspective planning. In as much as, this probably is the first policy statement that has come in the field of technology, its aims and goals have to be reflected in the type of technical education to be imparted to our youth.

4.0.2 *Integrated Planning*

There was a time when each sector used to plan its programmes for development in an individualistic pattern of self growth but the complexity of interlinking of the different activities, has led to the concept of integrated planning of which each sector form a sub-system of a major area of social and economic activity. This is more so in the general field of education and in the particular field of technical education which supplies manpower to the developmental activities of the sectors. The manpower demand of the individual sectors play a great part on the planning of quantitative output in technical institutions but for reasons well known, it has not been possible to plan technical education both at the micro and macro levels to match the demands of the different sectors. Without this the present maladies will continue. Hence technical manpower demands have to be suitably projected to plan the quantity level and quality of the trained people brought out by the institution. Whereas technical education in the industrial countries went hand in hand with technology development and technology evolution and break through, the history of technical education in the developing countries do not have such a historical background of growth. In our attempt to have our eyes in the west and their fantastic development and advance

ourselves in the minimum period we had to rely more on foreign technology rather than indigenous technology for even the same process wherever available. It is in this context that emphasis on development of indigenous technology and adaptation of imported technology require a closer observation. Science and Technology are global in character but the new forms of capitalisation of the developed countries on the developing countries in the matter of Science and Technology is widely known.

4.0.3 *Infrastructural Facilities*

The levels of technical institutions in the country are the Indian Institutes of Technology and Technical Universities, Regional Engineering Colleges, State Engineering Colleges, Colleges in the private sector, the Polytechnics and other institutions at the certificate level. The section on the review and present position deals with their numbers in Kerala and other details. The absence of a higher technical education centre devoted to higher studies and R & D activities is to be noted there.

The three components of an educational system are the students, faculty and institutions and a harmonious combination of these three items is necessary for the operation of a successful system.

Kerala has the good fortune of a selection system of students based on merit to quite a large extent. The demand for engineering college admissions has raised the rates of admission with the result that the colleges are over-crowded with the limited facilities available at the time of their inception. Though Government colleges are comparatively better off, the situation in the private institutions is dismal. This affects the discipline and standard of instruction and whereas engineering education has to be innovative in nature, it should have the important component of technology development, the environment in our institutions does not help the activity even to an appreciable level. As important as the curricular activities inside the class the extra curricular content and in many cases the time and energy of student community has to be suitably channelised

to provide a better environment and relationship much needed in a technical institution.

In any medium and long term planning the role of the academician is all important. Their level of knowledge, motivation and relationship with the student community go a long way to the success of the educational system. Now-a-days teaching positions in technical institutions are the least attractive. So that the recruitment in many cases do not satisfy the requirements expected of the positions. A comparative study of the salaries now being offered to technically qualified people in industrial undertakings and in the teaching profession will reveal the wide gap between the two. A revision of the pay scales is absolutely essential if better talent has to be attracted to our teaching institutions.

The quality improvement programmes that were started during the later period of Vth Five Year Plan and in VIth Five Year Plan have undoubtedly increased the academic attainments of some of our faculty. But the environment in our institutions have to be improved if their capabilities and training have to be fully utilised. A constant follow up of their work as well as a responsive hearing of their requirements will help to improve the situation. In fact the centres created in the College of Engineering, Trivandrum for this purpose have to augment their efforts in this direction also. The recommendation of the Ministry of Education during the Vth Five Year Plan period envisage assessment and incentive promotions to the talented faculty. This has to receive proper attention to avoid the frustrations of competent staff now waiting for non-cadre promotions which in one way strike at the very roots of efficiency of the system.

Collaboration between technical institutions and industries/departments form one way of updating the technology through a two phase flow of theoretical knowledge and practical experience in the field, workshop floor and research institutions, that is advantageous to all concerned. A beginning in this is being attempted but the programme has to be further intensified for better recognition of the academic capabilities of the faculty and

to provide much needed linkages for growth and developments. Adjunct Professorships, and Industrial Residencies for people from industry and departments and academic institutions are advised on their areas of speciality. For a successful programme of this kind it is necessary that identification of persons, specialities, timings, etc., have to be suitably planned.

The quality improvement programme now mainly for the teaching faculty should go down to all levels from top to bottom, from the Professor down to the Instructor in a workshop. The best time of engineering student is spent in workshops and laboratories and hence an improvement in quality means an improvement in total quality. It may be necessary to introduce a system of incentives for this type of training for sufficient motivation in the larger interests of the students and the institutions. It has generally been found that the post training period in the institute do not take care of the training received elsewhere and probably the outmoded equipment and the curriculum do not offer any challenge. Modernisation of equipment and replacement of the existing equipment are very vital and group efforts in modelling and project work bringing up together the talents of the instructor and student groups should be promoted. Such project work should be challenging in nature and realistic instead of satisfying the needs of the syllabus alone.

The third part is the institutional facilities, which require an in-depth study for each institution and its deficiencies. The Directorate of Technical Education and the Department of Industrial Training have to work out a detailed plan which within the financial constraints should give priorities on works to be taken up. The provisions made in the section on Seventh Five Year Plan proposals may be viewed in the light of this necessary study. A scientific study of the utilisation of the space and facilities will reveal the areas where more optimum use of facilities can be attempted.

The practical experience of the students and their future employability will be heightened if the training programme is sandwiched in the academic programme and teaching and training go hand in hand, one supplementing the other. Though

this type of sandwich training was attempted it could not meet with success due to lack of flexibility in the system and proper planning and delegation of power to the authorities. Though such a system may not be practical for large numbers, it is worthwhile continuing the effort for special courses, involving smaller numbers. The collaborations mentioned earlier could be accelerated in this direction also.

4.0.4 *Engineering and Science*

Now-a-days there is a tendency to give science education a secondary status in our technical institutions. Physical sciences are as important as technical sciences and an integration of the two with bias towards technology is essential. To quote an example the transistor was the result of basic scientific work though the technologists developed this for very many important areas causing a revolution in several areas of application. Science education should have a bias to technology and properly integrated to suit the needs of technical development.

Education in Kerala is largely a public sector activity. Though this may continue in the areas of general and higher education it is worth considering how the departments and industries for which almost tailor made products are given by these institutions support the technical education system. Though the institutions have to be the fore runner of the technology development and processes this is not being achieved due to several factors. The financial constraints limit the development and hence ways and means involving the employer organisations and R & D institutions in the management of the programmes is worth considering. Adoption of individual departments in the institutions by group of industries will give more relevance to the programmes that are being conducted. Examples can be in the area of chemical, electronics, etc.

4.0.5 *Polytechnic Education*

Just as the engineering colleges were conceived as institutions to train supervisors and design and R & D engineers, the polytechnics were designed to produce middlelevel supervisors in the departments and industries. They were also conceived as focal

institutions for rural development and towards this end the Government of India had a programme of Community Polytechnics. Institutionalising the activities envisaged in the programme did not give the necessary progress to the scheme, at least in our State. In as much as the technical education is linked to development and development of the rural sector and up-gradation of the poor are the goals to be achieved in the minimum possible period this is an essential programme for development to be linked to the academic programme at the ploytechnic level. This has to be revived with motivated workers so that the much oft-talked transfer of technology to the village level become a reality.

4.0.6 *Industrial Training*

The Craftsmen Training Scheme is a national programme implemented through the ITIs and ITCs. The skilled craftsmen is the backbone of any industry small, medium or large. Of late this category has a large potential for skilled jobs in industries in India and abroad and this has increased the number of institutions especially in the private sector giving training with little facilities. The unemployment figures are rising and unless serious steps are taken to regulate the working of these institutions, the student little knowing the value of training and institutional certificate fall a prey to the hopes raised by them. Any further development of this sector has to be done after complete study of the areas and courses to be offered. The quality improvement programmes mentioned earlier require greater emphasis to the craftsmen training as this is necessarily a skill oriented programme and depend on the training of the instructors and faculty at the floor level.

Continuing education and co-operative education programmes with industries are programmes aimed at improving the capabilities of in-service people and these have to be persued. Their practical experience with the theoretical instructions help them to discharge their duties better.

4.0.7 *Teaching Methodology*

Pedagogy and teaching methodology are vital in the instructional process. Though some efforts in this direction are being

made at the polytechnic level a lot more has to be done if teaching and learning has to become a challenging exercise. To this extent the instructional facilities in our institutions have to be modernised and expanded so that the age old system is given a final exit from our institutions.

In the earlier periods engineering discipline was classified into a few major disciplines. But with the technological developments disciplines are getting divided into specialities and super specialities. This is especially so in some of the modern emerging areas into which our nation has ventured in a big way. Examples are the computer and micro processors, energy, environment, bio-technology, remote sensing, communication, ocean development, etc. The above list can be expanded and divided and new opportunities are presenting itself as challenges and hopes to our future. Though it may not be possible to have programmes in all these, selective planning of need based areas and implementation through institutional, non-institutional, formal and informal system will go a long way to the development of the technical education. It is in this direction that Institutions/University collaboration at national and global levels have to be thought of. Apart from the above emerging areas, the conventional area which have stood the test of time and helped us to reach the present state of development have to be reviewed and selective dropping of courses and reorganisations will help to utilise the available resources in the best possible manner.

With the above idea in the background we have outlined the perspectives for the comprehensive development of technical educational and craftsmen training upto 2000 AD.

4.1 Technical Education

4.1.1 *Starting of New Institutions*

The quantitative expansion of technical education facilities in Kerala is not commensurate with the demand for admissions in Engineering Colleges, Polytechnics and other technical institutions. Therefore, more stress shall be given for the

quantitative expansion of technical institutions at degree, diploma and certificate levels. While establishing new institutions, priority shall be given for backward areas and areas with high literacy.

4.1.2 *Consolidation of Existing Facilities*

It has been noted that for a variety of reasons the general standard of instruction and learning in the Engineering Colleges and Polytechnics has come down in the recent years. One of the main reasons is the ad hoc increase made in the admissions. The intake in the institutions is made without sufficient provision for class rooms, hostel facilities and adequate teaching and laboratory staff. Therefore, it is necessary to undertake in a phased manner the need based consolidation of all institutions including modernisation of laboratories and replacement of obsolete equipment. A Standing Committee of Management shall be formed to update the standard list for procurement of machines, materials and equipment required for Engineering Colleges and Polytechnics. Computer facility has to be provided in all Engineering Colleges and Polytechnics and in the Technical Examination Wing of the Directorate. Over and above general facilities in the existing institutions like quarters, playgrounds, canteen, recreation facilities, dispensary and auditorium have to be increased considerably. Improved facilities are very essential for raising the academic standards and keeping proper discipline in the institutions.

4.1.3 *Diversification of Courses*

(a) *Post-graduate Courses*

The present system of post-graduate education is characterised by the drawbacks such as lack of candidates with the requisite academic competency, high percentage of drop outs, insufficient infrastructure facilities and absence of useful and meaningful research projects. Most of the post-graduate programmes are out-dated, sterotyped and unpopular. As Post-graduate education is a matter of national concern, there shall be a continuous and serious attention on a priority basis to improve the

facilities. The following measures are suggested for the improvement of post-graduate education:—

—Fifty per cent of seats in P.G. courses should be reserved for sponsored candidates from industry.

—P. G. research work should be directed towards industrially oriented problems.

—Part time evening P.G. courses should be started for the benefit of employed persons.

—P.G. courses in emerging and expanding areas of technology like Ocean Structures, Coastal Engineering, Docks and Harbour Engineering, Environmental Sciences, Building Technology & Construction Management, New Energy Systems, Materials Technology, Bio-Engineering, Computer Technology, High Voltage Engineering, Project Engineering & Industrial Management, etc., should be started.

(b) *Undergraduate Courses*

It has been noted that a large number of seats are allotted for the conventional branches of specialisation such as Civil, Mechanical and Electrical Engineering. In order to relate the courses to the varying types of engineers required by industry, it is necessary to change the traditional pattern and diversify courses in the existing and new institutions to produce the needed technical personnel. The precise subject fields in which courses are to be conducted should be subject to constant review to suit the changing needs of industry for specialised technical personnel. The stress, therefore, in engineering degree education should be on consolidation of existing infrastructure and diversification of the courses by introducing new and emerging areas of technology. Integration of theory and practice should be attempted wherever possible. Credit system should also be introduced so as to make the courses more flexible and diversified. Degree courses in Transportation Engineering, Computer Science, Computer Technology, Building Technology, Water Resources,

Environmental Sciences, Art Ceramics, Ceramic & Glass Technology, Industrial Electronics, Cinematographic Engineering, Textile Engineering, Rubber Technology, Wood Technology, Paper Technology, etc., are found relevant.

(c) *Diploma Courses*

Post diploma courses should be introduced in areas of new technology and high demand like Safety Engineering, Inspection & Testing, Maintenance Engineering, Fertilizer Technology, Micro-processor Applications, Piping Engineering, Welding Technology, etc. Sandwich pattern of instruction should also be introduced for courses like Printing Technology, Rubber Technology, Tool & Die Engineering, Wood Technology etc. The number of seats for diploma courses should be increased to 5,000 by starting new institutions and introducing new courses in Ceramic & Glass Technology, Mineral Soil Technology, Pulp & Paper Technology, Spices Technology, Fertilizer Technology, Production Engineering, Maintenance Engineering, Welding Technology, Tourism & Travel, Cine Photography, Sound & Lighting, Interior Decoration, Boat Building & Repair, Post Harvest Technology, etc.

4.1.4 *Centres of Excellence*

An institution can come into prominence only if it develops one or two areas of specialisation into centres of excellence in studies, research and development. Therefore, steps shall be taken to set up centres of excellence in all Engineering Colleges, depending on the expertise available and the needs of the society. Such centres will concentrate on higher learning and research in specified areas of technology. They should be conceived to develop into full-fledged departments offering post-graduate courses and R & D activities in specified areas. The areas identified as suitable for establishing centres of excellence include Geo-Technical Engineering, Water Resources Development, Environmental Sciences, Energy Systems & Research, Micro-processor Studies, Materials Science, Rural Technology, etc.

4.1.5 *Autonomy for Engineering Institutions*

It is a fact that the slow pace of the development and growth of our technical institutions is mainly due to the absence of academic and administrative autonomy. Greater flexibility in curriculum and changes in examination system are essential to produce excellence in teaching and learning and to improve the standard of education. It is, therefore, suggested that academic autonomy and necessary administrative freedom may be granted to selected Engineering Colleges and Polytechnics in a phased manner.

4.1.6 *Institute for Staff Training and Technology Updating*

Introduction of new and efficient technology in different areas of industrial and agricultural production is essential for expanding the productivity. Keeping this in view, it is suggested to establish an Institute for Staff Training and Technology Updating to give pre-service and inservice training to teaching staff, technicians and craftsmen associated with technical education at various levels. Under the scheme specific provisions shall be made for hiring out experts from outside institutions for re-training and updating certain crafts and technology. Such an institute shall be started in collaboration with the existing institutes like, T.T.T.I., AVTC and FTI and outside agencies such as ILO, UNDP, etc.

4.1.7 *Institute for Traditional Crafts and Technology*

The existing technical institutions are mainly catering to the manpower requirements in modern crafts and technologies. They are not structured to give useful and effective training in traditional crafts and technologies which can generate a number of job opportunities in the State. In this context, an Institute for Traditional Crafts and Technology is envisaged for preserving and modernising the traditional craft forms.

4.1.8 *Centre for Non-Institutional Technical Education*

The demand for technical education is tremendously increasing. As there has been no improvement in the facilities for technical education we are not able to provide formal type of

institutional education and training for the large masses who aspire for technical education. With the modern developments in communications, it will be possible to impart technical education and vocational education at various levels through correspondence, radio, television, tap-recorder, video and personalised computers. This type of non-institutionalised education is being successfully implemented in many advanced countries. Therefore, it is desirable to start non-formal system of technical education in Kerala through a Centre for Non-Institutional Technical Education.

4.1.9 *Centre for Micro-Electronics and Computer Studies*

Now-a-days Micro-Electronics Technology is widely applied in all activities like production, communication, transportation, banking, entertainment, education etc. The technology is now considered as the key industry of tomorrow. In future, employment opportunities of personnel with expertise in computer software technology and computer maintenance will be very high. Kerala, with its high literacy rate has tremendous potential for training and supplying the software and maintenance experts required for the computer industry. Therefore, it is envisaged to set up a Centre for Micro-Electronics and Computer Studies.

4.1.10 *Institute of Welding Technology*

Welding technology has made rapid strides in the past as a premier production process. The technology is widely applied in general structural fabrication, ship building, production of missiles and rockets and in machine building industry. Already there is a dearth of qualified welders and welding technicians. The I.T.Is, Polytechnics and Engineering Colleges are not structured to impart allround know-how in the diverse areas of welding. Therefore, it is suggested to set up an Institute of Welding Technology.

The Institute shall devote for studies, research and development of welding. The institute, in addition to running regular training programmes for executives, supervisors and technicians, will conduct post-graduate and post diploma courses in welding.

4.1.11 *Involvement of Private Sector in Technical Education*

States like Karnataka, Tamil Nadu, Andhra Pradesh and Maharashtra have considerably expanded their technical education facilities in recent years mainly through the help of private agencies. In Kerala there is an urgent need for qualitative and quantitative expansion of technical education facilities. Considering the financial constraints of the State Government, it is suggested that private organisations may be permitted to establish Engineering Colleges and Polytechnics.

4.1.12 *Industry—Institution Collaboration*

Technical institutions provide the manpower resources required for industries. Therefore, a close collaboration between industry and institutions is imperative. To ensure an active interaction between the two, the following steps shall be considered:

- Continuing education programmes on selected topics shall be organised for field engineers, technicians and staff members;
- —Industry-based elective subjects shall be introduced in degree and diploma courses to be partly or fully taught by experts from industry;
- —A post of Industrial Liaison Officer may be created in each college for bringing out effective implementation of various liaison programmes. It is also suggested to set up Industrial Liaison Boards in all institutions;
- —Industries shall arrange campus interviews in all institutions;
- —The Industrial Residency Programme shall be redesigned to facilitate inter change of personnel between industry and institution for longer periods of one semester to two years;
- —Industry oriented research programmes shall be undertaken for post-graduate research and final year project works. Sandwich type or co-operative type of eduacation shall be implemented with assistance of industries; and
- —As technical institutions are the most important resources for the industry a portion of the expenditure on technical education shall be met by the industry.

4.1.13 *Technical University*

The Engineering Colleges in the State are affiliated to Kerala and Calicut Universities. Very shortly the M.A. College of Engineering, Kothamangalam will be separated from the Kerala University and affiliated to the Gandhiji University. As these Universities are very much concerned with general education, technical education does not get deserving attention in matters such as timely conduct of examination and publication of results. This has resulted in many problems, including the extension of the four year course to five years or more. In engineering degree education, especially after the introduction of semester pattern, the number of examinations both theory and practical has become large and existing Universities are finding it difficult to adjust with this type of improved works.

To give a sense of direction and uniformity in engineering education and to avoid the present delays in completing the courses it is suggested that all the Engineering Colleges in the State shall be brought under the academic control of a Technical University. Government of India has also advocated the setting up of Technical Universities in each State.

4.1.14 *Improve the Status of Teaching Personnel*

In Kerala, we are not able to attract competent persons with proven ability to the teaching profession in our Engineering Colleges and Polytechnics. The reasons are low pay scales, lack of promotion prospects and inadequate facilities such as staff quarters, transportation arrangements etc. Therefore the pay scales as recommended by the AICTE should be implemented, service conditions should be improved and merit promotion scheme should be introduced for engineering teachers so as to attract the best talents in the country for the teaching profession.

4.1.15 *Foreign Collaboration and Faculty Exchange*

The assistance of UNDP or reputed foreign Universities may be sought for setting up of new laboratories in emerging areas and modernisation of existing laboratories and for short term

staff exchange programmes. Mutual exchange of teachers and technicians will help to our faculty members to get short term training in some foreign Universities or research establishments and thereby update their technical competence. Availability of foreign experts in our institutions will help to give a new direction to teaching and research activities.

4.1.16 *Science and Technology Entrepreneurship Park (STEP)*

There is the absence of a proper interaction between the R & D centres and the industrial units in Kerala. The idea in establishing a Science and Technology Entrepreneurship Park (STEP) is to narrow down the above gap. Under the scheme industrial R & D and industrial production units using technologies and methods developed indigenously will be set up under the direct control and supervision of one or more technical institutions. If these units are found to be industrially viable and economically useful, they will be handed over to prospective entrepreneurs. Entrepreneurs can also set up experimental units of STEP with the technical assistance and control of technical institutions. It is, therefore, suggested that a Science and Technology Entrepreneurship Park shall be established in Kerala at a suitable location.

4.1.17 *Vocational Education*

In order to improve the facilities for vocational education, it is suggested to start one JTS in each taluk by the end of 2000 AD and introduce vocational education at plus two stage in all the Junior Technical Schools in trades appropriate to the local needs. Pre-Vocational Training Centres should be started in all Junior Technical Schools and one year post SSLC intensive training programme may be introduced in specified trades of high demand.

4.1.18 *Commercial Institutes*

It is necessary to enforce certain guidelines for the efficient and proper working of the private commercial institutes. Therefore, Government commercial schools have to be established one in each taluk to train candidates for the diploma course in

typewriting and shorthand. It is expected that when sufficient number of commercial institutes are established in public sector the number of private institutes having inadequate facilities will gradually drop down.

4.1.19 *Industrial Schools and Engineering Institutes*

With regard to the vocational training institutes the policy should be to continue the industrial training centres which impart training in tailoring and embroidary. Sufficient number of TGMT centres should be opened in backward areas. The syllabus and curriculum should be updated, the institutions should be properly equipped and strict control should be enforced on standards of training. With regard to engineering institutes, it is suggested to include all the engineering trades in the plus two vocational stream in Junior Technical Schools. Gradually the KGC Examination in engineering branches should be discontinued.

4.1.20 *Food Craft Institute and Centres*

The Food Craft Institute at Kalamassery should be upgraded into a diploma institute and additional courses should be started in the extension centres at Calicut and Trivandrum. Extension centres of the institute should be started at Trichur, Kottayam, Idukki etc.

4.1.21 *Fine Arts College and Institutes*

The following measures are suggested for the development of fine arts education:—

—Post graduate courses in Painting, Sculpture, Applied Arts and Graphic Arts may be introduced in the College of Fine Arts, Trivandrum;

—New degree courses in Functional Arts such as Textile Design, Ceramic Arts, Furniture Design and Interior Decoration may be started;

– Diploma course in Cinematography, Film Editing etc., may be started; and

– The facilities at the College of Fine Arts, Trivandrum may be increased considerably.

4.1.22 *Kerala State Science and Technology Museum*

The following are envisaged for the development of Kerala State Science and Technology Museum: —

—Construction of a planetarium and space science gallery;

Completion of building science gallery;

—Opening of mechanical power gallery;

—General land scaping and opening of children's science park; and

—Setting up science centres in all the districts.

4.1.23 *Lal Bahadur Sastri Engineering Research and Consultancy Centre*

The activities of the centre should be expanded with emphasis on the following:—

—Development of computer software;

—Setting up of instrument repair and maintenance facility;

—Development of mechanised toys;

—Starting continuing education programmes in emerging areas; and

—Undertaking turn key projects in areas of design, fabrication, development and training.

4.2 **Craftsmen Training**

4.2.1 *Starting of New Institutions*

(*a*) *Industrial Training Institutes*

Kerala, compared to other states in India, is far behind in establishing Industrial Training Institutes. In the recent past, there has been a rapid growth in the demand for craftsmen. This has resulted in opening of more Industrial Training Centres under private sector. Today, we have only 21 I.T.Is. where as the number of ITCs have reached at 206. Further increase in the number of ITCs in the private sector is likely to affect

the credibility of the National Trade Certificate in the State and affect the training standards adversely. As such more ITIs have to be started to provide adequate number of training places.

(b) Women Industrial Training Institutes

In Kerala, there are three Women's Industrial Training Institutes located at Kazhakuttom, Quilon and Calicut. In tune with the Government of India proposal to uplift the employment avenues of women in the country, the training facilities for women have to be increased considerably. Electronics, Machanic, Machanic (Radio & Television), Draughtsman (Civil), Secretarial Practice, Stenography (English), Service & Repair of Household Appliances, Beautician etc., are the trades identified as suitable for introducing in the Women ITIs.

(c) I.T.I. for Physically Handicapped

The Industrial Training Institute for Physically Handicapped will help to rehabilitate the deaf and orthopaedically handicapped persons. As a large number of persons to this category are found non-matric, it is suggested to introduce non-matric trades in the institution. Fitter, Plumber, Upholstry, Photography, Painter, Printing, Book Binding etc., are some of the trades suitable for the institute.

(d) Regional Vocational Training Institute for Women

The Government of India in collaboration with the International Labour Organisation and the Sweedish International Development Authority has set up Regional Vocational Training Institutes in the country for imparting vocational training to women. In Kerala an R.V.T.I. has been started recently at Kazhakuttom. It is desirable to start one more institute in the State.

4.2.2 *Consolidation and Updating of Facilities*

Very shortly the State Government will have to implement the new syllabus in the ITIs as revised by the Director General of Employment & Training. The introduction of the new

syllabi will require the re-arrangement of the workshops, setting up of new machinery and equipment, re-constructing the buildings and structures in the Industrial Training Institutes. The newly started ITIs in the State do not have the required infrastructure facilities. The N.C.V.T. insists that all Government institutes should have the training facilities as per the norms prescribed and that new institutes and trades would be permitted only after all the facilities are made available. Therefore, steps have to be taken to consolidate and update the training facilities in the existing institutions, provide additional machinery and equipment for newly introduced trades, replace the obsolete and unserviceable equipment and introduce theoretical instructions.

4.2.3 *The Need for a Change in the Pattern of Admissions*

There is an imbalance between the supply and demand for trained personnel. In some of the conventional type of trades such as moulder, carpentry, sheet metal etc., there is high rate of unemployment among the trainees. At the same time the demand for welder, draughtsman (civil), electrician, fitter, mechanic etc., is appreciable. Accordingly, it is suggested that admission to the trades where employment opportunities are limited should be reduced. Additional trades having employment potential and local demands should be introduced.

4.2.4 *Special Training Programmes*

Advanced vocational training, apprenticeship training, intensive training and basic training for non I.T.I. trades, are the schemes contemplated under the programme.

The advanced vocational training system may be modernised by introducing new courses like Induction to Engineering Technology, Refrigeration and Air Conditioning, Metrology, Engineering Inspection etc.

Under apprenticeship training it is suggested to organise related instruction centres in the districts where they are not existing, strengthen the R. I. centres at Trivandrum and Kalamassery, provide regular teaching staff to the R. I. centres

and introduce R.I. classes to some specified trades under the vocational education at plus two stage.

As the trainees in the I.T.Is and I.T.Cs receive only traditional type of training it is necessary to introduce intensive training in selected trades such as electronics, mechanic, carpentry, etc. Basic training centres should also be organised for non-I.T.I. trades such as printing, photography, leather craft etc.

4.2.5 *Strengthening of Millwrights*

In the Industrial Training Institutes, many items of costly equipments are neither maintained nor utilised properly. A large number of machinery available in the institutes need repair as these are being constantly used by trainees. Therefore, it is suggested to strengthen the millwrights in the I.T.Is so that the machinery and equipment could be set right without delay.

5.0 ORGANISATIONAL AND INSTITUTIONAL ARRANGEMENTS

The Technical Education Department is concerned with development and implementation of technical education at all levels and vocationalisation of secondary education. The Department of Industrial Training deals with craftsmen training, apprenticeship training and advanced vocational training. A large number of development programmes will have to be implemented through these departments during the successive Five Year Plans. Therefore, it has been felt necessary to reorganise and strengthen the departments according to the following lines:—

5.1 Department of Technical Education

5.1.1 *Establishing Regional Directorates*

The Academic Inspection Wing attached to the Directorate is entrusted with the standardisation of equipments in various laboratories in the Engineering Colleges and Polytechnics and

preparation of laboratory instruction manuals. In order to facilitate rigorous inspection of all institutions the inspection programmes should be streamlined by strengthening the inspection wings at Cochin and Calicut as Regional Directorates.

5.1.2 *Manpower Information Cell*

Due to the absence of a reliable manpower information system, it has not been possible to anticipate areas of growth and to plan for technical manpower development. Hence there is a pressing need for establishing a Manpower Information Cell. In this connection, we are glad to note that the Government of India have recently set up a National Manpower Information System with a Lead Centre in the Institute of Applied Manpower Research, a Manpower Information Cell in the Ministry of Education and 17 Nodal Centres in selected higher technological institutions. For Kerala, the Cochin University has been identified as a Nodal Centre and it is located in the School of Management Studies of the University. The Advisory Committee of the Nodal Centre consists, among others, of the Director of Technical Education, the Director of Industries and the head of the State Manpower Unit. The Centre has already started work.

5.1.3 *Construction and Maintenance Wing*

With the expansion of technical education and starting of new institutions in recent years, the number of civil works has increased considerably. Due to various problems and limitations the Public Works Department is not being able to attend to these works promptly and complete them in time. Delay in execution of civl works, especially that of the buildings, has seriously affected the growth of technical education. In this context, a Construction and Maintenance Wing may be formed under the Directorate of Technical Education to deal with construction and maintenance of buildings.

5.1.4 *Technical Examination Wing*

At present, the technical examination wing is entrusted only with the engineering diploma examinations. It is suggested

that the K.G.T., K.G.C. and other technical examinations which are now being conducted by the Commissioner for Government Examinations should be brought over to the Technical Examination Wing. To facilitate this, the Technical Examination Wing should be strengthend by setting up a question bank and data storage system.

5.2. Department of Industrial Training

The Director of Employment and Training is the head of Industrial Training Department. The Director is also the State Apprenticeship Advisor. The Craftsmen Training and Apprenticeship Training are the two major activities of the Department. The Programmes such as Advanced Vocational Training System, Intensive Training Scheme, Employment Generation Schemes, Special Training Courses for SC/ST, Schemes under Labour Welfare Fund Board, Training under TRYSEM are also implemented through the Department.

In order to implement the craftsmen training and other programmes more effectively the Department of Industrial Training may be suitably reorganised and strengthened. In this connection it is suggested to decentralise the administrative set up of the department under an Additional Director supervised by the Director of Employment and Training. It is also proposed to organise separate divisions for Training, Affiliation, Apprenticeship Training, Purchase and Maintenance, Planning etc.

6.0 SEVENTH FIVE YEAR PLAN PROPOSALS (1985-90)

6.1 Technical Education

During the previous Five Year Plans, under Technical Education major emphasis was given for consolidation and improvement of facilities and on diversification of courses. In the Seventh Five Year Plan also priority shall be given on further diversification of courses to meet emerging trends in technology and the requirements of the industry and for general

improvement of infrastructure facilities in existing institutions to achieve excellence in standards of education and research. It is also necessary to discontinue some courses of study which have no demand at present, reduce the intake of students in certain other courses, suitably modify and update the curriculum in some courses and start new courses in areas of high demand and emerging technology. A few new institutions shall be started in order to meet the increasing demand for technical personnel and to reduce regional imbalances in the location of technical institutions.

6.1.1 *Strategy for Technical Education*

The following are the broad strategies suggested for the development of technical education during the Seventh Five year Plan (1985-90): –

—Diversification of courses at all levels by introducing new courses in emerging and expanding areas of technology;

—Infrastructure facilities in the existing institutions shall be improved. Out-dated and obsolete equipment shall be replaced by new machinery and equipment;

—Centres of excellence shall be started in engineering colleges to develop expertise and research capability in relevant areas;

—Emphasis shall be given for quantitative expansion of technical education facilites;

—The Kerala State Science and Technology Museum shall be developed into a leading museum;

—Special institutes shall be set up in emerging areas of technology;

—Vocationalisation of education at the plus two stage shall be extended to all Junior Technical Schools; and

—Certificate examinations such as K.G.T., K.G.C. etc., shall be taken over from the Commissioner for Government Examinations. The conduct and supervision of these examinations shall be entrusted with the Technical Examination Wing.

6.1.2 *Scheme-wise Proposals*

An aggregate outlay of Rs. 22.25 crores is proposed for the development of Technical Education during the Seventh Five Year Plan (1985-90). Of the total outlay, an amount of Rs. 7.20 crores is proposed for starting new institutions and Rs. 12.10 crores is intended for providing improved facilities in the existing institutions. The rest of the outlay is for other programmes including direction and administration and starting of special institutions/centres. The scheme-wise details on the proposals are given below:-

I. Starting of New Institutions

Considering the large demand for admissions to various courses and the general development of technical education facilities in the neighbouring States, top priority has to be given in the Seventh Five Year Plan, for starting the following institutions.

1. *Starting of New Engineering Colleges*

(Proposed Outlay Rs. 500 lakhs)

In Kerala no Engineering College has been started during the past two decades. In Karnataka, Tamil Nadu and Andhra Pradesh a large number of Engineering Colleges have been started during the past five years. For engineering degree courses Tamil Nadu, Karnataka and Andhra Pradesh have intake capacitites of 4180, 8450 and 4850 respectively. The annual intake of Engineering Colleges in Kerala is only 1960. The existing Engineering Colleges are over-burdened with students. The demand for admissions in engineering is very high. Over and above, there is very possibility for migration of engineering graduates outside the State and aborad for employment purpose. In the circumstances it is suggested to increase the intake of degree courses in engineering by starting of at least three Engineering Colleges during the Seventh Five Year Plan. While establishing new Engineering Colleges priority should be given for Kottayam being an area of high literacy and Kasargode as a backward region.

2. *Starting of New Polytechnics*

(Proposed Outlay Rs. 120 lakhs)

In Kerala, today, there are only 23 polytechnics compared to 62 in Tamil Nadu, 38 in Karnataka, and 44 in Andhra Pradesh. The demand for technician education in our State is steadily increasing. Therefore, it is proposed to start four new polytechnics during the seventh Five Year Plan. The outlay is intended for starting the institutions in Kasargode, Alleppey, Pathanamthitta and Quilon where there are no Government Polytechnics at present.

3. *Starting of New Women's Polytechnics*

(Proposed outlay Rs. 50 lakhs)

The demand for admissions to women's polytechnics exceeds the number of available seats. It is envisaged to give top priority for training facilities for women. The outlay is intended for starting of two new women's polytechnics during the Seventh Five Year Plan.

4. *Starting of New Junior Technical Schools*

(Proposed Outlay Rs. 50 lakhs)

The Junior Technical Schools are being widely accepted by the society. They help to transfer science and technology to remote parts of the State. Considering the pressing demand from various sections of the society for starting new Junior Technical Schools it is proposed to start at least five Junior Technical Schools by the end of the Seventh Five Year Plan.

The new Engineering Colleges and Polytechnics will be started with three courses in the beginning with intake of 100 in Engineering Colleges and 90 in Polytechnics. These will be expanded with more courses and with the full proposed intake within a period of five to eight years depending on the development of infrastructure facilities.

More than half the courses proposed to be started in the new Engineering Colleges and Polytechnics will be in the emerging

areas of technology like Micro-Electronics, Computer Sciences, Environmental Studies, New Energy Systems, Materials Technology, Maintenance Technology, Ceramics & Glass Technology, Mineral Sand Processing, Paper Technology, Spices Processing, Post-Harvest Technology, Water Resources Development & Management, Wood Technology, etc.

II. Improved Facilities for Existing Institutions

The next priority relates to the consolidation and modernisation of existing facilities in the various institutions. They include: -

—Modernisation of laboratories, workshops and library including provision of computer and teaching aids;

—Diversification of courses at the degree, diploma and certificate levels to meet the demands from emerging areas of technology;

—Starting of centres of excellence in Engineering Colleges to develop expertise and research capability in areas of relevance to Kerala;

- Development of Kerala State Science and Technology Museum to the level of a National Museum; and

- Revision of staff structure based on scientific study.

The following are the programmes suggested for providing improved facilities to the existing institutions:—

5 *Government Engineering Colleges*

(Proposed Outlay Rs. 200 lakhs)

The basic infrastructure facilities in Government Engineering Colleges in areas of weakness and in areas of emerging technology has to be strengthened. The obsolete and out-dated equipment and machinery have also to be replaced by new and sophisticated items.

The general facilities like libraries, staff quarters, student hostels, canteen, play-grounds, dispensary, auditorium and transportation have to be provided sufficiently so as to improve the quality of teaching and discipline in the Colleges.

The outlay proposed is for modernisation of laboratories, workshops and library including provision for computer.

6. *Private Engineering Colleges*

(Proposed Outlay Rs. 60 lakhs)

The outlay is intended as grant for diversification, development and expansion of the three private engineering colleges in the State.

7. *Regional Engineering College, Calicut*

(Proposed Outlay Rs. 30 lakhs)

The programme envisages the development of the campus of the Regional Engineering College, Calicut, by constructing compound wall, stadium, swimming pool, etc.

8. *Government Polytechnics*

(Proposed Outlay Rs. 240 lakhs)

Under the scheme, it is proposed to undertake the following activities during the Plan period:—

—Consolidation and modernisation of the facilities in the workshops, laboratories and libraries in the Government Polytechnics including Women's Polytechnics;

—Provision of additional administrative support to principals for running the institutions efficiently; and

—Provision of general facilities like quarters, hostels, playgrounds, dispensaries, auditorium, class room and laboratory spaces.

9. *Private Polytechnics*

(Proposed Outlay Rs. 45 lakhs)

The outlay is intended for providing grant for diversification, modernisation, development and expansion of the private polytechnics in the State. Construction of buildings, purchase of equipment, furniture and books, modernisation of workshops and laboratories, provision of student amenities, revision of staff structure, implementation of academic programmes, starting of new courses etc. are contemplated under the scheme.

10. *Junior Technical Schools*

(Proposed Outlay Rs. 75 lakhs)

During the Seventh Five Year Plan, it is proposed to provide improved instructional facilities, modernise the workshops and introduce new trades in the existing Junior Technical Schools. General facilities to staff and students will also be provided in all the institutions.

11. *Pre-Vocational Training Centres Attached to Junior Technical Schools*

(Proposed Outlay Rs. 5 lakhs)

The Pre-Vocational Training Centres attached to Junior Technical Schools enable to provide vocational education and training to students at the upper primary level. The outlay is intented for modernisation and improvement of existing P.V.T.Cs.

12. *Vocationalisation of Post-Secondary Education*

(Proposed Outlay Rs. 20 lakhs)

Vocational education at plus two level is being implemented in eight Junior Technical Schools. It is intented to bring all the Junior Technical Schools under the scheme in a phased manner during the Seventh Five Year Plan. The outlay includes provision for additional buildings required for the plus two level courses.

13. *Commercial Institutes*

(Proposed Outlay Rs. 15 lakhs)

The outlay is for providing improved facilities in the existing commercial institutes and starting of new institutes in areas where they are not existing.

14. *Vocational Institutes and TGMT Centres*

(Proposed Outlay Rs. 10 lakhs)

The scheme proposes to start a few T G M T centres in rural and unrepresented areas and introduce new trades and consolidate the facilities in the existing centres/institutes.

15. *Food Craft Institute and Centres*

(Proposed Outlay Rs. 20 lakhs)

During the Seventh Five Year Plan the Food Craft Institute, Kalamassery will be upgraded into a diploma level institution and the facilities in the extension centres will be improved considerably.

The proposed outlay is for consolidation and modernisation of existing institutions, upgradation of the institute at Kalamassery and for starting new centres at Kottayam, Trichur etc.

16. *College of Fine Arts and Institutes of Fine Arts*

(Proposed Outlay Rs. 60 lakhs)

It is proposed to introduce post-graduate courses and degree courses in Art Ceramics and Textile Design in the College of Fine Arts, Trivandrum during the Seventh Five Year Plan.

The outlay is intented for consolidation and improvement of existing facilities, starting of post graduate and under-graduate courses and introducing new courses in fine arts education in the College of Fine Arts, Trivandrum and Fine Arts Institutes at Mavelikara and Trichur.

17. *Diversification of Courses in the Engineering Colleges and Polytechnics*

(Proposed Outlay Rs. 80 lakhs)

In order to keep pace with the manpower requirements in emerging areas of technology, it is proposed to start new courses at all levels of technical education. The All India Council of Technical Education, the Working Group on Technical Education and the Department of Science and Technology (Government of India) have given guidelines on emerging areas in which emphasis is to be laid in planning new courses. Accordingly, it is proposed to start degree courses in Computer Science, Computer Technology, Building Technology, Transportation Engineering, Textile Engineering, Ceramic and Glass Technology, Cinematography and Environmental Engineering. Diploma/post-diploma courses in Mineral Soil Technology, Pulp and Paper Technology, Production Engineering, Maintenance Engineering, Welding Technology, Fertiliser Technology, Plastics Technology, Tourism & Travel Services, Sound & Lighting Technology and Interior Design are also proposed to be started during the Seventh Five Year Plan.

The outlay is proposed for starting six new courses in Engineering Colleges and eight new courses in Polytechnics in emerging areas of technology. The outlay include the cost of buildings, equipment, library, furniture etc. for introducing new courses in the institutions.

18. *Centres of Excellence*

(Proposed Outlay Rs. 100 lakhs)

In this era of sophisticated technology each institution should strive to develop centres of excellence in areas where it has necessary facilities like qualified staff, equipment and expertise. Therefore, it is envisaged to start a few centres of excellence in selected Engineering Colleges in areas like Geotechnical Engineering, Water Resources Development, Environmental Sciences, Energy Systems & Research, Micro-Processor Studies, Materials Science and Rural Technology.

The outlay is for provision of staff, buildings and equipment required for the centres.

19. *Kerala State Science and Technology Museum*

(Proposed Outlay Rs. 200 lakhs)

The newly started Kerala State Science and Technology Museum at Trivandrum has to be properly developed into a leading museum with emphasis on traditional as well as modern technology. During the Seventh Five Year Plan, the planetarium, physical science gallery, building science gallery and the children's science park are proposed to be completed. The outlay is intented for the above purpose.

20. *Revision of Staff Structure*

(Proposed Outlay Rs. 40 lakhs)

The scheme is proposed for review of the existing pattern of teaching and technical personnel in all technical institutions and implement the staff structure based on scientific study.

21. *Lal Bahadur Sastri Engineering Research and Consultancy Centre*

(Proposed Outlay Rs. 10 lakhs)

The proposed outlay is for strenghtening the activities of the Lal Bahadur Sastri Engineering Research and Consultancy Centre.

III. Direction and Administration

22. *Strengthening the Directorate of Technical Education*

(Proposed Outlay Rs. 50 lakhs)

The devlopment activities envisaged in the Seventh Five Year Plan necessitate the strengthening and expansion of the Directorate of Technical Education in the following lines:—

—Re-organising the Directorate and strengthening the regional offices at Calicut and Cochin.

—Strengthening the Planning Wing and the Placement & Training Wing in order to have a close liaison with industry, promote interaction between industry and

institution, contribute towards student counselling & placement and to assess the technical manpower requirements of industry.

—Strengthening the Academic Inspection Wings at Trivandrum, Cochin and Calicut with a view to evaluate, stabilise and modernise technical education at all levels.

Expanding the activities of the Public Relations Wing with responsibility of organising district level exhibitions, making of publicity oriented movie and video films on various courses and programmes of the department, organising State level youth festivals of Polytechnics and Junior Technical Schools.

Acquiring land and constructing administrative buildings for the Directorate.

23. *Strengthening the Technical Examination Wing*

(Proposed Outlay Rs. 25 lakhs)

The Technical Examination Wing at the Directorate is engaged with the conduct and supervision of diploma examinations in engineering and technology. It is proposed to expand the activities of the wing by bringing into its fold K.G.T. and K.G.C. Examinations and the examinations of Commercial Schools, Fine Arts Institutions and Junior Technical Schools. It is also intended to form a question bank and to procure a suitable computer for storing and processing of questions.

IV. Starting of Special Institutions/Centres

Considering the expansion of technical know-how at various levels and taking into account the necessity for development of certain emerging areas it is proposed to start the following special institutions/centres on a phased manner during the Seventh Five Year Plan:-

24. *Institute for Staff Training and Technology Up-dating*

(Proposed Outlay Rs. 20 lakhs)

The scheme envisages to set up an Institute for Staff Training and Technology Up-dating to give pre-service and

in-service training to teaching staff, technicians and craftsmen associated with technical education at different levels.

The outlay is for the staff, buildings and equipment required for establishing the proposed institute.

25. *Institute for Traditional Crafts and Technology*

(Proposed Outlay Rs. 35 lakhs)

It is an accepted fact that the existing technical institutions are not structured to impart useful and effective training in traditional crafts and technology which can generate employment opportunities. In this context, it is proposed to set up a separate Institute for Traditional Crafts and Technology in the State, with a view to modernise and popularise the traditional craft forms.

The outlay is intended for buildings, equipment and staff for establishing the institute.

26. *Setting up an Institute for Micro-Electronics and Computer Studies.*

(Proposed Outlay Rs. 35 lakhs)

With a view to accelerate the development of micro-electronics industry in Kerala and create a large number of job opportunities to the educated youth, especially women, it is proposed to start at Trivandrum an Institute for Micro-Electronics and Computer Studies. The institute is expected to offer short-term regular courses at various levels in software and hardware technology.

The proposed outlay is for meeting the expenditure on staff, equipment and buildings for the institute.

27. *Establishing a Centre for Non-Formal Technical Education*

(Proposed Outlay Rs. 10 lakhs)

The programme envisages to establish a Centre for Non-Formal Technical Education with the objective of providing facilities for technical education at various levels through

correspondence and using modern audio-visual aids and teaching equipment.

The outlay proposed includes provision for staff, equipment and buildings required for the centre.

V. Other Programmes

28. *Part-time Degree and Diploma Courses*

(Proposed Outlay Rs. 10 lakhs)

Part-time courses are proposed to be started in all the Engineering Colleges and in selected Polytechnics. It is also proposed to start part-time post-graduate courses at the College of Engineering, Trivandrum and Engineering College, Trichur, for the benefit of in-service engineers and faculty.

29. *Apprenticeship Training Programme*

(Proposed Outlay Rs. 10 lakhs)

The programme envisages implementation of apprenticeship training of graduates and diploma holders, conduct of supervisory and career development programmes, activities connected with industry-institution collaboration, liaison work between the department and industries, industrial residency activities, formulation of employment generation schemes, training of fresh diploma holders in Foremen Training Institute, Bangalore and starting of supervisory development centres at appropriate locations.

30. *Establishment of Community Extension Centres*

(Proposed Outlay Rs. 10 lakhs)

It is proposed to establish extension centres in selected Engineering Colleges and Polytechnics for the transfer of scientific and technical know-how to the community around the institutions. This is being planned to implement through exhibitions, field demonstrations, workshops, short-term training programmes, movie and video films, work centres, service centres etc.

The proposed outlay is for meeting the expenditure on sallary, honorarium to staff, equipment, transport, consumables and contingencies.

31. *Production of Text Books and Teaching Aids*

(Proposed Outlay Rs. 10 lakhs)

Proper text books fully covering the curriculum of various courses and certain specialised and emerging areas are not readily available for many engineering subjects. Therefore, the scheme envisages to give financial assistance to technical teachers and experts to prepare text books, laboratory manuals and monograms and fabricate and design teaching aids and other materials.

The outlay is for giving honorarium to the teachers and experts and meeting the expenses involved in printing and publishing.

32. *Merit Promotion Scheme for Faculty*

(Proposed Outlay Rs. 10 lakhs)

It is proposed to introduce a merit promotion scheme for the engineering college and polytechnic teachers. Under the scheme a few number of posts in each department in each institution will be reserved solely for promotion by merit which will be decided by the performance in teaching, research and development works as decided by an expert selection committee.

The outlay proposed is for meeting the expenses of salary to be paid in the higher posts which are solely created for merit promotion purposes.

33. *Faculty Development Programmes*

(Proposed Outlay Rs. 40 lakhs)

Quality improvement programmes through ful-time, part-time and short-time training courses are contemplated under the scheme. The programme envisages the following –

--The minimum qualification for head of sections in polytechnics should be made a post-graduate degree in

engineering. Therefore, it is proposed to provide facilities for polytechnic teachers to acquire post-graduate degrees either by attending full-time or part-time courses;

Continue the scheme of deputation of engineering college teachers for higher studies like M. Tech. and Ph.D. programmes and to extend the full-time doctorate programme to the Engineering College, Trichur; and

Introduce programmes for re-training of staff in emerging areas of technology.

The outlay is for meeting the expenditure on existing faculty development programmes, for the introduction of suitable programmes for polytechnic teachers and for re-training programmes for staff.

34. *Starting of Construction and Maintenance Wing*

(Proposed Outlay Rs. 10 lakhs)

With the expansion of technical education and starting of new institutions in recent years the number of civil works has increased considerably and the Public Works Department of the State is not being able to attend to these works promptly and complete them in time.

In this context, it is proposed to set up a Construction and Maintenance Wing under the Directorate of Technical Education to deal with construction of new buildings and maintenance of existing buildings. The outlay is for the formation of the wing.

35. *Establishment of Youth Training Centres*

(Proposed Outlay Rs. 5 lakhs)

In Kerala there are many among the youth who could not get the opportunity to undergo institutional training in skilled tradles and crafts. The programme envisages to establish a few Youth Training Centres in selected institutions to give need

based training in selected areas to unemployed youth and semi-skilled workers. The infrastructure facilities available in the Engineering Colleges, Polytechnics and Junior Technical Schools could be utilised for implementing the programme. The proposed outlay is for implementing the scheme during the Seventh Five Year Plan.

36. *Extension Centre of TTTI*

(Proposed Outlay Rs. 15 lakhs)

The extension centre of the Technical Teachers Training Institute at Kalamassery is a joint venture of TTTI Madras and the State Government. The outlay proposed is for construction of buildings and curriculum development activities of the centre.

6.2 Craftsmen Training

During the Fifth and Sixth Five Year Plan periods due provisions were not given for the development of craftsmen training in the State. Consequently, the Industrial Training Institutes have become ill-equipped and the training standards of the trainees have declined drastically. As a result the craftsmen trained in the ITIs are not able to attain the skill development expected of them for self employment or for gainful employment in industries.

The committee of experts (Quadir Committee) appointed by Government of India in 1978 to review the craftsmen training and the All India Conference of State Labour Ministers, held in September 1983 have pointed out that the State Governments have failed to provide sufficient funds for the development of craftsmen training. Therefore, in the Seventh Five Year Plan adequate provision may be made for the expansion of craftsmen training facilit es.

During the Seventh Five Year Plan, the new syllabus as revised by the Directorate General of Employment and Training will have to be implemented in the ITIs. This will necessitate the setting up of new machinery and equipment and

construction of additional buildings in the existing institutes. More over, new ITIs and ITIs for women shall have to be started in areas where they are not existing. Therefore, the proposals for the Seventh Five Year Plan includes only the programmes which are considered as inevitable for the development of craftsmen training in Kerala.

6.2.1 *Strategy for Craftsmen Training*

The following are the strategy drawn up for the expansion of craftsmen training facilities in the State during the Seventh Five Year Plan (1985-90) :

- The general facilities in the Industrial Training Institutes shall be consolidated and strengthened in accordance with the norms and standards prescribed by the NCVT

- In order to facilitate the introduction of the revised syllabus, the existing I.T.Is shall be modernised by re-arranging the workshops, setting up of new machinery and equipment and making improvements to the existing buildings.

  As a measure to control the growth of I.T.Cs in private sector, efforts shall be made to start I.T.Is and Women I.T.I.s in areas where they are not existing.

- The programmes such as the Trade Apprenticeship Training Scheme and Advanced Vocational Training System shall be strengthened.

  Special programmes such as Post I.T.I. Intensive Training, Training of Teaching Staff, Apprenticeship Training for the Products of Vocational Stream, Basic Training in Non-I.T.I. Trades etc., shall be introduced.

6.2.2 *Scheme-wise Proposals*

Under craftsmen training an aggregate outlay of Rs. 6.25 crores is proposed for the Seventh Five Year Plan. Of the total outlay an amount of Rs. 3.50 crores is intended for consolidation, strengthening and updating of facilities in the existing institutions. For starting of new I.T.I.s only an amount of Rs. 1.00 crore is suggested. The rest of the outlay is proposed for implementing

other schemes including Apprenticeship Training, Advanced Vocational Training System etc. The order of priority of the schemes proposed for the Seventh Five Year Plan is given below—

1. *Consolidation and Strengthening of Facilities in the Existing I.T.Is*

(Proposed Outlay Rs. 300 lakhs)

Most of the I.T.Is started in Kerala during the Vth and VIth Five Year Plan periods have not been given permanent affiliation due to lack of permanent buildings, machinery and equipment as per the prescribed norms of NCVT. Therefore, a comprehensive programme is proposed which envisages consolidation and strengthening of the existing I.T.Is in the State by providing the necessary infrastructure including the buildings. Provision is also made under the scheme for the replacement of obsolete and out-dated machinery and equipment, procurement of additional equipment, alterations to workshop facilities and improvement of theoretical instructions in the institutes by training the staff and providing modern teaching aids. It is also proposed to introduce a few new trades in the existing I.T.Is.

2. *Updating the I.T.Is According to New Syllabi*

(Proposed Outlay Rs. 50 lakhs)

The new syllabus as revised by the Directorate of Employment and Training (Government of India) will have to be implemented in the I.T.Is during the Seventh Five Year Plan. The introduction of new syllabi will require the re-arrangement of the workshops, setting up of new machinery and equipment, improvements to the buildings etc.

The outlay proposed is for procurement of machinery, tools & equipment, making improvements to the buildings and giving orientation training to teaching staff to handle the new topics.

3. *Direction and Administration*

(Proposed Outlay Rs. 25 lakhs)

The Department of Industria Training may be reorganised and strengthened so as to implement the craftsmen

training programmes more effectively. In this connection it is suggested to decentralise the administration of the department under an Additional Director supervised by the Director of Employment and Training. It is also proposed to organise separate divisions for Training, Affiliation, Apprenticeship Training, Purchase & Maintenance, Planning etc.

All matters relating to training in I.T.Is. should be brought under the control of a Joint Director (Training). A Curriculum Development and Audio Visual Cell shall be organised under the Joint Director of Training as has been recommended by Quadir Committee and accepted by Government of India. All matters pertaining to Industrial Training Centres such as inspection and affiliation and conduct of All India Trade Tests and other examinations should be brought under the supervision of a Joint Director (Affiliation). A Joint Apprenticeship Adviser will be incharge of the entire Apprenticeship Training Programme. A law officer to advise the State Apprenticeship Adviser in matters relating to Apprentices Act and to deal with various legal matters of the department is also proposed. Transportation facility is to be provided for the affiliation, trade test and curriculum development purposes.

The purchase and maintenance wing of the Department shall be strengthened and brought under a Technical Officer of the rank of Deputy Director. The planning and preparation of development schemes under craftsmen training shall be entrusted with the planning wing Besides, the administrative matters and accounts relating to the department shall be dealt in by the Administrative Officer and Accounts Officer respectively.

The outlay proposed is for implementing the above programmes during the Seventh Five Year Plan.

k. *Starting of New Industrial Training Institutes*

(Proposed Outlay Rs. 50 lakhs)

The demand for craftsmen training is very high in our State. As a result, large number of Industrial Training Centres have been

started under private sector. Considering the need of the society for admissions in training institutions and the necessity to check the growth of I.T.I.Cs. it is imperative to start more Indlustrial Training Institutes under public sector. Therefore, the proposal is to start five I.T.Is. during the Seventh Five Year Plan. The outlay is intended for providing land, buildings, machinery & equipment, furniture and other infrastructure to the proposed I.T.Is.

5. *Starting of Women's Industrial Training Institutes*

(Proposed Outlay Rs. 50 lakhs)

In Kerala, there are only three Women's I.T.Is. As a part of encouraging employment opportunities for women, it is necessary to start more women I.T.Is. with suitable trades such as Electronics, Mechanic, Mechanic (R & TV), Draughtsman (Civil), Secretarial Practice, Stenography (English), Service & Repair of Household Appliances etc. Accordingly, it is envisaged to start three Women I.T.Is. during the Seventh Five Year Plan with a minimum of five trades in each institute.

6. *Post ITI Intensive Training Scheme*

(Proposed Outlay Rs. 25 lakhs)

The scheme envisages to give intensive training in repairing and servicing of TV and VC Rs to I T I Certificate holders in Electronics and Mechanic (R & TV). The outlay proposed is for continuance of the advanced TV Technicians course at Trivandrum and to start new centres.

Part of the outlay is intended for giving intensive practical training to I. T. I. trainees in trades like Carpentry, Plumping, Automobile Servicing, Blacksmithy, Moulder, Welder etc. so as to improve their skills and make them self employable.

7. *Trade Apprenticeship Training Scheme Under the Apprentices Act* 1961

(Proposed Outlay Rs. 25 lakhs)

Related instruction centres have been set up in eight districts to provide apprenticeship training for trade apprentices

There are no R. I. centres in Malappuram, Cannanore, Idukki, Wynad and Pathanamthitta districts. The trade apprentices in these districts are attending R. I. classes at the nearest I.T.Is. under the supervision of principlas of the I. T. Is. concerned. Therefore, separate R. I. centres have to be started in these districts.

The R. I. centres at Trivandrum and Kalamassery are over crowded with a large number of trade apprentices. As the establishments under these centres are more, the training officers find it difficult to visit all the establishments for survey and placement. Besides, appointment of regular teaching staff in the R. I. centres and introduction of R. I. classes for newly designated trades are the areas which require urgent attention.

The proposed outlay is intended for organising R. I. centres in Malappuram, Cannanore, Idukki, Wynad and Pathanamthitta districts, upgrading the R. I. centres at Trivandrum and Kalamassery, providing regular teaching staff to the R. I. centres and introducing R. I. classes for newly designated trades.

Advanced Vocational Training

(Proposed Outlay Rs. 20 lakhs)

The proposed outlay is for updating the existing courses, introducing new courses such as Induction to Engineering Technology, Refrigeration & Air Conditioning, Metrology and Engineering Inspection and providing indigenous tools and equipment, A. C. rooms and laboratories in the AVTS at Kalamassery. Part of the outlay is for meeting the expenditure for giving training to the instructors at the A.T.I. Madras and in reputed industries outside the State.

Regional Vocational Training Institute for Women

(Proposed Outlay Rs. 20 lakhs)

The Regional Vocational Training Institute for Women Kazhakuttom is established in collaboration with the Government of India, SIDA and ILO on the condition that the land and buildings for the institute will be provided by the State

Government. The provision is intended for providing land and buildings for the institute.

10. *Special Scheme for Giving C.T.I. Training to the Staff of I.T.Cs. and I.T.Is.*

(Proposed Outlay Rs. 20 lakhs)

Kerala does not have a Central Training Institute for training instructors of I.T.Is. and I.T.Cs. C.T.I. training is an obligatory training prescribed by the Government of India. Considering the large number of staff to be trained and the limited facilities available in the existing C.T.Is. and taking into account the large amount of money required for sending them to outstations, it is proposed to conduct special training courses for the staff, using the facilities available in some of the institutes in Kerala. The programme shall be undertaken on the modular pattern, with the concurrence of the NCVT and Government of India and with active co-operation of the C.T.Is.

11. *Special Component Plan—Rural I.T.I. and Intensive Training Scheme for Scheduled Castes and Scheduled Tribes*

(Proposed Outlay Rs. 10 lakhs)

Under the scheme it is proposed to start an I.T.I. for training Scheduled Castes/Scheduled Tribes in trades such as carpentry, bamboo, willow and cane work. The trainees passing out of the institute are to be given a further intensive training for one year in the actual production process by using the raw materials available in the area. The proposed outlay is for starting a Rural I.T.I. for Scheduled Castes/Scheduled Tribes.

12. *Model Industrial Training Institute*

(Proposed Outlay Rs. 10 lakhs)

The model I.T.I. scheme, sponsored by Government of India envisages to offer training in the modular pattern. It is a method intended for training of craftsmen for self-employment. At Beypore, a model I.T.I. has been started in July 1982 by Government of India. The land required for the building has

to be provided by the State Government. The outlay proposed is for providing land and temporary accommodation to the institute.

13. *Apprenticeship Training for the Products of Vocational Stream*

(Proposed Outlay Rs. 5 lakhs)

As we have already introduced vocational education at secondary level, it has become necessary to implement apprenticeship training in some specific trades of vocational courses. This programme could be implemented through the infrastructure facilities provided for implementing the trade apprenticeship training programme. The outlay is for strengthening the infrastructure facilities for introducing apprenticeshiptraining for vocational courses.

14. *Basic Training Centres for Non ITI Trades*

(Proposed Outlay Rs. 10 lakhs)

Due to lack of basic training facilities a large number of trades under the apprenticeship training scheme are unable to be implemented in the State. Therefore, it is necessary to provide basic training facilities for trades like printing, photography, leather craft, chemical, etc. In this context, it is proposed to set up three basic training centres, one each at Trivandrum, Ernakulam and Calicut during the Seventh Five Year Plan. The outlay is for providing buildings, equipment and staff required for the training centres.

15. *Strengthening of Millwrights in the ITIs*

(Proposed Outlay Rs. 5 lakhs)

A large number of costly machinery and equipment available in the ITIs are not used properly due to minor faults and breakdown. Therefore, it is proposed to strengthen the millwrights in the institutes to repair and maintain the machinery and equipment.

7.0 SUMMARY OF RECOMMENDATIONS

The Committee on Education and Employment recommends the following for the comprehensive development of Technical Education and Craftsmen Training in Kerala upto 2000 A.D.

1. In Kerala, the quantitative growth of technical institutitions is very slow. At the same time the demand for the engineering and technical courses is highly attractive. There is prospective potential of employment opportunities for technically trained personnel. Therefore, there shall be a quantitative expansion of technical institutions at degree, diploma and certificate levels. (4. 1. 1)

2. The basic infrastructure facilities in the technical institutions are inadequate. Consolidation of facilities, modernisation of laboratories, replacement of obsolete and out-dated equipment and machinery and provision for general amenities like hostels, quarters etc. are need based requirements. (4. 1. 2)

3. There shall be diversification of courses at post-graduate, degree and diploma levels by introducing new and relevant areas of technology. Courses which are not in demand should be replaced by other courses and faculty retrained for this purpose wherever necessary. (4. 1. 3)

4. Centres of excellence shall be establised in all Engineering Colleges so as to enable them to work in specialised areas which can at a later stage develop into full-fledged departments offering post-graduate courses and R&D activities. (4. 1. 4)

5. Academic autonomy and limited administrative freedom shall be granted to selected Engineering Colleges and Polytechnics in a phased manner. (4. 1. 5)

6. An Institute for Training and Technology Updating shall be organised for updating of technology and skills of the various categories of staff involved in technical education and craftsmen training. (4. 1. 6)

7. Steps shall be taken to establish an Institute for Traditional Crafts and Technology with a view to preserving and modernising traditional crafts. (4. 1. 7)

8. In order to popularise non-formal system of technical education, a Centre for Non-Institutional Technical Education shall be organised. (4. 1. 8)

9. With a view to provide adequate number of software and maintenance experts required for electronics and computer based industries, a Centre for Micro-Electronics and Computer Studies shall be set up. (4.1.9)

10. In order to supplement the severe dearth of qualified welders and to open new avenues of employment potential of the engineering graduates and diploma holders, an Institute of Welding Technology shall be started to impart post-graduate, degree and diploma levels of studies in welding. (4.1.10)

11. As the State has financial constraints to start new technical institutions, the private sector may be permitted to establish a few Engineering Colleges and Polytechnics with proper control. (4. 1. 11)

12. In order to ensure an active inter-action between the industry and institutions, the schemes like continuing education, campus interviews, sandwich type or co-operative type of education shall be implemented. Industry based elective subjects in degree/diploma courses and industry-oriented research programmes for post-graduate research and final year project works shall be introduced. Besides, the programmes such as Industrial Residencies and Industrial Liaison shall also be strengthened. (4.1.12)

13. With a view to giving a sense of direction and uniformity with built in flexibility in engineering education and avoiding the present delays in completing the courses, it is desirable to establish a Technical University for the conduct, supervision and control of engineering education. (4.1.13)

14. The pay scales and service conditions of engineering teachers, as recommended by the AICTE shall be implemented so as to attract the best talents in the country for the teaching profession in technical education. (4.11.14)

15. Support of UNDP or reputed foreign Universities shall be sought for modernisation of laboratories. A programme shall also be introduced for exchange of faculty members. (4.11.15)

16. In order to provide the missing link between the laboratory process and viable industrial projects a Science and Technology Entrepreneurship Park (STEP) shall be set up in the State. (4.11.16)

17. Efforts shall be made to establish one JTS and one PVTC in all taluks and vocational education at plus two stage shall be introduced in all the Junior Technical Schools. (4.11.17)

18. Establish sufficient number of commercial schools under public sector in order to prevent the growth of private commercial institutions with inadequate facilities. (4.11.18)

19. Start more TGMT centres under public sector. Include all the engineering trades offered at the private iinstitutions in the plus two vocational stream and thus abolish gradually the K.G.C. Examination in engineering branches. (4.11.19)

20. Upgrade the Food Craft Institute at Kalamassery into a diploma institute and start extension centres of the institute at Trichur, Kottayam and Idukki. (4.1.20)

21. Reorganise Fine Arts Education as more employment oriented and introduce post-graduate, degree and diploma courses in special areas. Consolidate the facilities in the Fine Arts College/Institutes. (4.1.21)

22. Develop the Kerala State Science and Technology Museum as a full-fledged institution and organise District Science Centres for the dissemination of scientific literacy to all sections of the society. (4.1.22)

23. The activities of the Lal Bahadur Sastri Engineering Research and Consultancy Centre should be expanded with emphasis on continuing education and undertaking project works. (4.1.23)

24. Consolidation and modernisation of facilities in the existing ITIs must have priority. New institutes are to be started only in unrepresented areas and in need based disciplines. (4.2.1)

25. As a pre-requisite in introducing the revised syllabus for industrial training, rearrange the workshops, set up new machinery and equipment, make alterations and additions to the structures in the existing institutions. (4.2.2)

26. Introduce restrictions in admissions to conventional ype of trades in the ITIs and introduce new branches in emerging areas of technology. (4.2.3)

27. Strengthen t'e prorgammes of advanced vocational raiuing and apprenticeship training. Introduce intensive raining for ITI trades and basic trainnig for non ITI trades. (4.2.4)

28. Strength the Directorate of Technical Education by stablishing regional directorates. (5.1.1)

29. The Nodal Centre in the University of Cochin attached the National Manpower Information System may be equired to collect, store, update, retrieve and analyse man power ata on technical personnal at all levels in Kerala and make tem available to the Directorate of Technical Education. (5.1.2)

30. A Construction and Maintenance Wing may be formed nder the Directorate of Technical Education in order to ndertake construction and maintenance of technical institutions. (5.1.3)

31. Bring all the certificate examinations in engineering, mmercial and craftsmen groups under the control of the partment of Technical Education. (5.1.4)

32. Reorganise and strengthen suitably the administrative up of the Department of Industrial Training. (5.2)

APPENDICES

List of Appendices

APPENDIX 1

Plan-wise Outlay and Expenditure on Technical Education (1974-75 to 1984-85)

(*Rs. lakhs*)

Name of Scheme	*V Plan* (1974-78)		*Annual Plans* (1978-80)		*VI Plan* (1980-85)		
	Outlay	*Expenditure*	*Outlay*	*Expenditure*	*Outlay*	1980-84* *Expenditure*	1984-85 *Proposed Outlay*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Direction and Administration	12.00	6.34	10.00	3.14	40.00	44.03	18.00
2. Junior Technical Schools	..	13.91	5.00	19.85	87.00	101.43	60.00
Polytechnics							
3. Government Polytechnics	56.00	25.66	20.25	12.54	110.00	93.66	40.00
4. Assistance to Private Polytechnics	4.00	2.73	3.00	0.68	10.00	7.20	4.00
Engineering Colleges							
5. Govt. Engineering Colleges	42.00	38.68	50.10	61.83	105.00	105.21	50.00

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
6. Assistance to Regional Engineering College	5.00	2.71	3.00	4.00	6.00	4.00	3.00
7. Assistance to Private Engineering Colleges	4.00	2.79	8.50	4.35	20.00	29.72	8.00
Other Institutions							
8. Food Craft Institute, Kalamassery and Other Institutions	..	3.00	4.00	3.89	20.00	15.34	8.00
9. Central Instrument Workshop	..	..	1.50	..	10.00	18.23	6.00
10. Extension Centre of TTTI.	..	3.20	3.20	..	5.00	2.11	2.00
11. Science and Technology Museum	..	1.13	..	0.03	10.00	3.54	8.00
12. College of Fine Arts	..	6.32	6.65	6.55	25.00	21.10	8.00
13. Centres of Diploma in Commercial Practice	..	2.93	3.00	2.71	15.00	17.45	5.00
14. Tailoring & Garment Making Training Centres	..	..	4.00	1.73	10.00	8.25	3.50

Other Programmes

15.	Modernisation of Laboratories	..	0.62	3.00	1.76	5.00	6.08	2.00
16.	Apprenticeship Training	..	1.09	2.00	2.69	20.00	17.92	6.00
17.	Revision of Staff Structure	..	..	4.50	..	15.00	20.54	8.00
18.	Diversification of Courses	52.50	13.66	11.10	12.62	40.00	70.05	18.00
19.	Matching Grant for Central Schemes	..	..	8.00	2.80	15.00	11.33	3.00
20.	Construction of Staff-Quarters	..	..	1.00	..	10.00	7.34	5.00
21.	Faculty Development	41.00	27.41	17.10	15.73	45.00	48.41	12.00
22.	Special Component Plan	..	..	..	..	10.00	10.74	6.00
23.	Tribal Sub Plan	..	..	..	..	..	0.21	0.50
24.	Schemes Deleted/Modified	19.50	8.89	27.60	13.97	67.00	67.02	..
	Total	236.00	161.07	197.00	171.19	700.00	732.91	284.00

*Inclusive of the anticipated expenditure for 1983-84.

APPENDIX 2

District-wise Number of Technical Institutions in Kerala—1983

	Trivandrum (25.96)	*Quilon* (28.14)	*Alleppey* (23.50)	*Kottayam* (16.97)	*Idukki* (9.72)	*Ernakulam* (25.35)	*Trichur* (24.39)	*Palghat* (20.44)	*Malappuram* (24.02)	*Calicut* (22.45)	*Wynad* (5.56)	*Cannanore* (28.03)	*Total* (254.54)	*Remarks*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Engineering Colleges	1	1				1	1	1		1			6	
Polytechnics	1	1	2	1	1	2	3	1	1	2	1	2	18	Including 2 newly started
Women's Polytechnics	1					1	2			1			4	Including 1 newly started
Institute of Printing Technology								1					1	
Food Craft Institute & Extension Centres	1					1				1			3	
College of Fine Arts	1												1	
Institute of Fine Arts			1				1						2	
Commercial Institutes	2		1		1	1		1		1	1		8	
Junior Technical Schools	3	3	2	3	2	2	4	3	2	3	2	5	34	Including 9 newly sanctioned
Pre-Vocational Training Centres	2	2	2	2	—	1	3	2	1	1	..	3	19	

Government Industrial Schools	..	..	..	..	..	..	2	..	..	..	..	..	2	
Vocational Training Centres	5	..	..	..	..	..	..	..	..	..	..	..	5	
Tailoring Training Centres	6	..	1	..	..	..	..	..	..	..	..	..	7	
T.G.M.T. Centres	1	2	..	2	4	3	3	3	5	3	2	3	31	Including 7 newly sanctioned
Tailoring Trade Schools	..	..	1	..	1	..	..	..	..	..	..	..	2	
Technical Teachers Training Extension Centre	..	..	..	..	..	..	..	1	..	..	..	..	1	
Total	24	9	10	8	9	13	17	12	10	12	7	13	144	

Note:— Population of each district is given within bracket (in lakhs)

APPENDIX 3

Facilities Available for Technical Education in Southern Region

State	Number of Institutions	Intake
(1)	(2)	(3)
A. *Post Graduate Course*		
Andhra Pradesh	10	514
Karnataka	7	380
Kerala	3	112
Tamil Nadu	13	903
B. *Degree Course*		
Andhra Pradesh	24	4357
Karnataka	46	10554
Kerala	6	2165
Tamil Nadu	18	4317
C. *Diploma Course*		
Andhra Pradesh	41	5209
Karnataka	46	5901
Kerala	19	2987
Tamil Nadu	57	10109
Pondicherry	1	180
D. *Women's Polytechnic*		
Andhra Pradesh	7	894
Karnataka	4	510
Kerala	4	345
Tamil Nadu	9	1184
E. *Junior Technical School*		
Andhra Pradesh	12	723
Karnataka	6	360
Kerala	34	1980

APPENDIX 4

Population, Density, Literacy and No. of Engineering Colleges and Polytechnics in India—1981

	States/Union Territories	*Population (in lakhs)*	*Density (No.)*	*Literacy (%)*	*No. of Engineering Colleges*	*No. of Polytechnics*	*No. of Women's Polytechnics*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.	Andhra Pradesh	535.00	195	29.9	11	19	3
2.	Assam	193.97	254		3	6	1
3.	Bihar	699.15	402	26.01	7	14	1
4.	Gujarat	340.86	174	48.75	8	20	2
5.	Hariyana	129.23	292	35.84	2	8	1
6.	Himachal Pradesh	42.81	77	41.91	..	..	..
7.	Jammu & Kashmir	59.87	59	26.17	1	2	..
8.	Karnataka	371.36	194	38.41	14	25	3
9.	Kerala	254.54	655	70.42	6	19	4
10.	Madhya Pradesh	521.79	118	27.82	10	22	1
11.	Maharashtra	627.84	204	47.37	16	32	1
12.	Manipur	14.21	64	41.99	..	1	..
13.	Megalaya	13.36	60	33.22	..	1	..
14.	Nagaland	7.75	47	41.99	..	1	..
15.	Orissa	263.70	169	34.12	2	5	1

(1)	(2)	(3)	(4)	(5)	(6)	(7)
16. Punjab	167.89	333	40.74	2	12	1
17. Rajasthan	342.62	100	24.05	5	6	..
18. Sikkim	3.16	45	33.83	..	..	..
19. Tamil Nadu	484.08	372	45.78	14	43	7
20. Tripura	20.53	196	41.58	1	1	..
21. Uttar Pradesh	1108.62	377	27.38	13	42	3
22. West Bengal	545.81	615	40.88	12	26	1
Union Territories						
1. Delhi	62.20	4194	61.06	5	5	1
2. Goa, Daman & Due	18.87	285	55.86	2	2	..
3. Arunachal Pradesh	6.32	8	20.00	..	..	..
4. Pondicherry	6.04	1229	54.23	..	1	..
5. Mizoram	4.94	23	59.50	..	..	..
6. Chandigarh	4.52	3961	64.68	4	1	1
7. Andaman & Nicobar Island	1.89	23	25.27	..	..	..
8. Dadra and Nagar Haveli	1.04	211	28.60	..	..	..
9. Lakshadeep	0.40	1258	54.72	..	..	..

APPENDIX 5

Facilities for Academic Courses in Kerala (1983-84)

1. Engineering Colleges

A. *Post Graduate Courses*		*Institutions*	*Intake*
1. Civil Engineering			
1. Structural Engineering	..	Engineering College, Trivandum	(6)
	..	Regional Engineering College, Calicut	(10)
2. Hydraulics	..	Engineering College, Trivandrum	(4)
3. Soil Mechanics	..	Engineering College, Trivandrum	(6)
4 Public Health Engineering	..	Engineering College, Trivandrum	(4)
5. Transport and Traffic Engineering	..	Engineering College, Trivandrum	(4)
2. Mechanical Engineering.			
1. Heat Power Engineering		Engineering College, Trivandrum	(4)
2. Machine Design		Engineering College, Trivandrum	(4)
3. Production Engineering	..	Engineering College, Trichur	(6)
4. Refrigeration and Airconditioning		Regional Engineering College, Calicut	(10)
5. Propulsion Engineering		Engineering College, Trivandrum	(4)
3. Electrical Engineering.			
1. Power System	..	Engineering College, Trivandrum	(6)
2. Machine Design	..	Engineering College, Trivandrum	(4)

3.	Control System ..	Engineering College, Trivandrum	(4)
		Engineering College, Trichur	(6)
		Regional Engineering College, Calicut	(10)
4.	Navigational and Guidance Control ..	Engineering College, Trivandrum	(4)

4. Electronics and Tele-Communication.

1.	Micro-Wave Engineering ..	College of Engineering, Trivandrum	(6)
2.	Applied Electronics ..	College of Engineering, Trivandrum	(4)

5. Chemical Engineering

	Process Control ..	Engineering College, Trichur	(6)

B. *Under Graduate Courses*

		Intake	*Institution*
1.	Civil Engineering	565	All Six Engineering Colleges
2.	Mechanical Engineering	570	do.
3.	Electrical Engineering	495	do.
4.	Electronics	115	Engineering College, Trivandrum (50), T.K.M. Colle of Engineering (35) a Engineering College, Trichur (3
5.	Architecture	30	Engineering College, Trivandrum
6.	Chemical Engineering	70	Engineering College, Trichur (50), T. K. M. College Engineering (20)
7.	Production-cum-Plant Engineering	25	Engineering College, Trichur
8.	Instrumentation and Control System	20	N.S.S. College of Engineeri Palghat

9.	production Engineering	20	T.K.M. College of Engineering, Quilon
10.	Applied Electronics and Instrumentation	20	College of Engineering, Trivandrum
11.	Industrial Engineering	15	do.
12.	Electrical Communication	15	Engineering College, Trichur
C.	*Part Time Degree Course*		
1.	Civil Engineering	55	Engineering College, Trivandrum (20) Engineering College, Trichur (20) T.K.M. College of Engineering (15)
2.	Mechanical	55	do.
3.	Electrical	55	do.
4.	Electronics	20	Engineering College, Trivandrum
5.	Chemical Engineering	20	Engineering College, Trichur

II. College of Fine Arts

Degree Courses in Fine Arts

1.	Painting	30	College of Fine Arts, Trivandrum
2.	Sculpture		
3.	Applied Art		

III. Polytechnics

A. *Post-Diploma Course*

1.	Industrial Electronics	10	Central Polytechnic, Trivandrum
2.	Air Conditioning and Refrigeration	10	Government Polytechnic, Kalamassery
3.	Foundry	10	M.T.I., Trichur
4.	Television Engineering	10	Central Polytechnic, Trivandrum

B. *Diplomo Courses*

1.	Civil	789	All Polytechnics except Palghat
2.	Machanical	797	All Polytechnics
3.	Electrical	726	All Polytechnics except Palgha and Kanhangad.
4.	Automobile	75	Polytechnic Kalamassery an Kanhangad
5.	Chemical	60	Polytechnics Kalamassery an Calicut.
6.	Textile Technology	60	Central Polytechnic, Triwandrui and Government Polytechnic Cannanore.
7.	Electronics	175	Central Polytechnic, Trivandrum Government Polytechnic, Palgha S. S. M. Polytechnic, Tirui Womens Polytechnic, Trichur Calicut and Ernakulam.
8.	Polymer Technology	10	Government Polytechnic, Kotta yam.
9.	Printing Technology	60	Institute of Printng Technology Shoranur.
10.	Instrument Technology	30	Womens Polytechnic, Trivandrur and Government Polytechnic, Pal ghat.
11.	Commercial Practice	189	Womens Polytechnic, Trivandrum Trichur, Calicut. Ernakulam an Government Polytechnic Kottayam
12.	Costume Design and Dress Making	90	Womens Polytechnic, Trivandrum Trichur and Calicut.
13.	Wood Technology	10	Government Polytechnic, Cann nore.
14.	Tool and Die Engineering	15	Kerala Government Polytechni Calicut.

.	*Part time Diploma Course*		
1.	Civil	72	Central Polytechnic, Trivandrum. Government Polytechnic, Kalamassery, M. T. I., Trichur and Government Polytechnic, Calicut.
2.	Mechanical	72	do.
3.	Electrical	72	do.
4.	Textile Technology	15	Central Polytechnic, Trivandrum.
).	*Certificate course in Textile Technology*	60	Central Polytechnic, Trivandrum and Government Polytechnic, Cannanore.
.	*Craft Course in Polytechnic*		
1.	Rattan & Basket Making		
2.	Lacquer Work	36	Central Polytechnic, Trivandrum.
3.	Carpet and Durrie Weaving		
V.	**Fine arts Institutions**		
	Post Diploma		
	Modelling, Scrulpture, Drawing and Painting		
	Diploma		
	Drawing and Painting Modelling	60	Ravi Varma Institute of Fine Arts, Mavelikara & Institute of Fine Arts Trichur.
	Certificate Course		
	Drawing and Painting Modelling and Scrulpture		
'.	**Food Craft Institute**		
..	*Certificate Course*		
1.	Craftsmanship in Cookery	40	Food Craft Institute and Extension Centre, Calicut and Trivandrum
2.	Craftsmanship in Bakery and Confectionery	15	Food Craft Institute, Kalamassery.
3.	Canning and Food Preservation-Craftsmanship	15	do.

4.	Hotel Receiption and Book-keeping Craftsmanship	40	Food Craft Institute, Kalamassery and Extension Centre, Calicut and Trivandrum
5.	Restaurant and Counter Service	40	Food Craft Institute Kalamassery and Extension Centre, Calicut and Trivandrum.
B.	*Short-term Course*		
1.	Cookery	40	Food Craft Institute, Kalamassery and Extension Centre, Calicut.
2.	Backery and Confectionery	20	Food Craft Institute, Kalamassery
3.	Canning and Food Preservation	10	do.

VI. Commercial Institutions

Part-time Diploma

Diploma in Shorthand and Typewriting	30	Institute of Part-time Diploma Course in Type-writing and Shorthand, Trivandrum.

Certificate Course

Certificate course (K. G. T. E.)	60	All Commercial Institutes

VII. Short term (one year) Technical Course of Post S.S.L.C. level in Polytechnics & Junior Technical Schools.

1.	Building Technology	30	Government Polytechnic, Calicut.
2.	Maintenance Technology	30	J. T. S., Manjeri.
3.	Welding Technology	30	J. T. S. Nedumangad.
4.	Refrigeration and Air Conditioning	30	J. T. S., Shertallai.
5.	High Way Engineering	30	Government Polytechnic, Perinthalmanna.
6.	Public Health Engineering	30	Government Polytechnic, Kottayam.
7.	Furniture Technology	30	J. T. S., Cannanore.
8.	Surface Furnishing Technology	30	J. T. S., Badagara.
9.	Tailoring and Garment Making	30	J. T. S., Mattannur.

VIII. Tailoring and Garment Making Centres/Schools/ Vocational Training Centres

	Two year Course	*Intake*	*Institutions*
1.	Book Binding	60	Book Binding Centres, Palkulangara and Kulathur.
2.	Rattan	15	Rattan Training Centre, Paraniyam.
3.	Composing and Printing	30	Composing and Printing Centre, Vattiyoorkavu.
4.	Weaving	15	Weaving Training Centre, Aralumood.
5.	Tailoring and Embroidery	40	Government Industrial Schools, Irinjalakuda and Wadakkanchery.

One Year Course

Tailoring and Garment Making	20 for each division	All Tailoring and Garment Making Training Centres, Tailoring Trade Schools and Tailoring Training Centres.

IX. Junior Technical Schools

	Trades for Specialisation	*Institutions*
1.	Turning	In all J.T.S.
2.	Fitting	
3.	Welding	
4.	Black Smithy	
5	Pattern Making	
6.	Sheet Metal	
7.	Foundry	
8.	Automobile/Motor (Vehicle) Mechanic	J.T.S. Palghat, J.T.S. Manjeri, J.T.S. Kuttipuram, J.T.S. Badagara, J.T.S. Sultan Battery.
9	Candle, Soaps and Detergent	J.T.S. Calicut.
10.	Agriculture	J.T.S. Kodungallur, J.T.S. Chittur.

11.	Electroplating	J.T.S. Nedumangad J.T.S. Shornur.
12.	Horology	J.T.S. Adoor.
13.	Fisheries	J.T.S. Ezhutone.
14.	Mechanic in Typewriting and Sewing Machine	J.T.S. Perumbavoor
15.	Weaving	J.T.S. Cannanore
16.	Electronics	J.T.S. Palai, J.T.S. Palghat, J.T.S. Sultan Battery, J.T.S. Cheruvathur.
17.	Composing, Proof Reading and Book Binding	J.T.S. Kunnamkulam.
18.	Building Technology	J.T.S. Trichur.
19.	Cabinet Making	J.T.S. Mattannur
20.	Rubber Technology	J.T.S. Pampady.
21.	Plumbing	J.T.S. Krishnapuram.
22.	Air Conditioning and Refrigeration	J.T.S. Sherthallai, J.T.S. Idukki, J.T.S. Sultan Battery.
23.	Surface Finishing and Painting	J.T.S. Koratty, J.T.S. Palghat
24.	Electrical Wiring and Motor Winding	J.T.S. Attingal.
25.	Timber Technology	J.T.S. Kuttipuram, J.T.S. Idukki
26.	Canning and Cookery	J.T.S. Idukki J.T.S. Palgha, J.T.S. Sultan Battery.
27.	Construction Technology	J.T.S. Kuttipuram
28.	Sanitary Engineering	J.T.S. Kuttipuram
29.	Maintenance of Domestic Appliances	J.T.S. Kuttipuram.
30.	Electrical Maintenance and Repairing	J.T.S. Trichur.
31.	Mechanic (Agriculture Machinery)	J.T.S. Palgha.

X. Pre-Vocational Training Centre*

1.	Smithy	P.V.T.C. Attingal, P.V.T.C. Manjeri.
2.	Foundry	P.V.T.C. Attingal, P.V.T.C. Manjeri.
3..	Sheet Metal	P.V.T.C. Attingal and Manjeri.
4..	Welding	P.V.T.C. Attingal and Manjeri.
5..	Carpentry	P.V.T.C. Attingal and Manjeri
6..	Fitting	P.V.T.C. Attingal and Manjeri
7.	Machine Shop	P.V.T.C. Attingal.
8.	Elementary Training Based on Agriculture	P.V.T.C. Kodungallur.
9..	Tailoring and Embroidery (Girls)	P.V.T.C. Manjeri (for Girls)
10..	Home Science and Needle Crafts	P.V.T.C. Cannanore (only for Girls)
11.	Agriculture	P.V.T.C. Nedumangad, Chittur (only for Girls) and Cheruvathur.
12..	Cabinet Making	P.V.T.C. Mattannur.
13.	Book Binding and Composing	P.V.T.C. Kunnamkulam.
14..	Painting, Varnishing and Surface Polishing	P.V.T.C. Koratty (only for Girls)
15..	Rubber Products	P.V.T.C. Pampady and Palai.
16..	Coir Technology	P.V.T.C. Krishnapuram and Shertallai.
17..	Fisheries	P.V.T.C. Ezhukone.
18..	Fitting and Welding	P.V.T.C. Shoranur, Ezhukone.
19..	Poultry	P.V.T.C. Adoor
20..	Automobile	P.V.T.C. Badagara.

*Attached to the Junior Technical Schools concerned.

XI. Vocational Course at +2 level in Junior Technical Schools

1.	Electrical and Electronics, Domestic Appliances	J.T.S. Cheruvathur, Attingal and Badagara.
2.	Farm Mechanic and Post Harvest Technology	J.T.S. Cheruvathur and Kodungallur.
3.	Automobile Maintenance and Servicing Technology	J.T.S. Manjeri and Badagara.
4.	Timber Products	J.T.S. Manjeri
5.	Draughtsmanship and Quantity Surveying	J.T.S. Shoranur and Attingal.
6.	Foundry Technology	J.T.S. Shoranur
7.	Building Technology	J.T.S. Kodungallur and Adoor.
8.	Rubber Technology	J.T.S. Pampady
9.	Composing and Printing	J.T.S. Pampady.
10.	Ceramic Technology	J.T.S. Adoor.

APPENDIX 6

Intake, Enrolment and Out-turn in Engineering Colleges in Kerala (1962-63 to 1979-80)

Year	*No. of Institutions*	*Intake*			*Out-turn*
		Sanctioned	*Actual*	*Enrolment*	
(1)	(2)	(3)	(4)	(5)	(6)
1962-63	6	..	779	3072	377
1963-64	6	970	980	3530	323
1964-65	6	1050	966	3708	434
1965-66	6	..	..	4279	638
1966-67	6	1075	911	4355	605
1967-68	6	1130	918	4234	654
1968-69	6	728	634	4127	646
1969-70	6	875	817	..	1553
1970-71	6	836	716	3307	602
1971-72	6	836	642	2978	552
1972-73	6	872	838	2863	527
1973-74	6	967	976	3037	544
1974-75	6	1022	943	3534	414
1975-76	6	1027	991	3764	779
1976-77	6	1113	1022	4060	670
1977-78	6	1202	1207	4080	843
1978-79	6	1242	1253	4519	917
1979-80	6	1401	1456	5317	..

APPENDIX 7

Intake, Enrolment and Out-turn in Polytechnics in Kerala (1962-63 to 1979-80)

Year	No. of Institutions	Intake		Enrolment	Out-turn
		Sanctioned	Actual		
(1)	(2)	(3)	(4)	(5)	(6)
1962-63	15	2024	1996	4350	937
1963-64	16	2348	2129	5029	818
1964-65	16	2128	2232	5137	1083
1965-66	16	..	..	6207	1312
1966-67	17	2661	2516	5646	1434
1967-68	18	2691	2553	6633	1431
1968-69	18	2061	2101	6019	1168
1969-70	18	1968	1921	..	1425
1970-71	18	2310	2183	5498	713
1971-72	18	2328	2225	5118	759
1972-73	18	2341	2259	5164	584
1973-74	18	2375	2345	5398	523
1974-75	18	2423	2336	5893	327
1975-76	18	2751	2765	6430	795
1976-77	18	2517	2457	7074	997
1977-78	18	2695	2650	6805	1153
1978-79	18	2918	2777	6824	1173
1979-80	18	2941	2892	8704	

APPENDIX 8

Intake, Enrolment and Out-turn in Junior Technical Schools in Kerala 1962-63 to 1979-80

Year	No. of Institutions	Intake		Enrolment	Out-turn
		Sanctioned	Actual		
(1)	(2)	(3)	(4)	(5)	(6)
1962-63	17	1020	1022	2132	238
1963-64	20	1200	1055	2677	347
1964-65	20	1200	594	2250	451
1965-66	20	..	..	2390	..
1966-67	20	1200	1162	2422	263
1967-68	20	1200	1151	2852	212
1968-69	21	1260	1152	3111	369
1969-70	21	..	1089	..	483
1970-71	21	1230	1010	2971	302
1971-72	21	1230	1071	3078	268
1972-73	21	1230	1135	3091	195
1973-74	21	1230	1124	3289	314
1974-75	21	1230	1172	3389	463
1975-76	21	1230	1140	3382	391
1976-77	21	1230	1148	3484	504
1977-78	21	1230	1160	3496	545
1978-79	21	1390	1291	3713	678
1979-80	21	1380	1349	3854	659

APPENDIX 9

Sanctioned Intake of Undergraduate and Post Graduate Courses in Engineering Colleges in Kerala —1983-84

Name of Institution	*Branches*												
	Civil	*Mechanical*	*Electrical*	*Architecture*	*Electronics & Communication*	*Chemical*	*Production-cum-Plant Engineering*	*Instrumentation & Control System*	*Production Engineering*	*Applied Electronics & Instr.*	*Industrial Engg.*	*Electrical Communication*	*Total*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
A. *Degree Course—Full Time*													
1. Engineering College, Trivandrum	135	120	90	30	50	..	..	..	..	20	15	..	460
2. Engineering College, Trichur	90	90	75	..	..	50	25	..	..	..	..	15	345
3. T.K.M. College of Engineering, Quilon	90	90	90	..	35	20	..	..	20	..	..	..	345
4. M.A. College of Engineering, Kothamangalam	90	90	90	..	..	..	..	..	..	..	..	..	270
5. N.S.S. College of Engineering, Palghat	90	90	90	..	..	..	..	20	..	..	..	..	290
Total	495	480	435	30	85	70	25	20	20	20	15	15	1710
6. R.E.C. Calicut	70	90	60	.	30	..	..	..	..	..	..	..	250
Total (A)	565	570	495	30	115	70	25	20	20	20	15	15	1960

B. *Degree Course—Part Time*

1. Engineering College, Trivandrum	20	20	20	..	20	—	—	..	..	..	..	..	80
2. Engineering College, Trichur	20	20	20	..	..	20	—	..	..	..	..	..	80
3. T.K.M. College of Engineering, Quilon	15	15	15	..	..	..	..	..	..	..	..	..	45
Total (B)	55	55	55	..	20	20	..	..	..	..	..	..	205

C. *Post Graduate Course*

1. Engineering College, Trivandrum	24	12	18	..	10	—	—	—	—	..	..	..	64
2. Engineering College, Trichur	..	6	6	..	—	6	—	—	—	..	..	..	18
3. R.E.C. Calicut	10	10	10	..	..	..	..	..	..	..	..	..	30
Total (C)	34	28	34	..	10	6	..	..	..	..	..	..	112

APPENDIX 10

Sanctioned Intake of Diploma Courses (Full Time & Part Time) in Polytechnics in Kerala (1983-84)

Name of Institution	*Branches*														
	Civil	*Mechanical*	*Electrical*	*Electronics*	*Automobile*	*Wood Technology*	*Textile Technology*	*Polymer Technology*	*Instrument Technology*	*Chemical*	*Tool & Die Engineering*	*D.C.P.*	*Printing Technology*	*C.D.& D.M.*	*Total*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
A. *Diploma Courses—Full time*															
1. Central Polytechnic, Trivandrum	50	50	50	40	..	..	30	..	..	..	..	..	..	..	220
2. Government Polytechnic, Kottayam	32	32	32	..	..	..	..	10	..	..	..	24	..	..	130
3. Government Polytechnic, Kalamasserry	53	53	52	..	40	..	..	..	..	30	..	..	..	..	228
4. S. R. Polytechnic, Valappad	43	43	42	—	..	..	..	..	..	..	..	..	..	..	128
5. M.T.I. Trichur	50	43	50	—	—	..	..	..	..	—	..	—	..	..	143
6. Government Polytechnic, Perinthalmanna	32	32	32	—	—	..	—	..	..	—	..	—	..	..	96
7. Government Polytechnic, Calicut	83	83	82	—	—	—	—	..	..	30	15	—	..	..	293
8. Government Polytechnic, Cannanore	50	50	50	..	..	10	30	..	..	..	..	..	..	..	190

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
9.	Government Polytechnic, Palghat	..	25	..	15	..	..	..	..	15	..	..	..	..	..	55
10.	Government Polytechnic, Muttom	15	15	15	..	..	..	..	..	..	..	..	..	..	..	45
11.	Government Polytechnic, Wynad	15	15	15	..	..	..	..	..	..	..	..	..	..	..	45
12.	Government Polytechnic, Kothamangalam	20	20	..	15	..	..	..	..	..	..	..	..	..	..	55
13.	Institute of Printing Technology, Shoranur	..	..	..	..	..	..	..	..	..	..	..	..	60	..	60
14.	S.N. Polytechnic, Kottiyam	66	66	66	..	..	..	..	..	..	..	..	..	..	..	198
15.	Carmel Polytechnic, Alleppey	60	60	60	..	..	..	..	..	..	..	..	..	..	..	180
16.	N.S.S. Polytechnic, Pandalam	80	60	60	..	..	..	..	..	..	..	..	..	..	..	200
17.	Thiagarajar Polytechnic, Alagappa Nagar	45	45	45	45	..	..	..	..	..	..	..	..	..	..	180
18.	S.S.M. Polytechnic, Tirur	45	45	45	45	..	..	..	..	..	..	..	..	..	..	180
19.	S.N. Polytechnic, Kanhangad	30	50	..	..	35	..	..	..	..	..	..	..	..	..	115
	Total (1)	764	782	711	100	75	10	60	10	15	60	15	24	60	..	2741

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
20. Women's Polytechnic, Trivandrum	..	..	..	..	..	..	..	..	15	..	..	50	..	30	95
21. Women's Polytechnic, Trichur	..	..	..	45	..	..	..	..	..	..	..	50	..	30	125
22. Women's Polytechnic, Calicut	..	..	..	15	..	..	.	..	..	..	..	50	..	30	95
23. Women's Polytechnic, Ernakulam	..	..	..	15	..	..	..	..	..	..	..	15	..	..	30
Total Women's Polytechnics (2)	..	..	..	75	..	..	..	..	15	..	..	165	..	90	345
Total (A) (1+2)	764	782	711	175	75	10	60	10	30	60	15	189	60	90	3186
B. *Diploma Courses—Part time*															
1. Central Polytechnic, Trivandrum	24	24	24	..	..	..	..	..	..	..	..	..	..	..	72
2. Government Polytechnic, Kalamasserry	16	16	16	..	..	..	..	..	..	..	..	..	..	..	48
3. M.T.I., Trichur	16	16	16	..	..	..	..	..	..	..	..	..	..	..	48
4. Government Polytechnic, Calicut	16	16	16	..	..	..	..	..	..	..	..	..	..	..	48
Total (B)	72	72	72	..	..	..	..	..	..	..	..	..	..	..	216

APPENDIX 11.

Seventh Five Year Plan Proposals for Technical Education Financial Outlay (1985-90)

Name of Scheme	*Outlay Proposed (Rs. lakhs)*
(1)	(2)
I. *Starting of New Institutions*	
1. Starting of New Engineering Colleges	500.00
2. Starting of New Polytechnics	120.00
3. Starting of Women's Polytechnics	50.00
4. Starting of New Junior Technical Schools	50.00
II. *Input to Existing Institutions*	
5. Government Engineering Colleges	200.00
6. Private Engineering Colleges	60.00
7. Regional Engineering College	30.00
8. Government Polytechnics	240.00
9. Private Polytechnics	45.00
10. Junior Technical Schools	75.00
11. Pre-Vocational Training Centres	5.00
12. Vocationalisation of Post Secondary Education	20.00
13. Commercial Institutes	15.00
14. Vocational Institutes and TCMT Centres	10.00
15. Food Craft Institutes	20.00
16. College of Fine Arts and Institutes of Fine Arts	60.00
17. Diversification of Courses	80.00
18. Centres of Excellence	100.00
19. Kerala State Science and Technology Museum	200.00
20. Revision of Staff Structure	10.00
21. Lal Bahadur Sastri Engineering Research and Consultancy Centre	10.00

(1)		(2)
III.	*Direction and Administration*	
22.	Strengthening the Directorate of Technical Education	50.00
23.	Strengthening the Technical Examination Wing	25.00
IV.	*Starting of Special Institutions/Centres*	
24.	Institute for Staff Training and Technology Up-dating	20.00
25.	Institute for Traditional Crafts and Technology	25.00
26.	Institute for Micro-Electronics and Computer Studies	35.00
27.	Centre for Non-Formal Technical Education	10.00
V.	*Other Programmes*	
28.	Part-time Degree/Diploma Courses	10.00
29.	Apprenticeship Training Programme	10.00
30.	Community Extension Centres	10.00
31.	Production of Text Books and Teaching Aids	10.00
32.	Merit Promotion Scheme for Faculty	10.00
33.	Faculty Development Programme	40.00
34.	Starting of Construction and Maintenance Wing	10.00
35.	Youth Training Centres	5.00
36.	Extension Centre of T. T. T. I.	15.00
	Total	2225.00

APPENDIX 12

Outlay and Expenditure on Craftsmen Training (1974-75 to 1984-85)

(Rs. in lakhs)

Scheme	*Vth Plan* (1974-78)		*Annual Plans* (1978-80)		*VIth Plan* (1980-85)		
	Outlay	*Expenditure*	*Outlay*	*Expenditure*	*Outlay*	*Expenditure* 1980-84*	1984-85 Proposals
1. Strengthening of the Directorate of Training including Orientation Training	2.00	1.32	2.00	1.80	12.00	14.99	7.00
2. Strengthening of ITIs including Diversification of Trade and Advance Courses (Post ITI) & Opening of New ITIs	73.00	48.24	34.60	56.07	126.00	136.93	80 00
3. R. V. T. I. for Women — State Share	..	2.00	5.00	2.18	5.00	6.00	8.00
4. National Apprenticeship Training Scheme	30.00	19.66	12.00	12.11	15.00	12.76	8.00
5. Advanced Vocational Training Scheme— State Share	19.00	4.00	7.00	9.30	13.00	13.79	8.00
6. Model ITI—State Share	..	..	..	..	..	3.00	4.00
7. Special Component Plan—Training for SCs/STs	..	0.50	2.00	3.29	5.00	3.53	2.00
8. Construction of Staff Quarters	..	..	1.40	2.40	..	..	..
Total	124.06	75.72	64.00	87.15	176.00	191.00	117.00

*Include the anticipated expenditure for 1983-84.

APPENDIX 13

Intake, Enrolment and Out-turn in ITIs
1961-62 to 1981-82

Year	*Intake*	*Enrolment*	*Out-turn*
1961-62	2674	2664	2032
1962-63	..	..	..
1963-64	2496	3969	1318
1964-65	2742	5134	1402
1965-66	2810	4996	2449
1966-67	3980	6127	2427
1967-68	4596	6604	3500
1968-69	4985	6654	3641
1969-70	3723	6236	2816
1970-71	4399	6246	2957
1971-72	4640	6620	2498
1972-73	5371	7016	3495
1973-74	4876	7048	3431
1974-75	5515	7048	3576
1975-76	5697	7272	3361
1976-77	5496	7492	4411
1977-78	5459	7968	3334
1978-79	6075	8634	3833
1979-80	5464	8652	3461
1980-81	..	8652	..
1981-82	..	9040	..

APPENDIX 14

District-wise Number of ITIs, Women ITIs and ITCs in Kerala (1983)

Sl. No.	*Districts*	*Number of Institutions*			
		ITIs	*Women ITIs*	*ITCs*	*Total*
1.	Trivandrum	3	1	29	33
2.	Quilon	1	1	22	24
3.	Pathanamthitta	1	..	20	21
4.	Alleppey	1	..	30	31
5.	Kottayam	2	..	17	19
6.	Idukki	1	..	8	9
7.	Ernakulam	1	..	29	30
8.	Palghat	1	..	3	4
9.	Trichur	2	..	19	21
10.	Malappuram	1	..	5	6
11.	Wynad	1		2	3
12.	Kozhikode	1	1	13	15
13.	Cannanore	2	..	9	11
	Total	18	3	206	227

APPENDIX 15

District-wise Distribution of Seat Strength in the ITIs, Women ITIs and ITCs in Kerala (1983)

Sl. No.	*Districts*	*Number of Seats*			
		ITIs	*Women ITIs*	*ITCs*	*Total*
1.	Trivandrum	2472	224	3524	6220
2.	Quilon	728	128	4716	5572
3.	Pathanamthitta	96	..	3256	3352
4.	Alleppey	760	..	4896	5656
5.	Kottayam	896	..	3240	4136
6.	Idukki	148	..	572	720
7.	Ernakulam	716	..	4579	5295
8.	Palghat	696	..	272	968
9.	Trichur	868	..	2312	3180
10.	Malappuram	220	..	432	652
11.	Wynad	48	..	160	208
12.	Kozhikode	624	192	1224	2040
13	Cannanore	840	..	768	1608
	Total	9112	544	29951	39607

APPENDIX 16

Sanctioned Intake of ITI s for One Year Course (August 1983

Institutions/ Trade	*Black Smith*	*Carpenter*	*Mech. (Diesel)*	*Mech. (Tractor)*	*Moulder*	*Painter*	*Plumber*	*Sheet Metal Worker*	*Welder*	*Dress Making*	*Secretarial Practice*	*Stenography (E)*	*Stenography (H)*	*Upholstry*	*TOTAL*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1. Dhanuvachapuram	32	48	32	..	32	..	32	48	72	..	..	..	..	..	296
2. Trivandrum	32	64	32	..	32	..	32	48	96	..	..	..	..	..	336
3. Womer ITI, Kazhakuttom	..	..	..	..	..	..	..	..	..	32	32	32	16	..	112
4. Attingal	32	32	..	..	..	..	32	32	48	..	..	32	..	..	208
5. Quilon	32	32	16	..	32	16	32	16	48	..	..	..	..	..	224
6. Women ITI Quilon	..	..	..	..	..	..	..	..	..	16	16	16	..	..	48
7. Pathanamthitta	..	..	..	..	..	..	..	..	..	..	..	16	..	..	16
8. Chenganoor	32	32	..	32	16	..	32	16	72	..	..	16	..	.	248
9. Kattapnana	16	..	..	..	..	..	..	..	24	..	..	32	..	..	72
10. Ettumanoor	32	32	..	..	16	..	32	16	72	..	..	16	..	16	232

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
11. Pallikathodu	..	..	..	..	..	16	16	..	..	..	..	16	..	..	48
12. Kalamasserry	32	32	..	..	32	16	16	32	48	..	..	16	..	..	224
13. Chalakudy	32	32	..	..	32	..	32	16	60	..	..	16	..	..	220
14. Mala	..	..	..	..	..	..	16	..	..	..	..	16	..	..	32
15. Palghat	16	16	..	32	16	..	..	16	48	..	..	32	..	..	176
16. Malappuram	16	..	..	..	..	..	..	..	12	..	..	16	..	..	44
17. Women ITI, Kozhikode	..	..	..	..	..	..	..	..	..	16	16	16	16	..	64
18. Kalpetta	..	..	..	..	..	..	16	..	..	..	..	..	..	..	16
19. Calicut	16	32	32	..	..	..	32	16	48	..	..	32	..	..	208
20. Cannanore	16	32	..	..	16	..	16	16	48	..	..	16	..	..	160
21. Kasargode	..	..	..	..	..	..	..	..	..	..	..	16	..	..	16
Total	336	384	112	64	224	48	336	272	696	64	64	336	32	16	3000

APPENDIX T/

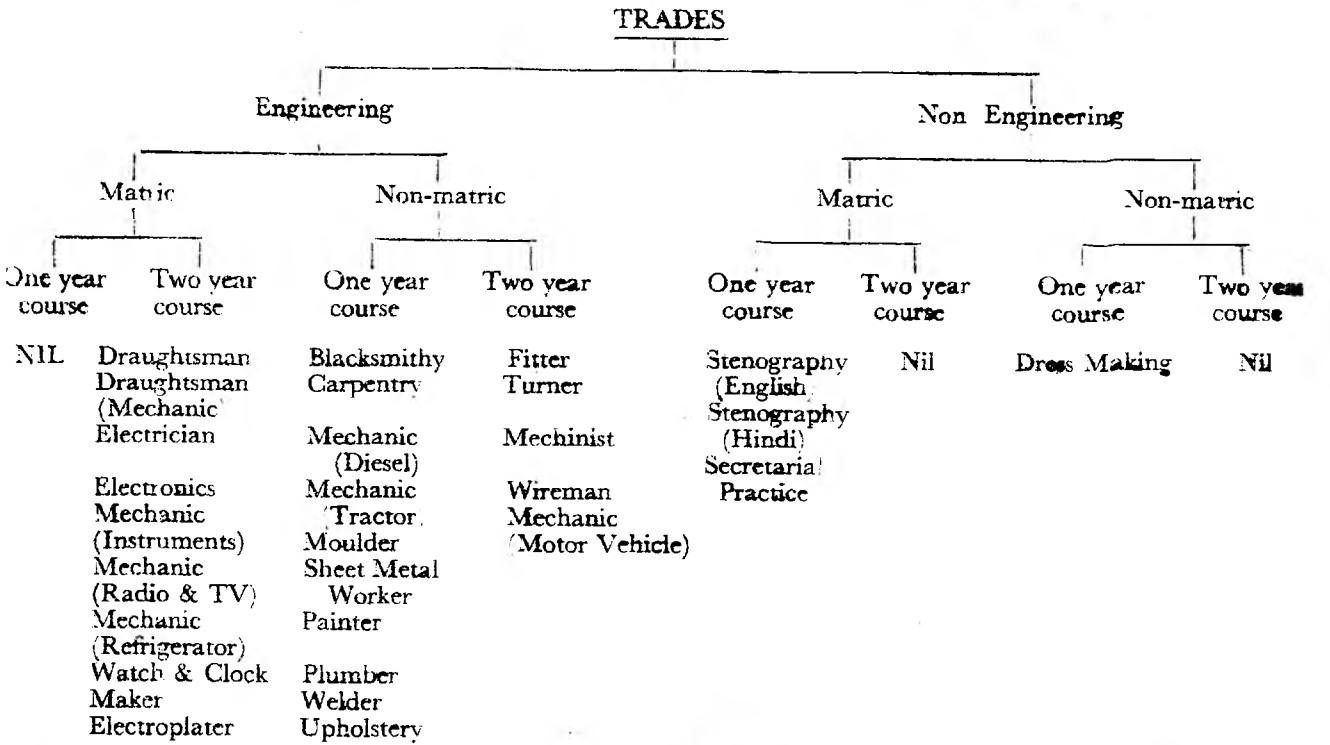
Sanctioned Intake of ITIs for Two Year Course August 1983

Institution/trade	Draughtsman (Civil)	Draughtsman (Mechanical)	Electrician	Electroplater	Mech. (Radio & Television)	Mech. (Instrument)	Mech. (Refr. & A.C.)	Surveyor	Fitter	Turner	Mechanist	Mech. (Motor Vehicle)	Wireman	Watch & Clock maker	Electronics	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1. Dhanuvachapuram	32	32	64	..	48	..	32	..	128	48	72	32	64	..	32	548
2. Trivandrum	32	32	64	..	64	32	48	32	64	48	48	32	64	..	64	624
3. Women ITI, Kazhakuttom	32	..	..	..	32	..	..	..	..	..	..	..	..	16	32	112
4. Attingal	32	32	..	16	64	..	48	..	80	24	..	32	48	..	48	424
5. Quilon	..	32	64	..	..	..	64	32	96	48	72	32	32	..	32	504
6. Women ITI, Quilon	16	..	..	..	16	..	..	16	..	..	..	..	..	16	16	80
7. Pathanamthitta	16	..	..	..	16	..	..	..	16	..	..	16	..	..	16	80
8. Chengannoor	32	..	64	..	32	..	32	..	80	72	72	32	64	..	32	512
9. Kattappana	..	..	16	..	16	..	..	..	16	12	..	..	..	..	16	76
10. Ettumanoor	32	..	64	..	32	32	32	..	96	60	60	32	64	..	32	536
11. Palakkathodu	16	..	..	..	16	..	16	..	..	..	..	16	16	..	..	80
12. Kalamassery	32	..	64	..	..	32	32	..	96	60	48	32	64	..	32	492

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
13. Chalakudy	32	32	96	..	32	..	..	32	96	48	72	32	64	..	16	552
14. Mala	16	..	..	..	16	..	..	..	16	..	..	..	..	..	16	64
15. Palghat	32	..	64	..	48	32	..	..	96	72	48	32	64	..	32	520
16. Malappuram	32	..	32	..	..	..	..	..	32	..	..	16	32	..	32	176
17. Women ITI, Kozhikode	32	..	..	..	32	..	..	..	..	..	..	..	..	32	32	128
18. Kalpetta	32	..	..	..	..	..	..	..	..	..	..	..	..	..	..	32
19. Calicut	48	..	48	..	32	..	32	..	64	24	24	32	80	..	32	416
20. Cannanore	32	32	48	..	64	32	48	32	96	72	48	32	64	..	48	648
21. Kasargode	16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	16
Total	344	192	658	16	560	160	354	144	1072	558	564	320	720	64	560	6656

APPENDIX 18

Classification of Trades Offered at the Industrial Training Institutes



APPENDIX 19

Seventh Five Year Plan Proposals for Craftsmen Training—Financial Outlay (1985-90)

	Name of Scheme	*Outlay proposed (Rs. lakhs)*
	(1)	(2)
1.	Consolidation and Strengthening of Facilities in the Existing ITIs	300.00
2.	Updating the Existing ITIs according to Revised Syllabi	50.00
3.	Direction and Administration	25.00
4.	Starting of New ITIs	50.00
5.	Starting of Women ITIs	50.00
6.	Post ITI Intensive Training Scheme	25.00
7.	Trade Apprenticeship Training Scheme under the Apprenticeship Act, 1961	25.00
8.	Advanced Vocational Training System	20.00
9.	Regional Vocational Training Institute for Women (Government of India—Institute)	20.00
10.	Special Scheme for Giving C.T.I. Training to ITCs and ITIs	20.00
11.	Special Component Plan for SC/ST	10.00
12.	Model ITI (Government of India—Institute)	10.00
13.	Apprenticeship Training for the Products of Vocational Education.	5.00
14.	Starting of Basic Training Centres for Non-ITI Trades	10.00
15.	Strengthening of Millwright in ITIs	5.00
	Total	625.00