GOVERNMENT OF KERALA

MAN POWER STUDIES

Vol. II

BUREAU OF ECONOMICS & STAT
TRIVANDRUM

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TRIVANDRUM

FOREWORD

The Man Power Unit started functioning in the Bureau of Economics and Statistics from April 1974. This unit has taken up various Man Power Studies relating to different disciplines and areas of operation. This unit has already published Man Power studies Vol.I covering 12 studies, in October, 1977.

The Man Power Division is now publishing another Volume containing 6 studies prepared by the Officers working in this unit.

It is hoped that the Man Power studies conducted by the Bureau may be useful to the Planners and Administrators.

I am presenting the reports of these 6 studies as a comprehensive Volume.

Trivandrum,
July, 1978.

DR. P. A. NAIR,
Director,
Bureau of Economics & Statistics.

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1.

HIGHER EDUCATION AND EDUCATED MANPOWER IN KERALA

1. INTRODUCTION

Education is considered to be a function of Socio-economic environment. Therefore, it is an integral part of the national planning of any country. The development of the Economic and Social needs of a nation is mostly related to the availability of the educated manpower.

1.2 In the present study an attempt is made to go through the historical development of higher education in the state and to highlight the expansion of the arts and science colleges and enrolment of students since the formation of Kerala state in 1956-57.

1.3 University education in the country had been growing faster than School education in the past decade. In the sixties while the enrolment in schools registered an increase of 60%, the increase in the enrolment for University Education was 128%. In Kerala the growth was much more faster than the all India growth rate. While the increase in the enrolment of students for school education was 44%, the increase in the enrolment for college education was 268% during the period. In 1975-76 the number of students in schools was one and half times compared to the position in 1961-62 and the corresponding position of enrolment in colleges was four fold. The low rate of growth in school education in Kerala compared to the all India growth rate during the sixties may be due to the advancement of school education in Kerala even before the sixties.

1.4 The State Government spent about 37% of the budgeted expenditure in 1975-76 for education while the corresponding per centage for All India was only 23%. The expenditure on education in 1960-61 was 16.16 crores and it increased to Rs.130.17 crores in 1975-76 registering 8 fold increase over a period of fifteen years. The increase in the per capita Government expenditure on education during the period was from Rs. 9.56 to Rs. 52.48. When Kerala spents about 6.5 % of the State income on education the corresponding all India average is only nearly 3 per cent.

In the distribution of funds for education at different levels, more than half of the expenditure is for primary education and a quarter of the fund goes to secondary education. The expenditure for University education comes

to nearly one-eighth of the total expenditure for education. The distribution made during 1974-75 and 1975-76 was as follows:

Level of Education	1975-76 (*R.E.*)		1976-77(*R.E.*)	
	Amount (lakhs)	*Percentage*	*Amount (lakhs)*	*Percentage*
Primary education	7451.46	54.46	8097.98	52.62
Secondary education	3280.85	23.98	3723.60	24.20
University education	1525.34	11.15	1725.33	11.21
Technical	431.87	3.16	515.39	3.34
Others	992.48	7.25	1327.46	8.63
Total Education	13682.00	100.00	15389.76	100.00

2. Facilities for University Education

The Kerala State was formed in 1956 by the amalgamation of the Travancore-Cochin states and the Malabar region of the Madras province. The institutions for higher education in the Malabar area and the former Cochin State were under the control of the Madras University, while those in Travancore area were under the Travancore University for Academic matters. Before the formation of the Travancore University, the institutions in the former Travancore state were also under the Madras University. In the early part of the twentieth century the Government of Travancore state realised that "the time had come for the establishment of a separate independent University for Travancore. Despite the large amounts spent by the Government for providing accommodations in the Colleges of Travancore, students were obliged to seek admission in the institutions outside the state". The pre-eminence of Travancore in the matter of education and the magnificient record of educational progress made during the reign of the Maharajas justified the establishment of the University of Travancore in November 1937. Consequent on the formation of the Kerala State, the Travancore University was renamed as Kerala University and all the institutions for higher education in the state were brought under its control. At the time of formation of Kerala state there were 28 Arts and Science Colleges with about 25 thousand students.

2.2 As the number of colleges and the number of students on the rolls increased considerably the administration of these institutions created much difficulties. Hence it was found imperative to start another University for the institutions in the northern districts of Kerala and the Calicut University was established in July 1968. The jurisdiction of the Kerala University was

subsequently bifurcated and the institutions situated in the districts, Trichur, Palghat, Malappuram, Kozhikode and Cannanore were affiliated to the Calicut University.

2.3 The establishment of the University of Cochin during 1971-72 was a note-worthy development in the field of higher education in Kerala. This University has some unique features. Its object is the development of higher education with particular emphasis on Post-graduate studies and research in applied science, technology, industry and commerce. The University will keep liaison with industries and work in close collaboration with them for achieving its objectives. The University has no affiliated colleges. In 1976 there were seven departments of study and research in the University. During the period 1975-76, the research programme of the University was closely integrated with teaching and research in all departments in accordance with the stated objective of the University.

2.4 Departments under the Universities

Kerala University

Under the Kerala University there are at present 24 teaching/research departments and five non-teaching departments. Most of the teaching/research departments are working at the University campus at Karyavattam. The department of Aquatic Biology and fisheries are located at Sangumugham. The other departments are functioning in the premises of the University Office buildings. The Post-graduate courses leading to masters degree in the teaching departments of the University are given in Appendix. The University provide research facilities for the award of Ph.D. in the subjects noted below:

Doctoral Research for Ph.D

	Subject	*No.of scholars working*	
		Full-time	*Part-time*
	(1)	(2)	(3)
1.	Economics	7	6
2.	Politics	7	16
3.	Psychology	13	12
4.	Sociology	5	4
5.	History	12	19
6.	English	4	6
7.	German	2	3
8.	Sanskrit	5	18
9.	Malayalam	14	24
10.	Tamil	10	6
11.	Linguistics	19	13

(1)		(2)	(3)
12.	Mathematics	5	4
13.	a. Statistics	2	8
	b. Demography	2	9
14.	Physics	5	8
15.	Chemistry	20	12
16.	Biochemistry	14	5
17.	Botany	17	3
18.	Geology	2	5
19.	Aquatic Biology & Fisheries	11	..
20.	Education	6	27
21.	Oriental Research	1	6
22.	Lexicon	3	3
	Total	186	217

2.4.2 It may particularly be mentioned in this context, that of the total 403 research scholars more than one third are female candidates. Among 186 full-time research fellows 97 are females. In almost all branches including mathematics and statistics ladies are doing research work and their number is increasingly seen in botany, zoology, linguistics and languages. In addition to the facilities for research in different branches indicated above the University also conducted courses for M.Phil. in Politics, Sanskrit, Malayalam, Tamil, Linguistics, Statistics, Zoology Aquatic Biology and Fisheries and Chemistry in 1976. There are diploma and Certificate Courses in the Departments for German and Russian languages.

2.4.3 The departments of the University are now located in and around Trivandrum and the higher education especially Post-graduate studies in other areas is entirely left to the affiliated colleges, a large majority of them being under private management. Therefore the University has decided to start the Post-graduate centres at Quilon and Changanacherry. In 1977 the U.G.C. has given sanction to start such centres in Alleppey, Kottayam and Palai also.

2.4.4 The University had taken a decision in 1975 to start correspondence courses. In the subsequent year the scheme was implemented in part with the appointment of the Director in charge of the institute for correspondecnce courses. The institute is now working at the University centre at Karyavattam. Though the University is a late beginner in this field, the doors for higher education could be opened to all those who are employed and unable to undergo the regular college studies.

2.4.5 The University also provides facilities for registration of candidates for the examinations in pre-degree, degree and post-graduate levels in Arts ubjects by private study.

2.4.6 *Calicut University*

The University was started in 1968. With the sanctioning of the departments such as Mathematics, Economics, Philosophy, Psychology, Journalism and Drama in 1976 by the U.G.C., the number of teaching departments under the University has increased to nineteen. There is also a proposal to start a department for sanskrit also. With the department of English at Tellicherry and the department of Economics at Dr. John Mathai centre, Trichur, the University has developed into a multi-campus university. Post-graduate courses leading to masters degree have been started in 15 departments. In the Department for Russian language only part-time courses for certificate and diploma in Russian are conducted.

In the Department of Commerce and Management studies in addition to the course for masters degree in commerce a one year post-graduate diploma course in business administration (D.B.A.) is also being conducted. Proposals for starting the following courses are under consideration.

1. Masters degree in Business Administration (M.B.A.) (Full-time)
2. Masters degree in Office Administration (M.O.A.) (3 year part-time course)
3. Plantation Management course (two year full-time diploma course)
4. Master of Philosophy course (M.Phil.) (one year course)

The course for M.Phil. is also being conducted in the Department of English also.

The following departments provide facilities for research leading to Ph.D.

	Subject	*No. of scholars working*	
		Full-time	*Part-time*
1.	Malayalam	6	13
2.	Hindi	5	5
3.	English	8	8
4.	Education	1	4
5.	History	2	20
6.	Economics	Not Started	
7.	Psychology	do	
8.	Philosophy	1	3
9.	Commerce	..	9
10.	Chemistry	Not Started	
11.	Physics	3	..
12.	Mathematics	..	..
13.	Botany	15	9
14.	Zoology	10	2
	Total	51	73

2.4.7 Of the 124 research scholars only 28 are ladies (22.6%) and among them 19 are full-time research fellows. Most of the ladies are found to be working in humanitic studies and botany and zoology.

2.4.8 As in the case of Kerala University, candidates are allowed to appear for the examinations in pre-degree, degree and post-graduate level by private study. But no correspondence course is yet started.

2.4.9 *Cochin University*

The University was started in 1971-72 for the development of higher education by conducting post-graduate courses and providing facilities for research in applied science, technology industry and commerce. In 1976 the following departments were functioning.

1. Physics
2. Marine Science
3. Ship Technology
4. High Polymer and Rubber Technology
5. School of Management studies
6. Department of Law
7. Hindi

2.4.10 Post graduate cous es are being conducted in Physics, Marine Biology, Oceanography, Meteorology, Management studies Law and Hindi. The courses in slip technology and High polymer and Rubber technology are for the award of B. Tech. The school of management aims at undertaking a programme of research, teaching and service with a view to assisting the industrial and commercial establishments of the region.

The school offers the following courses:

1. M.B.A.(two year full-time)
2. M.B.A.(Three year part-time)
3. Special diploma courses in different areas and Management and
4. Short-term courses.

It also proposes to start M.Phil. course in the same branch. The departments of Physics, Marine Science, Management studies, Law and Hindi provide facilities for research or the award of Ph.D. Altogether, 61 full-time and 35 part-time scholars are doing research in these departments.

2.4.11 In addition to the departments mentioned above, the following board of studies were constituted with effect from the dates noted against each:

1. Mathematics & Statistics	20-6-1975
2. Applied Chemistry	20-6-1975
3. Applied Economics	20-6-1975
4. Electronics & Communication system	18-7-1975

3. Administration

The academic and technical control over the institutions for higher education are vested with the Universities. The territorial jurisdiction of the Kerala University comprises the southern districts upto Ernakulam and all colleges are affiliated to the Kerala University. The colleges in the remaining districts are affiliated to the Calicut University. In addition to these colleges at one college at Mahi and another at Kavarathi are also affiliated to the Calicut University. The Cochin University has no affiliated colleges. But the Engineering college at Trichur is recently affiliated to the Cochin University.

3.2 The administration of all the Government colleges, irrespective of the territorial jurisdiction of the Universities is under the control of the Director of Collegiate Education. In the Directorate, he is assisted by an Administrative Officer, a Special Officer for scholarships, one Assistant Director for monitoring and an Accounts Officer. In 1972 a scheme was introduced for the payment of salaries to the teaching and non-teaching staff of the private Arts and Science colleges in the State from Government fund. For the implementation of the scheme three zonal offices, each at Quilon, Ernakulam and Calicut were opened and in each zonal office one Deputy Director was posted. The Director also exercised administrative control over the Music College and Academic Physical Education College and Training Colleges.

4. Growth of Institutions

At the time of the formation of Kerala State in 1956-57, there were only 28 Arts and Science Colleges in the State. The aspiration of the parents to give higher education to their children is indicated by the increase in the number of colleges in the recent past.

Progress in the number of Arts and Science College

Year	*No. of Colleges*	*Index of Growth*
1956-57	28	100
1961-62	47	168
1965-66	100	357
1971-72	177	418
1973-74	122	436
1975-76	128	457
1976-77	128	457

4.2 From the above table it can be seen that of the total 128 colleges, 53 were started in the third plan period alone. The growth of institutions for a decade from 1965-66 to 1795-76 was just a little above half the growth

registered during the third five year plan period. Because of the huge commitment of the Government due to the introduction of direct payment to the staff in the private colleges starting of new colleges is restricted to the bare minimum required to meet the acute demands of a locality.

4.3 Private management played a leading role in the development of higher education in the State. The christian missionaries were the pioneers in starting new institutions in different parts of the State. Contribution of other communities towards starting of new institutions for the development of higher education in the State may also be appreciated. Of the 128 Arts and Science Colleges in the state only 23 are in the State sector.

Number of Arts and Science Colleges owned by Government and Private management 1977-78

District	*Government*	*Private*	*Total*	*Population severved by one college* ('000)
1. Trivandrum	5	11	16	154
2. Quilon	..	13	13	208
3. Alleppey	..	14	14	171
4. Kottayam	1	16	17	102
5. Idukki	..	2	2	430
6. Ernakulam	2	15	17	143
7. Trichur	3	12	15	159
8. Palghat	3	5	8	237
9. Malappuram	2	4	6	348
10. Kozhikode	4*	7	11	215
11. Cannanore	3**	6	9	295
Total	23	105	128	187

* Government Junior College at Kavarathi excluded.

** Excluded Government College Mahe.

4.4 From the table given above, it is indicated that the facilities for higher education in the districts Quilon, Alleppey and Idukki are provided by the private management alone. In the State 1.87 lakh population is served by one college. Facilities for higher education are better in the districts, Trivandrum, Alleppey, Kottayam, Ernakulam and Tichur, when compared to the average number of people served by one college for the State as a

whole. In Kottayam district for every 1.02 lakh population there is one college and this district comes first. The Trivandrum district comes only the third, the second being Ernakulam district. In Idukki and Malappuram facilities are quite inadequate, population served by one college in these districts being 4.30 lakhs and 3.48 lakhs respectively. It may also be pointed out that all the districts in the former Travancore-Cochin area except Quilon and Idukki are better of compared to the State averages and all the districts in Malabar area still continue as backward.

4.5 Of the 128 Arts and Science College, 124 colleges provide facilities for pre-degree course. Of these 25 are Junior colleges. There are degree courses in 102 colleges. Facilities for post-graduate studies are provided in 42 colleges.

Number of Colleges having Pre-degree, degree and post-graduate courses—1976

	District	*No. of colleges*	*No. of colleges conducting courses for*		
			Pre-degree	*Degree*	*Post-graduate*
1.	Trivandrum	16	14	12	6
2.	Quilon	13	13	11	5
3.	Alleppey	14	14	10	3
4.	Kottayam	17	17	14	4
5.	Idukki	2	2	1	..
6.	Ernakulam	17	16	14	9
7.	Trichur	15	14	11	4
8.	Palghat	8	8	7	4
9.	Malappuram	6	6	5	..
10.	Kozhikode	11	11	9	4
11.	Cannanore	9	9	8	3
	Total	128	124	102	42

4.6 The districts of Trivandrum, Ernakulam and Malappuram are well placed in regard to the facilities for Post-Graduate studies as the teaching departments of Kerala, Cochin and Calicut Universities are located in these districts. The decision of the Kerala University to start study centres in Quilon, Changanacherry, Alleppey, Kottayam and Palai will lead to the expansion of higher education in less developed areas. The Calicut University has already at present two such centres one at Trichur and another at Tellicherry.

5. Enrolment of students.

The enrolment of students in Arts and Science Colleges is a clear indicator of the expansion of higher education in the State. In 1957-58, the enrolment of students in all the 28 colleges was 22254. There was a phenominal increase in the enrolment of students in subsequent periods and reached upto the level of 1.8 lakhs in 1976-77, that is about 8 fold increase over a period of two decades.

Index of growth of Arts and Science Colleges and enrolment of students

Year	*Colleges*		*Enrolment of students*	
	No.	*Index*	*No.*	*Index*
1956-57	28	100	22254	100
1961-62	47	168	41739	188
1965-66	100	357	102841	462
1971-72	117	418	153437	689
1973-74	122	436	156579	704
1975-76	128	457	165448	743
1976-77	128	457	175915	790

5.2 It is seen from the above table that the growth in the enrolment of students surpassed the growth in the number of colleges. The increase in the enrolment of students was maximum during the third plan period, registering a record of more than 61 thousand students during the period. In the subsequent five-year period the increase was only 51 thousand and again declined to 12 thousand during the period 1971-72 to 1975-76. This was mainly because of the fact that the number of colleges newly opened during 1971-72 to 1975-76 was only eleven.

5.3 When we go through the enrolment of students in each district in 1976-77, the largest number of students is seen in Kottayam district where there are 17 colleges, followed by Quilon, Ernakulam and Trivandrum. The lowest enrolment is seen in Idikki district where there are only two colleges. The districts in Malabar area still stands behind the districts in Travancore-Cochin area (except Idukki) in regard to the enrolment of students. The following table will illustrate this fact.

Enrolment of students in each district 1976-77

	District	*No. of colleges*	**Enrolment of Students*	*Enrolment of students per lakh population*
1.	Trivandrum	16	22605	916
2.	Quilon	13	22721	838
3.	Alleppey	14	19340	810
4.	Kottayam	17	26918	1557
5.	Idukki	2	2279	265
6.	Ernakulam	17	22688	933
7.	Trichur	15	20110	841
8.	Palghat	8	10222	540
9.	Malappuram	6	4779	229
10.	Kozhikode	11	12752	539
11.	Cannanore	9	11501	433
	State	128	175915	734

* For estimated mid year population.

5.4 The enrolment of students in colleges per lakh population is an indicator of the development of higher education. In 1976-77, 734 students were going to colleges in the state for every lakh population. All the districts (except Idukki) in Travancore-Cochin area stand above the level of the state average) Kottayam stands first followed by Ernakulam and Trivandrum. In Kottayam district the progress is remarkable registering an achievement of 1557 students per lakh population. All the districts in Malabar area are submarginal even in respect of the student population ratio. Malappuram is the most backward district in this regard.

5.5 In the distribution of students for different courses of studies, nearly two-thirds of the students are in pre-degree course. The post-graduate students constitute only 3 per cent of the total enrolment.

Number of students in Arts and Science Colleges by course of study 1975-76 and 1976-77

Course	1975-76		1976-77	
	No.	*Percentage*	*No.*	*Percentage*
Pre-degree	101546	61	106546	60
Degree	59255	36	64545	37
Post-graduate*	5770	3	5861	3
Total	166571	100	176952	100

* Includes Post-graduate Students in the teaching departments of the universities.

5.6 The number of students in Arts, Science and Commerce for different courses of study is also analysed and the number of students in each group is shown below:

Enrolment of students in Arts, Science and Commerce 1975-76

Subject	*Pre-degree*	*Degree*	*Post-graduate*
Arts	35233	24973	3344
Science	57406	28244	1974
Commerce	8907	6038	452
Total	101546	59255	5770

5.7 It can be deduced from the above table that the number of students attracted to science subjects is more than the number going for studies in Arts for pre-degree and degree courses. This phenominon may be due to the eagerness of the students for professional and technical studies for which they have to acquire a basic qualification in the respective subject. More over there are facilities in appearing for examinations in pre-degree, degree and post-graduate levels in arts subjects privately without attending to the regular courses in colleges. This fact is reflected in the number of students appearing for the examination in recent years.

5.8 As regards higher education of women it was noticed that 48% of the total enrolment in arts and science colleges in 1976-77 are ladies. It is significant to note that the proportion of the enrolment of women is above the state average in all the districts in Travancore-Cochin area and women enrolment exceeded the number of men scholars in the districts, Trivandrum, Alleppey, Kottayam, Idukki and Trichur. Women education in Malabar area is not yet advanced. Malappuram district stands behind all other districts in the case of women enrolment in colleges where the strength of girls in the

six colleges in the district is only 28 per cent. Even though there are only two colleges in the Idukki district the enrolment of girls exceeds the enrolment of boys. The details are given in the following table:

Enrolment of students in Arts and Science College in each district by sex 1976-77

	District	*Enrolment of students*			*Percentage*	
		Male	*Female*	*Total*	*Male*	*Female*
1	Trivandrum	11240	11365	22605	49.7	50.3
2.	Quilon	11439	11282	22721	50.3	49.7
3.	Alleppey	9068	10272	19340	46.9	53.1
4.	Kottayam	12602	14316	26918	46.8	53.2
5.	Idukki	1112	1167	2279	48.8	51.2
6.	Ernakulam	11521	11167	22688	50.8	49.2
7.	Trichur	9829	10281	20110	48.9	51.1
8.	Palghat	5986	4236	10222	58.6	41.4
9.	Malappuram	3443	1336	4779	72.0	28.0
10.	Kozhikode	8311	4441	12752	65.2	34.8
11.	Cannanore	7164	4337	11501	62.3	37.7
	State	91715	84200	175915	52.1	47.9

5.9 According to the number of students in the year 1975-76 it could also be seen that there were more male students in the pre-degree, degree and post-graduate courses than the females. But in regard to the number of students in different groups, ladies dominate in arts groups in pre-degree and degree courses. Commerce is not much preferred by the ladies. The following table will illustrate this fact.

Percentage Enrolment of students by sex and by course of study 1975-76

Groups	*Pre-degree*		*Degree*		**Post-graduate*	
	Male	*Female*	*Male*	*Female*	*Male*	*Female*
Arts	44.0	56.0	46.2	53.8	47.5	52.5
Science	54.8	45.2	53.6	46.4	50.7	49.3
Commerce	74.1	25.9	85.8	14.2	92.0	8.0
All groups	52.8	47.2	53.8	46.2	52.1	47.9

* Including Post-graduate students in the University Departments.

5.10 Progress in the higher education of women can be assessed by the number of females in the age group 16-20 going to colleges for pre-degree and degree courses. This is given in the following table:

District	*Enrolment in pre-degree and degree, courses as percentage to the population in* 16-20 *age-group in* 1976-77		
	Male	*Female*	
1. Trivandrum	8.8	9.0	8.9
2. Quilon	8.2	8.4	8.3
3. Alleppey	7.6	8.6	8.1
4. Kottayam	14.4	16.3	15.4
5. Idukki	2.5	2.9	2.7
6. Ernakulam	9.0	9.2	9.1
7. Trichur	8.4	8.3	8.3
8. Palghat	6.4	4.4	5.4
9. Malappuram	3.4	1.3	2.3
10. Kozhikode	6.9	3.8	5.4
11. Cannanore	5.4	3.3	4.4
State	7.6	7.0	7.3

5.11 In Kerala when 7.6% of males and 7.0% of females in the age group 16-20 are going to colleges, the proportion of females going to colleges in the same age-group in Travancore-Cochin area is found to be greater than that of males. But women education in Malabar area is not yet developed when we take into account this proportion. Malappuram district is the most backward in regard to higher education in general and women education in particular. Here only 2.3% of the persons in the age-group 16-20 are going for higher education while the percentage of women going to colleges in the age-group is slightly more than one percent. In Idukki district even though there are only two colleges, 2.7% of the persons and 2.9% of the women in the age-group 16-20 are going for pre-degree or degree courses. In respect of the proportion of persons and women going to colleges also Kottayam district stands first in the state with 15.4% (more than double the state average) of the persons and 16.3% of women in the age group 16-20 attending colleges.

6. Out-turn of graduates

There has been an enromous growth in the number of graduates since 1970. In 1965 the number of students appeared for B.A., B.Sc. and B.Com examinations was nearly twelve thousand and the number passed was 5383. In 1970 the students appeared for and passed the degree examinations numbered 22488 and 16135 respectively. Since 1970 more than sixteen thousand degree holders are coming out every year from the Universities in Kerala. The out-turn of B.A., B.Sc. and B.Com degree holders in Kerala during 1957 to 1976 is given in the following tables.

Out-turn of B.A., B.Sc., B.Com degree holders

Year	*B.A.*		*B.Sc.*		*B.Com.*	
	appeared	*passed*	*appeared*	*passed*	*appeared*	*passed*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1957	4290	1401	4663	1504	656	300
1960	5332	1782	7820	2889	810	383
1965	2795	1412	7840	3379	1103	582
1970	8735	6627	11139	8036	2614	1472
1971	11352	7512	11508	7726	2149	1106
1972	13825	7968	13071	8152	3390	1439
1973	12259	7008	14201	7836	3692	1614
1974	12670	7245	11852	7233	3823	1643
1975	15915	7488	13493	7392	3997	1568
1976	15507	7281	13854	7463	4763	2035

6.2 As in the case of graduates, the number of post-graduates in arts, science and commerce had been increasing considerably since 1970. Only 361 post-graduates were produced by the Kerala University in 1960. In 1970 this number increased to 1708 and since 1971 on an average 2400 post-graduates are coming out every year from the universities in Kerala. As regard the out-turn of graduates in arts and science not much difference is noticed between them. But in the case of out-turn of post-graduates, the masters in arts exceed the masters in science and they account to nearly one and half times the out-turn of post-graduates in science. The subject commerce

was introduced in recent years and the out-turn of M.Com degree holders in 1965 was only 53. The increase in their out-turn is nearly four fold within a decade.

Out-turn of M.A., M.Sc., M.Com degree holders

Year	M.A.		M.Sc.		M.Com	
	appeared	passed	appeared	passed	aopeared	passed
1957	95	79	104	101	..	..
1960	294	254	126	116	..	..
1965	466	392	424	358	58	53
1970	1356	983	780	615	135	110
1971	1686	1312	1183	1007	164	143
1972	1655	1262	1086	948	156	138
1973	1816	1487	1100	968	151	135
1974	1740	1407	1278	1087	121	110
1975	1822	1386	1108	872	158	126
1976	1717	1264	1059	862	219	198

6.3 In the analysis of the number of students appeared and passed in different subjects in arts and science groups, it is observed that in the degree courses the number is more for Economics and History. In regard to languages English still predominates. In science subjects first preference goes to chemistry followed by Zoology, Physics, Mathematics and Botany. In post-graduate studies leading to M.A., Economics is given first preference. Enrolment for M.A. in English is seen to be much more than for Malayalam. Mathematics, Physics, Chemistry Zoology and Botany are the subjects chosen by the majority of the students for M.Sc. examination. The details of the number of students appeared and passed in different subjects in April/May 1976 under the universities in Kerala are given in Appendix.

7. Wastage

The real wastage for a course of study will include the dropouts before completing the course by discontinuing and failures even after attempting say five times. In regard to graduate and post-graduate studies the number of students discontinuing the course before appearing for the examination is very small when compared to the failures. As a separate study for the assessment of the real wastage is necessary, crude estimates of wastages in the graduate and post-graduate courses are worked out taking into consideration the number of students appeared and passed out.

7.2 Percentage of pass for B.A., B.Sc. and B.Com and M.A., M.Sc., M.Com in each year from 1971 to 1976 was as shown below:

Percentage of pass

Year	*M.A.*	*M.Com.*	*M.Sc.*	*B.A.*	*B.Com.*	*B.Sc.*
1971	77.8	87.2	85.1	66.1	51.5	67.1
1972	76.3	88.5	87.2	57.6	40.0	62.4
1973	81.9	89.4	88.0	57.1	54.7	55.1
1974	80.8	90.1	85.0	57.2	43.0	61.0
1975	76.1	79.8	78.7	47.1	39.2	54.9
1976	73.6	90.4	81.4	47.0	42.8	53.9

7.3 If we take moving average of the pass for a period of three years, the students who failed in the first attempt may be included in their further attempts to a maximum of five attempts including September examinations in the case of students for degree examinations. Thus we get a crude wastage as shown in the following table.

Crude wastage of students in degree course (%)

Period	*B.A.*	*B.Sc.*	*B.Com.*	*All courses*
1970-72	34.8	33.0	51.2	35.1
1971-73	39.9	38.9	55.9	41.3
1972-74	42.7	40.6	57.8	43.3
1973-75	46.7	43.2	58.1	46.7
1974-76	50.1	43.7	58.3	48.5
Average	43.3	40.0	56.7	43.5

7.4 The low percentage of pass indicates the huge wastage in higher education especially in the graduate level. The table given above also indicates that the performance of science graduates are much better than arts and commerce graduates. It is also pertinent to note that there is an increasing trend in the percentage of drop-outs due to failure since 1970 in all groups.

7.5 In regard to the wastage in post-graduate studies, it was significant to note that only an average of 13% had failed in the examination for M.Com during 1970 to 1976. In M.Sc. and M.A. the wastage were 16% and 23 % respectively. It is true that failures in post-graduate studies are

less than those in the graduate level. But in view of the specialisation in different branches of studies in the post-graduate level mere pass will not be creditable. In 1976 only 58% of persons appeared for M.A. examinations came out with first or second classs. In M.Sc. examinations 71% were the first or second class holders among the persons appeared for the examinations.

7.6 The wastage in higher education in the U.S.A. and the United Kingdom is estimated to be 11%. A study conducted by the M.S. University, Baroda shown that nearly one-third of the students who enrol for higher education in India leave the universities before completing their courses. This wastage not only curbs the personal income of the community but make a heavy loss to the exchequor also. The gravity of the situation would be exposed by the fact that with the cost of educating an undergraduate in arts/science for one year, we can give primary education to 22 children for one year. The cost of education in post-graduate level, M.A. or M.Sc. if measured in the same yard stick will be equivalent to the cost of schooling for 41 or 49 primary students for one year respectively.

Employment of Teachers

In 1956-77 there were only 1262 college teachers in all the 28 arts and science colleges. With the increase in the number of colleges, the number of teachers also increased considerably. It could not also be seen that along with the vertical growth of institutions, there was horizontal expansion by introduction of new courses. Therefore, the average number of teachers for one college had increased from 45 in 1956-57 to 63 in 1976-77.

Number of Teachers in Arts and Science Colleges

Year	*No. of colleges*	*No. of teachers*	
		Total	*Average per college*
1956-57	28	1262	45
1961-62	47	2336	50
1965-66	100	4553	46
1971-72	117	7267	62
1975-76	128	7892	62
1976-77	128	8011	63

8.2 As the private managements played a leading role in the expansion of higher education in the state,. of the 8011 teachers in 128 colleges, 6665 were employed in 105 colleges owned by the private managements. In other words eight out of every 10 teachers are employed in colleges owned by the private management.

8.3 Employment of women in the teaching profession is also note worthy. The number of lady teachers which was 2140 in 1973-74 , increased to 2473 in 1976-77 (that is 31% of the total number of teachers)

Employment of teachers, sex-wise 1976-77

Type of management	*Male*	*Female*	*Total*
Government	868	478	1346
Private	4670	1995	6665
Total	5538	2473	8011

8.4 As regards the student-teacher ratio in arts and science colleges, there was no significant veriation. In 1956-57 the ratio was 18 and it increased to 23 in 65-66 and declined to 21. For the year 1976-77 the ratio is worked out to be 22. The trend is indicated in the following table.

Student-Teacher ratio

Year	*Enrolment of students*	*Number of teachers*	*No. of students per teachers*
1956-57	22254	1262	18
1961-62	41739	2336	18
1965-66	10241	4553	23
1971-72	153437	7267	21
1975-76	165448	7892	21
1976-77	175915	8011	22

8.5 The table given above indicates a simultaneous growth in the number of teachers along with the increase in the enrolment of students maintaining the student-teacher ratio without significant variation.

9. Problem of unemployment

Though the progress in the field of higher education in the state was quite appreciable especially after the third plan period, it could be seen that

the supply of educated hands has grown by leaps and bounds with no correlation with the demand in the foreseable future. The growth in the number of educated job-seekers will illustrate this truth.

Growth of Job-seekers 1966 to 1976

Year (as on Dec. 31st)	*Pre-degree level*		*Degree level*		*Post-graduate level*		*Total Pre-degree and above*	
	No.	*Index*	*No.*	*Index*	*No.*	*Index*	*No.*	*Index*
1966	2923	100	3581	100	445	100	6949	100
1967	3558	122	4822	135	631	142	9011	130
1968	3893	133	6615	185	832	187	11340	163
1969	6275	215	11002	307	1687	379	18964	273
1970	7469	256	17703	494	1994	448	27166	391
1971	10168	348	20841	582	2253	506	33262	479
1972	16457	563	20396	570	3333	749	40186	578
1973	18965	649	24327	679	4156	934	47448	683
1974	20075	687	36947	1031	3870	870	60892	876
1975	28329	969	44456	1241	4840	1088	77625	1117
1976	38176	1306	49749	1389	5641	1268	93566	1346

9.2 The alarming trend in the increase in the number of job-seekers with higher qualifications every year is indicative of defects in educational planning. It is true that there is social and cultural values for higher education. But most of the students going to colleges are for acquiring a degree to secure a job in virtue of his higher qualification as indicated by the studies conducted by the Planning Forums. The table given above shows that there was about 13 fold increase among job-workers in all levels of educational qualifications. This explosive growth of educated unemployed is not at all surprising when we look into the fact that we are producing about fifteen thousand graduates and more than two thousand post-graduates every year.

10. Conclusion

The University education in the state was growing faster than school education in the sixtees. When the number of students in schools was one and half times in 1975-76 compared to the 1960-61 position, the corresponding increase in the colleges was four fold. The State Government

spend more than one-third of the budgeted expenditure for education when the all India average is only 23%. The expenditure on education in 1960-61 was 16.16 crores and it increased to Rs. 130.17 crores in 1975-76, registering eight fold increase over a period of fifteen years. Of this amount nearly one-eighth goes for university education. The increase in the per capita government expenditure on education during the period was from Rs. 9.56 to Rs. 52.48. When Kerala spends about 6.5% of the state income on education, the corresponding all India expenditure is only nearly 3%.

10.2 In the development of higher education, the Travancore area of the state was much in advance even before the formation of Kerala in 1956. All the colleges in Travancore were under the Travancore University which was established in 1937. After the formation of Kerala state, the Travancore University was renamed as Kerala University and all the colleges in the state were brought under its control. At the time of the formation of the Kerala University there were 28 arts and science colleges with about 25 thousand students. The Calicut University was established in 1968 with its jurisdiction comprising Trichur, Palghat, Malappuram, Kozhikode and Cannanore Districts. The establishment of Cochin University in 1972 was another note-worthy development in the field of higher education in the state, It was established with the object of developing higher education with particular emphasis on post-graduate studies and research in applied science, technology, industry, and commerce. It has no affiliated colleges. All the universities have teaching/research departments where there are facilities for post-graduate studies and research. Enrolment of students in these departments now comes to above 1100.

10.3 The Calicut University has developed into a multi-campus university with its centres at Trichur and Tellicherry. The Kerala University has already decided to start post-graduate study centres at Quilon and Changanachery. The U.G.C. has also given sanction to start such centres in Kottayam, Changanacherry and Palai.

10.4 Facilities for higher education are expanded in Kerala and Calicut Universities by providing private registration of candidate for university examinations in Arts subjects without undergoing the regular college courses. In Kerala University an institute for correspondence courses was opened in 1976 and thus the doors of higher education was opened to those who are unable to undergo the regular college studies.

10.5 While the academic and technical control on the colleges are vested with the Kerala and the Calicut Universities in their respective jurisdictions, the general administration of the colleges are under the control of the Director of collegiate Education. With the introduction of the 'Direct payment system' to the staff of the private colleges in 1972, three regional offices each under the control of a Deputy Director were opened.

10.6 The growth of arts and science colleges in the state was phenominal especially, during the Third Plan period. Of the total 128 arts and science colleges 53 were started during this period. In the development of higher education in the state the role of private management deserves special mention. Of the 128 colleges 105 are under the private management. In 124 colleges, including 25 junior colleges, pre-degree courses are being conducted. There are degree-courses in 102 colleges. Facilities for post-graduate studies are provided in 42 colleges.

10.7 The progress of higher education in each district was uneven and the districts in Malabar region still continue to be backward. When compared to the population served by one college in each district, Kottayam stands first with one college for every 1.02 lakh population, the state average being 1.87 lakh population. All the districts in the former Travancore Cochin area (except the newly formed Idukki District) are better off compared to the state average. In Idukki and Malappuram facilities are quite inadequate, population served by one college in these districts being 4.30 lakhs and 3.48 lakhs respectively.

10.8 The enrolment of students per lakh population in the state in 1976-77 was 734. In this criterion also Kottayam stands first with 1557 students per lakh population. The student-population ratio in all the districts in Malabar area was below the state average. Even when the number of students in Idukki district was the least, the student-population ratio in the district was higher than that in Malappuram district (Malappuram 229 and Idukki 265).

10.9 The number of students in science subjects was found to be greater than the number in arts subjects in pre-degree and degree courses. This phenomenon may be due to the eagerness of the students for professional and technical studies for which they have to acquire a basic qualification in the respective groups. Again, as the students can appear examinations in arts groups, by private study rush in colleges for arts groups is reduced.

10.10 In regard to the higher education of women also Kerala is in advanced stage. About 48 % of the total enrolment in arts and science colleges in 1976-77 was ladies. The proportion of women-scholars was greater than the state average in all the districts in the Travancore-Cochin area and even exceeded the number of men-scholars in the districts, Trivandrum, Alleppey, Kottayam., Idukki ad Trichur. Higher education of women in Malabar area has not much advanced still. The Malappuram district stands behind all other districts in this respect with slightly more than a quarter of women-scholars of the total enrolment in the six colleges.

10.11 In Kerala enrolment of students for pre-degree and degree courses comes to 7.3% of the population in the age group 16-20, percentage of men and women scholars being 7.6 and 7.0 respectively. Kottayam district stands first in this respect also. Here 15.4% of the persons

and 16.3% of the females in the age group 16-20 are attending to colleges for pre-degree and degree courses. (More than double the state average). In Malappuram district slightly more than one per cent of females in this age group are attending colleges.

10.12 There had been an enormous growth in the out-turn of graduates in the state since 1970. More than sixteen thousand graduates are now coming out from the universities in Kerala every year. The out-tern of post-graduates had also increased considerably since 1970. Only 361 post graduates were produced in the state in 1960. In 1970 number increased to 1708 and from 1971 onwards, nearly 2400 post-graduates are coming out. Of this more than one-third is post-graduates in science.

10.13 It is observed that the number of admission in Economics and History is more than in other subjects for the degree courses. In regard to languages English still dominates. In science subjects first preference goes to Chemistry, followed by Zoology, Physics, Mathematics and Botany. In post-graduate studies in arts subjects Economics gets the first prefernce. Enrolment for M.A. in English is seen to be much more than for Malayalam.

10.14 The low percentage of pass in degree examinations indicates the huge wastage in higher education especially in graduate level. The average annual wastage due to failures for the last six years in degree level comes to 43.5%. This percentage will be much higher if the number of persons discontinuing their studies is also taken into account. It is quite alarming to note that there is an increasing trend in the percentages of drop-outs since 1970 in all groups.

10.15 As regards the wastage in post-graduate studies near about 13% failure is observed in the examination for M.Com during 1970-76. For M.Sc. and M.A. the failures were 16% and 23% respectively. But the number of persons who came out with first or second class for M.A. in 1976 was only 58% while for M.Sc. 71% of the total persons appeared were first or second class holders.

10.16 The huge wastage in higher education not only curbs the personal income of the community but makes a heavy loss to the exchequer also. It is estimated that with the cost of educating an under graduate in arts/science for one year we can give primary education to 22 children for one year. The cost for higher education in post-graduate level is still higher. The cost of educating one post-graduate for two years for M.A. is equivalent to the post for schooling 82 primary students in one year and for M.Sc. it comes to 98.

10.17 With the vertical and horizontal expansion of the institution the employment of teachers in arts and science colleges increased from 1262 in 1956-57 to 8011 in 1976-77. The average number of teachers per college had increased from 45 to 63 during the period. The student-teacher ratio

was maintained without much variations and it remained between 18 and 22 during the period under reference. Since most of the colleges are under private managements, eight out of every ten teachers, got employment in private colleges. Employment of women in the teaching profession is also noteworthy. In 1976-77 31 per cent of the total strength of teachers was ladies.

10.18 The opportunities for employment of the educated persons have not so much widened enough to accommodate the increase in the facilities for higher education in the state. The impact of higher education on social and cultural changes of a community is well recognised. But the increase in the number of educated job seekers in the state for the last decade was quite alarming. There was thirteen fold increase in the number of job-seekers with higher qualifications in all levelss. In 1976 there were nearly fifty thousand degree holders and thirty eight thousand pre-degree holders in the employment market. The post-graduates seeking employment were nearly six thousand.

APPENDIX

TABLE 1

Progress in the number of arts and science colleges and Enrolment of student in the state

Year	*No. of colleges*	*Enrolment of students*	
		Number	*Index of growth 1956-57=100*
1956-57	28	22254	100.00
1961-62	47	41739	187.66
1965-66	100	102841	462.12
1971-72	117	153437	689.48
1973-74	122	156579	703.60
1975-76	128	165448	743.45
1976-77	128	175915	790.49

TABLE 2

Number of arts and science colleges and enrolment of students by district 1976-77

District	*Government*		*Private*		*Total*	
	No. of colleges	*Enrolment*	*No. of colleges*	*Enrolment*	*No. of colleges*	*Enrolmen*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Trivandrum	5	7294	11	15311	16	22605
Quilon	..	..	13	22721	13	22721
Alleppey	..	..	14	19340	14	19340
Kottayam	1	937	16	25981	17	26918
Idukki	..	..	2	2279	2	2279
Ernakulam	2	2913	15	19775	17	22688
Trichur	3	2145	12	17965	15	20110
Palghat	3	5004	5	5218	8	10222
Malappuram	2	881	4	3898	6	4779
Kozhikode	†4	3819	7	8933	11	12752
Cannanore	*3	3234	6	8267	9	11501
State	23	26227	105	149688	128	175915

†Excludes Government junior college in Kavarathi Island.

*Excludes Government college at Mahe.

Note:— There are evening colleges in five centres, total strength of students being 760 only which is excluded from the above table.

TABLE 3

Enrolment of Students in Arts and Science Colleges in each district by Sex 1976-77

District	*Enrolment of students*			*Percentage of students*	
	Male	*Female*	*Total*	*Male*	*Female*
(1)	(2)	(3)	(4)	(5)	(6)
Trivandrum	11240	11365	22605	49.7	50.3
Quilon	11439	11282	22721	50.3	49.7
Alleppey	9068	10272	19340	46.9	53.1
Kottayam	12602	14316	26918	46.8	53.2
Idukki	1112	1167	2279	48.8	51.2
Ernakulam	11521	11167	22688	50.8	49.2
Trichur	9829	10281	20110	48.9	51.1
Palghat	5986	4236	10222	58.6	41.4
Malappuram	3443	1336	4779	72.0	28.0
Kozhikode	8311	4441	12752	65.2	34.8
Cannanore	7164	4337	11501	62.3	37.7
State	91715	84200	175915	52.1	47.9

TABLE 4

Enrolment of Students in Arts and Science Colleges per lakh of population in each district—1976-77

District	*No. of Colleges*	*Enrolement of students*	*Estimated mid year population ('000)*	*Enrolement per lakh of population*	*Population served by one college ('000)*
(1)	(2)	(3)	(4)	(5)	(6)
Trivandrum	16	22605	2468	916	154
Quilon	13	22721	2710	838	208
Alleppey	14	19340	2388	810	171
Kottayam	17	26918	1729	1557	102
Idukki	2	2279	860	265	430
Ernakulam	17	22688	2431	933	143
Trichur	15	20110	2391	841	159
Palghat	8	10222	1892	540	237
Malappuram	6	4779	2086	229	348
Kozhikode	11	12752	2365	539	215
Cannanore	9	11501	2656	433	295
State	128	175915	23976	734	187

TABLE 5

Number of Students in Arts and Science Colleges by Course of Study 1975-76 and 1976-77

Course	1975-76 *No.*	*Percentage*	1976-77 *No.*	*Percentage*
Pre-degree	101546	61	106546	60
Degree	59255	36	64545	37
*Post-graduate	5770	3	5861	3
Total	166571	100	176952	100

* Includes post-graduate students in the teaching departments of Kerala Cochin and Calicut Universities.

TABLE 6

Enrolment of Students by Sex and by Course of study 1975-76

Course	*Number of students*			*Percentage*		
	Male	*Female*	*Total*	*Male*	*Female*	*Total*
Pre-degree Arts	15505	19728	35233	44.0	56.0	100.0
Science	31457	25949	57406	54.8	45.2	100.0
Commerce	6603	2304	8907	74.1	25.9	100.0
Total Pre-degree	53565	47981	101546	52.8	47.2	100.0
Degree Arts	11525	13448	24973	46.2	53.8	100.0
Science	15146	13098	28244	53.6	46.4	100.0
Commerce	5183	855	6038	85.8	14.2	100.0
Total Degree	31854	27401	59255	53.8	46.2	100.0
*Post-graduate						
Arts	1589	1755	3344	47.5	52.5	100.0
Science	1001	973	1974	50.7	49.3	100.0
Commerce	416	36	452	92.0	8.0	100.0
Total Post-graduate	3006	2764	5770	52.1	47.9	100.0

* Includes post-graduate students in the University departments.

TABLE 7

Out-turn of B. A., B.Sc. and B. Com. degree holders in Kerala 1957 to 1976

(in numbers)

Year	B.A.		B.Sc.		B.Com.		Total	
	Appeared	Passed	Appeared	Passed	Appeared	Passed	Appeared	Passed
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1957	4290	1401	4663	1504	656	300	9612	3205
1960	5332	1782	7820	2889	810	383	13962	5054
1965	2795	1412	7840	3379	1103	582	11738	5383
1970	8735	6627	11139	8036	2614	1472	22488	16135
1971	11352	7512	11508	7726	2149	1106	25009	16344
1972	13825	7968	13071	8152	3390	1349	30286	17369
1973	12259	7008	14201	7836	3692	1614	30152	16458
1974	12670	7245	11852	7233	3823	1643	28345	1612[1]
1975	15915	7488	13493	7392	3997	1568	33405	16448
1976	15507	7281	13854	7465	4763	2035	34124	16781

TABLE 8

Out-turn of M. A., M.Sc. and M. Com. degree holders in Kerala 1957 to 1976

(in numbers)

Year	M.A.		M.Sc.		M. Com.		Total	
	Appeared	Passed	Appeared	Passed	Appeared	Passed	Appeared	Passed
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1957	95	79	104	101	..	..	199	180
1960	294	245	126	116	..	..	420	361
1965	466	392	424	358	58	53	948	803
1970	1356	983	780	615	135	110	2271	1708
1971	1686	1312	1183	1007	164	143	3033	2462
1972	1655	1262	1086	948	156	138	2897	2348
1973	1816	1487	1100	968	151	135	3067	2590
1974	1740	1407	1278	1087	121	110	3139	2604
1975	1822	1386	1108	872	158	126	3088	2354
1976	1717	1264	1059	862	219	198	2995	2324

TABLE 9

Number of students appeared and passed in Pre-degree, B. A., and B. Sc., Subject-wise under the Universities in Kerala in April/May 1976

Course/Subject	No. passed	Number passed			Toal
		I Class	II Class	III Class	
(1)	(2)	(3)	(4)	(5)	(6)
Pre-degree	67632	3985	6884	16416	27285
B.A. History	2179	11	90	956	1057
Politics	581	Nil	23	244	267
Economics	5406	16	321	2569	2906
Philosophy	130	11	26	47	84
Sociology	149	10	63	49	122
English	1566	13	102	617	732
Malayalam	333	6	71	202	279
Sanskrit	161	18	29	67	114
Hindi	104	6	32	52	90
Arabic	22	6	7	3	16
Islamic History	22	..	9	7	16
Music	9	3	6	..	9
Other Subject	291	5	34	155	194
B.Sc. Mathematics	1957	354	153	216	723
Physics	2139	483	320	228	1031
Chemistry	2501	648	344	148	1140
Botany	1787	333	537	311	1181
Zoology	2371	474	723	305	1502
Geology	24	5	4	5	14
Home Science	186	29	51	59	139
Statistics	7	1	3	1	5

TABLE 10

Number of Students appeared and passed in M.A. and M. Sc. Subject-wise under the Universities in Kerala in April/May 1976

Course/Subject		Number appeared	Number passed			
			I Class	II Class	III Class	Total
	(1)	(2)	(3)	(4)	(5)	(6)
M.A. 1.	Malayalam	229	11	90	68	169
2.	Tamil	21	9	10	2	21
3.	Sanskrit	56	20	25	9	54
4.	English	377	12	119	158	289
5.	Linguistics	15	5	10	..	15
6.	German	6	4	..	1	5
7.	Hindi	120	11	70	32	113
8.	Arabic	28	17	8	1	26
9.	Kannada	5	1	4	..	5
10.	History	140	8	86	35	129
11.	Economics	377	22	195	125	342
12.	Politics	90	12	64	7	83
13.	Philosophy	69	3	24	23	72
14.	Psychology	16	4	11	1	16
15.	Sociology	96	8	74	14	96
16.	M.S.W.	49	5	43	..	48
17.	Music	9	..	1	3	4
M.Sc. 1.	Mathematics	211	41	38	51	130
2.	Physics	199	33	107	22	162
3.	Applied Physics	6	2	3	1	6
4.	Chemistry	186	26	82	17	125
5.	Analytical Chemistry	14	2	5	7	14
6.	Applied Chemistry	9	1	6	2	9
7.	Biochemistry	7	6	1	..	7
8.	Zoology	166	45	117	2	164
9.	Marine Biology	10	8	2	..	10
10.	Botany	163	67	82	8	157
11.	Genetics & Plant breeding	9	8	1	..	9
12.	Statistics	37	2	26	7	35
13.	Geology	6	4	2	..	6
14.	Oceanography	4	2	2	..	4
15.	Home Science	18	9	9	..	18

TABLE 11

Number of Students in Post-graduate courses in the teaching Departments of the Universities in Kerala 1975-76

	Name of Department	Kerala University			Calicut University			Cochin University			Total		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1.	Department of Economics	38	11	49	..	..	..						
2.	" Politics	34	12	46	..	..	..						
3.	" Psychology	15	16	31	..	..	..	177	5	182	271	76	347
4.	" Sociology	7	32	39	..	..	..						
5.	" Library Science	10	20	30	..	..	..	..	..	..	10	20	30
6.	" English	14	33	47	10	3	13	..	..	..	24	36	60
7.	" German	1	2	3	..	..	..	..	..	..	1	2	3
8.	" Russian	23	7	30	..	..	..	..	..	..	23	7	30
9.	" Malayalam	11	19	30	11	9	20	..	..	..	22	28	50
10.	" Tamil	3	13	16	..	..	..	..	..	..	3	13	16
11.	" Linguistics	11	24	35	..	..	..	..	..	..	11	24	35
12.	" Mathematics	12	18	30	..	..	..	..	..	..	12	18	30
13.	" Statistics	9	13	22	..	..	..	..	..	..	9	13	22
14.	" Physics	..	..	..	11	2	13	44	22	66	55	24	79
15.	" Chemistry	..	..	..	13	9	22	..	..	..	13	9	22
16.	Department of Bio-chemistry	6	5	11	..	..	..	..	..	..			
17.	" Botany	10	8	18	7	7	14	26	12	38	68	41	109
18.	" Zoology	..	..	..	7	9	16						
19.	" Geology	12	..	12	..	..	..						
20.	" Education	13	18	31	7	7	14	..	..	..	20	25	45
21.	" Hindi	..	..	..	16	16	32	15	43	58	31	59	90
22.	" Arabic	..	..	..	15	..	15	..	..	..	15	..	15
23.	" Commerce												
	1. M. Com.	..	..	..	31	..	31	..	..	..	31	..	31
	2. M. B. A.	..	..	..	..	..	..	..	..	..	..	..	..
24.	" History	..	..	..	7	22	29	..	..	..	7	22	29
25.	" Marine Science	..	..	..	..	..	..	..	..	..	..	..	..
26.	" Law	..	..	..	..	..	..	71	9	80	71	9	80
	Total	229	251	480	133	84	219	333	91	424	697	426	1123

TABLE 12

Number of Teachers in Arts and Science Colleges - by Sex

Year	No. of colleges	Number of teachers		No. of teachers	
		Male	Female	Total	Per college
(1)	(2)	(3)	(4)	(5)	(6)
1956-57	28	N. A.	N. A.	1262	45
1961-62	47	N. A.	N A	2336	50
1965-66	100	N. A.	N. A.	4553	46
1971-72	117	N. A.	N. A.	7267	62
1973-74	122	5425	2140	7565	62
1975-76	128	5477	2415	7892	62
1976-77	128	5518	2493	8011	63

TABLE 13

Number of Teachers in Arts and Science Colleges under Government and private Management during 1976-77

Type of Management	1976-77		
	Male	Female	Total
Government	868	478	1346
Private	4670	1995	6665
Total	5538	2473	8011

Source: Annual reports of the Kerala and Calicut Universities

TABLE 14

Student-Teacher ratio in Arts and Science Colleges in Kerala in different periods

Year	*Enrolment of students*	*Number of teachers*	*Number of students per teacher*
(1)	(2)	(3)	(4)
1956-57	22254	1262	18
1961-62	41739	2336	18
1965-66	102841	4553	23
1971-72	153437	7267	21
1973-74	156579	7565	21
1975-76	165448	7892	21
1976-77	175915	8011	22

2

A STUDY ON THE STATUTORY APPRENTICESHIP TRAINING PROGRAMME IN KERALA

A STUDY ON THE STATUTORY APPRENTICESHIP TRAINING PROGRAMME IN KERALA

Introduction

"The economic development of a country depends upon the extent of its advancement in the field of science and technology for which human resource development is an essential pre-requisite. This calls for training of man-power at various levels including craftsmen". Skilled craftsmen constitute the bulk of trained man power requirements for the development envisaged in our five year plans. Their number is large which entails large expansion in training facilities.

Institutional training of Craftsmen has been in existence in the country for quite some time. The Industrial Training Institutes were established on the basis of the report of the National Trade Certification Investigation Committee in order to have a uniform training programme for craftsmen throughout the country. The Department of Industrial Training of the Government of Kerala is responsible for the training programme in the state. The training is imparted in two ways.

(a) Institutional Training

(b) Apprenticeship Training

Institutional Training

While the Engineering Colleges and the Polytechnics will turn out Degree and Diploma Holders with higher supervisory skills and more technical competence by way of know how, the Industrial Training Institutes will produce the rank and file of skilled workers, who will actually run the machines and be engaged in the process of production on the shop floor.

There were 12 Government Industrial Training Institutes and 28 affiliated Private Training Centres in Kerala during 1976-77. The seat strength of the Government Industrial Training Institutes were 7492 and the seat strength of private training centres were 3124. During 1977-78 the number of Government Industrial Training Institutes have increased to 13 and Private Training Centres to 42. As a result the seat strength increased to 7968 and 5452 respectively.

The details regarding the number and seat strength of Industrial Training Institutes in Kerala (1977-78) is given in Appendix I1. Appendix II shows the number of students in Industrial Training Institutes in Kerala (1975-76

and 1976-77). The District-wise details of the number of Industrial Training Institutes and intake of trainees (1974-75) are given in Appendix III. The details of distribution of trainees according to intake in each trade in the Industrial Training Institutes (1974-1975) are furnished in Appendix IV. The intake and out turn of trainees in different trades from 1965-66 to 1974-75 are given in Appendix V.

Apprenticeship Training Programme

The apprenticeship Training Programme provides the country's future manpower requirements of the developing Industries which could improve the quality of production and minimise production cost as well as decreasing wastage of materials etc. The secondary object of the training programme is to regulate the progress of apprentices in industry in such a way to conform both standard of training and to utilize fully the facilities available in industry for imparting practical training, providing special attention to reserve training places for the weaker section of the community.

A careful study of the statement of objects and reasons (Appendix VI) underlying the introduction of the Bill in Parliament on 4th August 1961 brings out the following objectives of the Apprentices Act.

(1) To organise on a systematic basis the training of apprentices in industry with a view to meeting its increasing demand for skilled craftsmen.

(2) To utilise fully the facilities available with industry for the training of apprentices, and

(3) To ensure the training of apprentices in accordance with programmes, standards and syllabi drawn by expert bodies.

The Government of India enacted the apprentices Act, in 1961 in order to supplement the programme of institutional Training and also to regulate training arrangement in industry. The Apprentices Act was implemented in the State from 1963 onwards.

In the beginning stage only 14 Engineering trades were designated under the Act. Subsequently more engineering as well as non engineering trades were designated. By the end of 1974, 61 trades were designated under the Act. In August 1975, the trade 'Winder' was also designated making the total number of designated trades to 62. In September 1975, Government of India again designated 41 additional trades in Engineering and non-engineering trades and the total number of trades increased to 103.

The Act now covers the following trade groups.

Engineering trade group consisting of :—

(a) Machine shop
(b) Foundary
(c) Metal Working
(d) Electrical
(e) Building and Furniture.
(f) Maintenance
(g) Precision Machinery
(h) Instrument
(i) Refrigeration & Airconditioning
(j) Heat Engines
(k) Draftsman and Surveyor
(l) Construction
(m) Power Plant

Ratio of Apprentices

Section 8 (i) of the Act authorises the Central Government to determine for each designated trade the ratio of apprentices to workers other than unskilled in that trade. It is understood that the Ministry of Labour, Government of India had prescribed the ratio on a certain mathematical formula based on additional manpower needs on account of turn over due to retirement assuming the normal working life to be thirty years, growth in employment, promotions in industry and the needs of small establishments. The details of calculations are typical as under:

		Per cent
(a)	Turn over due to retirement	3.3
(b)	Annual growth in employment (in a particular industry for a particular period), say	8.5
(c)	Additional requirements due to promotions equal to annual growth in employment	8.5
(d)	Requirements of small establishments, say	5.0
	Total	25.3

The ratio in this particular case would be 1:4. It is further understood that these ratios as prescribed by the Government of India are applicable through out the country and changes if any, are made only by the Central Government.

The ratio of apprentices to workers, period of training and educational qualification are prescribed under the Apprenticeship rules framed under the Apprentices Act, 1961. The details regarding the trade groups, designated trades, ratio of apprentices to workers, period of training and educational qualifications are shown in Appendix VII.

The Apprenticeship Training is imparted, through on the job training in the shop floor. This has three stages:—

(1) Basic Training

(2) Practical Training

(3) Theory Classes (Related Instruction)

The Industrial Training Institutes in Kerala provide facilities for basic training in 46 Engineering trades. Facilities for the basic training in the other 50 trade are not available at present with the I. T. Is. But in the case of catering trades, four trades are now dealt with in the Food Craft Centre, Kalamassery and the courses are recognised as equivalent to a basic training course in the respective trades under Apprenticeship Act. Commercial Trades do not require basic training.

At present there are no facilities for basic training in Printing, Textile and Chemical trades at I. T. Is.

The details regarding the engagement of ex-industrial training Institute trainees as apprentices in the trades other than those taught in the industrial training institutes are given in Appendix VIII.

Period of training of the apprentices will be 6 months to 4 years. There are two types of apprentices, Freshers and ex I.T.I. boys. The later are entitled to a corresponding rebate for the period of Institutional training undergone at I. T. Is.

It is obligatory on the part of the employer both in the Public and Private Sector establishments to engage a certain number of apprentices as per ratio prescribed in the Apprentices Act 1961.

Related Instruction

As per provisions 10 (2) of the Act, it is a statutory obligation on the part of the State Government to give a course of Related Instruction (Theory classes) approved by the Government of India with a view to giving the trade apprentices such theoretical knowledge as they need in order to become fully qualified skilled Craftsmen thus enabling him to sit for the National Apprenticeship Certificate Examination. As per the rules of the Government of India, the apprentices are not supposed to sit for the final trade test after completion of the training unless the apprentices have also at the same time attended the prescribed number of classes in Related Instruction for which syllabus have been laid down.

It is also obligatory on the part of the employers engaging more than 500 people to run their own basic training and Related Instruction Centres. Such type of large establishments are very rare in Kerala and a few available are with the Central Sector and the apprentices Act is implemented in these establishments by the Regional Director of Apprenticeship.

Before the vigorous implementation of the apprentices Act, the related Instruction Classes for the apprentices were conducted at the respective Industrial Training Institutes in Kerala. Due to the vigorous drive, the number of apprentices have increased enormously and sanction was accorded to start Related Instruction Centres at different parts of the state. Now there are five Related Instruction Centres in Kerala, i.e. Trivandrum, Quilon, Kalamassery, Calicut and Kottayam.

The apprentices engaged are eligible for stipend sanctioned by the Government of India from time to time. The stipend rate to the apprentices was enhanced by the Government after the vigorous implementation of the Apprentices Act. Table—1 below shows the rate of stipend before 23-1-1976 and the rate of stipend after the vigorous implementation of the Act.

TABLE I

Year	*Rate of stipend before* 23-1-1976	*After the vigorous implementation of the Act (From* 23-1-1976*)*
Ist Year	Rs. 90.00	Rs. 130.00
2nd Year	Rs. 100.00	Rs. 140.00
3rd Year	Rs. 108.00	Rs. 150.00
4th Year	Rs. 144.00	Rs. 200.00

Taking an average of Rs. 140 per month per trainee, the apprentices in the state are getting a total stipend of Rs. 10,08,000 per annum (approximately). The Government is also paying actual bus fare to the trainees attending the Related Instruction Classes.

At present facilities are not available in the Industrial Training Institutes to conduct basic training for all the designated trades. For eg., Printing, Chemical and Textile trades have no basic training facilities in Kerala. The basic training for Printing trade is now being arranged by the concerned employers themselves for which a grant of Rs. 85 per month per trainee is paid to them.

Implementation of the Apprenticeship Training Programme

During 1970-71, there were 411 apprentices undergoing apprenticeship training in various industrial establishments in Kerala. The training seats located during the period were 613. The following table gives in a nut shell the performance of apprenticeship training programme from 1970-71 to 1974-75.

TABLE II

Period	*No. of seats located*	*No. of seats utilised*	*No. of places lying vacant*
1970-1971	613	411	202
1971-1972	752	694	58
1972-1973	898	622	276
1973-1974	1500	954	546
1974-1975	1872	1289	583

By 1974-75 the number of seats located increased from 613 (1970-71) to 1872. The number of seats utilised also increased from 411 in 1970-'71 to 1289 in 1974-75. The number of training seats lying vacant increased from 202 in 1970-71 to 583 in 1974-75.

The number of seats utilised had further increased to 1901 on 15-8-1975 against 1940 seats located. The places lying vacant dropped to 39 on that date.

The vigorous implementation of the apprenticeship training programme was introduced in our state also. The main objects laid down by the Government in this line were: "As one of the measures to increase employment opportunities for educated young people, the Apprenticeship Act will be suitably amended so that managements in the organised sectors of our economy take a larger number of apprentices for a specified period. Special care will be taken to ensure fair deal to scheduled caste and tribes, minorities and handicapped persons in the recruitment of apprentices".

The programme envisages (i) suitable amendment of the apprenticeship Act so as to increase the number of apprentices to be trained and (ii) the benefits of training should flow in increasing proportion to the weaker sections of society such as those belonging to Scheduled Castes and Scheduled Tribe, minorities, Women and physically handicapped persons.

Based on the decision of the Government Vigorous action was taken for survey and placement of apprentices in respect of trades. Intensive efforts were made in this direction by State Apprenticeship Adviser.

The details regarding the number of seats located, number of seats utilised and number of seats lying vacant, since the implementation of intensive drive are given in Table–3.

TABLE III

Performance of Apprenticeship Programme from August 1975 to December 1976

Period	*No. of seats located*	*No. of seats utilised*	*No: of seats lying vacant*
23-8-1975	2251	2097	154
24-9-1975	3063	2539	524
10-10-1975	3695	3432	263
30-10-1975	3886	3634	252
15-11-1975	3960	3671	289
31-12-1975	4021	3697	324
15-1-1976	4021	3700	321
28-2-1976	4021	3700	321
31-3-1976	4029	3805	224
19-6-1976	4119	4011	108
15-9-1976	4209	4202	7
31-12-1976	6089	5971	118

The number of seats utilised shot up from 2097 on 23-8-1975 to 4202 on 15-9-1976 (a 200% increase) against located seats of 2251 and 4209 respectively. This means on 15th August 1976 the training places lying vacant dropped from 154 on 23-8-1975 to 7. The number of seats utilised had further increased to 5971 on 31-12-1976 against 6089 seats located, i.e. a 70% increase within three months time.

The Directorate of Industrial Training could achieve a remarkable progress in locating maximum number of training places and engaging maximum number of apprentices during the period. The surveyors (Junior Apprenticeship Advisers) under the directions of Director of Training (State Apprenticeship Advisor) and the Deputy State Apprenticeship Advisor, undertake surveys in the establishments coming under the purview of the Act and determine with reference to the training facilities available corresponding to the syllabus framed for occupational training, the number of apprentices to be trained in certain proportion with the total number of persons engaged in that occupation.

While analysing the progress of the training programme in the state, it will be interesting to note the progress achieved by the various training centres. The following table (table No. 4) shows the Centre-wise details as on 15-9-1976 and 31-12-1976.

TABLE IV

Statement of Survey of Establishments, Assignments and Placements of Apprentices

Centre	*No. of seats Located*		*No. of seats Utilised*	
	15-9-1976	31-12-1976	15-9-1976	31-12-1976
Trivandrum	631	930	625	901
Quilon	481	650	481	650
Chengannoor	251	454	251	407
Ettumannoor	420	702	390	686
Kalamassery	976	1502	1180	1485
Chalakudi	349	450	304	447
Palghat	255	409	232	403
Calicut	589	637	502	637
Cannanore	257	355	237	355
Total	4209	6089	4202	5971

It is seen from the above table that Kalamassery Centre which is in the industrial belt was responsible for the engagement of about 28 percent (1180) of the total apprentices (4202) as on 15-9-1976. Trivandrum Centre engaged 625 apprentices out of 4202 (about 15%). As on 31-12-1976 also Kalamassery Centre stood first i.e. 1485 out of 5971 apprentices engaged in all the Centres (about 25%). Trivandrum Centre engaged 901 out of 5971 (about 15%) and stood second. The centre-wise information pertaining to the number of establishments as per records available from Industries and Labour Department total number of establishments, available in which on the spot survey has been completed, number of establishments in which facilities are not available on the basis of spot survey, number of establishments where facilities are available on the basis of spot survey, number of assigned seats located in the establishments actually surveyed and the number of seats utilised, in the above mentioned period is given in Appendix IX and X.

Government in Circular No. 634/C3/76/LBR dated, 6-2-1976 have requested all authorities of major establishments, to give preference to scheduled castes, and scheduled tribes in future so as to ensure the percentage of placement is at least 20% of the total placement.

At present there are no specific rules in the apprentices act for the reservation of seats to the physically handicapped, women and minorities. As far as Kerala is concerned, for the engagement of apprentices, due reservation

have been given to the above categories. Out of 3891 apprentices engaged as on 30-4-1976, a total number of 1703 training places were filled up from among the reservation categories.

The details of category-wise information is given below:

Scheduled caste	..	179
Scheduled Tribe	..	6
Physically handicapped	..	6
Minorities	..	1512
Total		1703

Special care has also been given for the engagement of the apprentices from Women candidates. 103 Women apprentices were engaged in different trades on 30-4-1976.

As regards the engagement of apprentices from among the weaker sections the progress of work as on 30-9-1977, appears to be quite satisfactory. Table No. 5 given below explains the number of apprentices engaged from Scheduled Castes Scheduled tribes, physically handicapped, women and minorities as on 30-9-1977. The table gives the district-wise details.

TABLE V

No. of Apprentices engaged from the Weaker Sections of Society as on 30-9-1977

District	*Scheduled Caste*	*Scheduled Tribe*	*Physically handi-capped*	*Women*	*Minori-ties*	*Total*
Trivandrum	75	Nil	7	184	404	670
Quilon	59	Nil	2	13	138	212
Alleppey	13	1	1	14	63	92
Kottayam and Idukky	23	5	Nil	47	135	210
Ernakulam	85	1	2	69	600	757
Trichur	10	Nil	Nil	20	84	114
Palghat	24	Nil	1	11	160	196
Calicut	16	3	4	16	215	254
Cannanore	3	4	1	29	23	60
Total	308	14	18	403	1822	2565

The number of Scheduled Castes and Scheduled Tribe candidates increased from 179 and 6 to 308 and 14 respectively during April 1976 and August 1977. Number of physically handicapped candidates increased from 6 to 18 during this period. As visualised in the intensive programme preference were also given to the women candidates and candidates from minority communities. As a result the number of women candidates engaged increased by four times ie. from 103 during April 1976 to 403 in August 1977 (a 400% increase). Number of candidates from minority communities also increased from 1512 to 1822. The proportion of candidates belonging to the specified categories to the total number of candidates engaged during August 1977 was above 42% ie. about 5% from among Scheduled Castes and tribes, about 6% from women and about 30% from minority community.

The fifth plan target of the state was to engage at least 1500 candidates. Government of India has further increased the target and instructed to engage 6200 candidates as on 31-12-1977. While analysing the latest available figures it is seen that the Directorate of Training is about to reach the goal.

Table 6 explains the position as on 30-9-1977.

TABLE VI

Performance of apprenticeship programme as on 30-9-1977

District	*No. of seats located*	*No. of seats engaged*
Trivandrum	939	947
Quilon	650	653
Alleppey	483	436
Kottayam & Idukky	702	689
Ernakulam	1502	1525
Trichur	450	450
Palghat	406	400
Calicut	722	682
Cannanore	355	355
Total	6209	6137

Ernakulam district accounts for the engagement of 1525 apprentices (about 25%) followed by Trivandrum where 947 apprentices (about 15%) were undergoing training. Calicut and Quilon stood third and fourth places, i.e. 682 and 653 respectively.

Kerala occupies a significant position in the engagement of apprentices on the all India canvas. Appendix XI shows that Kerala stood first in India in the percentage of achievement for engaging apprentices. Regarding the

position in other states, out of the total of 81,455 seats utlised in the state sector, establishments upto 17th April 1976, the highest engagement of apprentices number-wise, was recorded in Maharashtra to the tune of 14,400 or 17.7% followed by West Bengal where 10,326 apprentices were engaged.

National Employment Service and the Apprenticeship Training Programme

The link between the statutory Apprenticeship Training Programme and the national employment service is very weak. Indirectly, employment exchanges play some role in the recruitment prior to training and placement after training. The following table (table No. VII) gives the details regarding the number of applications forwarded to apprenticeship authorites/Training Centre and the number actually placed in apprenticeship/Training Centre from 1965-66 onwards through National Employment Service.

TABLE VII

No. of applications forwarded and number actually placed through National Employment Service

Year	*No. of applications forwarded to Apprenticeship authorities, Training Centre*	*No. actually placed in apprenticeship, Training Centres*
(1)	(2)	(3)
1965-66	3,098	372
1966-67	22,911	402
1967-68	3,775	270
1968-69	1,688	298
1969-70	1,448	65
1970-71	1,319	66
1971-72	2,283	152
1972-73	1,767	94
1973-74	1,942	94
1974-75	1,387	85
1975-76	6,679	309

During April 1977, 251 applicants were directed to Training Centre/ Apprenticeship authorities and 40 persons were placed in Apprenticeship Training through the Vocational Guidance programme of the National Employment Service of the State. In June 1977, 59 applicants were directed

to Training/Apprenticeship authorities and 41 were placed in apprenticeship programme. The number of applicants directed to training/apprenticeship authorities increased to 562 in August 1977 and 114 applicants were placed in apprenticeship.

Live Register:

The number of National Apprenticeship Holders in the live register of the Employment Exchanges is also increasing. During April 1977 the number of Apprenticeship Holders in the live register was 910. It increased to 938 in June 1977. The number of apprenticeship holders had further increased to 992 in August 1977.

Expenditure:

The budgeted plan out lay of the apprenticeship training programme for 1977-78 (Plan expenditure) was Rs. 10 lakhs and the original allotment in the non-plan scheme for 1977-78 was Rs. 4,64,000. The following tables show the details of expenditure upto the month of August 1977 both in plan and non-plan schemes. The budgeted plan outlay for 1976-77 was Rs. 7.00 lakhs and the original allotment in the non-plan was Rs. 3.15 lakhs for the Apprenticeship Scheme.

TABLE VIII

Expenditure (Plan outlay)

Budgeted Plan outlay for the year 1977-78 *(in lakhs)*	*Expenditure upto the end of previous month*	*Expenditure for the month of August* 1977	*Progressive expenditure upto the end of August* 1977
10.00	3.179	0.467	3.646

TABLE IX

Details of Expenditure under Non-Plan

Original allotment	*At the beginning of the month*	*Expenditure*		*Balance*
		During August 1977	*Progressive Total*	
Rs. 4,64,000	Rs. 1,27,385	Rs. 21,832	Rs. 1,49,217	Rs. 3,14,783

Technicians of varied skills

The needs of industry for skilled manpower call for a new approach to technical education, avoiding the division into traditional disciplines. What is currently required is mobility among the products of engineering education, which requires a broadening of the base, and a multi-disciplinary approach. This was the running theme of the discussion at the annual convention of the Indian society for Technical Education held in Trivandrum, some months back. Innovation in technical education for more efficient and effective utilisation of human and material resources, transfer of technology and its application for promoting rural development, continuing programmes for enabling technicians to keep abreast of advancing technology. Many of the future jobs for technicians would not lie squarely within the traditional engineering disciplines. Technological developments were outstripping such traditional divisions. Every teaching institution required an inter-disciplinary group of enthusiasts, who could cross-fertilize one another's thinking as they worked together.

Technical Education, requires, in the present Indian context, innovation in teaching methods; Innovation according to the needs of the Industry. The teaching staff in the Craftsmen training centres and the production engineers of the industry should be brought together to offer a meaningful academic programme and practical training for Craftsmen and other engineering students. This will help to avoid routinisation in technical education and for enabling engineering personnel to keep abreast of advancing technology.

Balancing Demand and Supply:

One of the most important objectives of the appreticeship programme was to organise the training of apprentices in such a manner as to meet the increasing demand of industry for skilled Craftsmen. It is very difficult to assess with certainty whether the industry's demand for skilled personnel has been completely met. Secondary evidence however, shows that there were a number of vacancies in industryfor skilled Craftsmen for which suitable candidates were not available while a large number of persons who were trained as apprentices were unemployed and seeking jobs. The reason for such as imbalance seems to lie in the absence of any machinery for estimating the specifix needs of industry and co-ordinating the training programmes in an integrated manner.

Man Power needs of the Industry and the training programme:

The problem of unemployment should be tackled at area or grass root level. This can be achieved only by studying the quantum and quality of current and prospective employment industry-wise and occupation-wise with a view to co-ordinating man power needs and employment opportunities with the output of educational system and available technical training facilities. This type of studies are of significant value in initiating measures for tackling

problems of unemployment and formulating schemes for expansion of self-employment, career advice, training and apprenticeship, job development, employment market infomation programme etc.

This type of manpower studies can be undertaken to assess the current manpower situation, forcast industry's needs for trained personnel in terms of quality and quantity and recommend the size of training programme accordingly. In arriving at the industry's requirements, the machinery should take into consideration not only the needs of existing industrial establishment but also the needs of industries which are likely to be set up in the near future.

Moreover such studies can (a) provide information for use in vocational guidance and in initiating an effective career advisory service which depend for its success on a sound knowledge of changing job opportunities in different occupations.

(b) to furnish details for use in job development and placement activities of the Employment Service;

(c) to provide specific information on changes that will be necessay in training and apprenticeship programme to meet future requirements;

(d) to provide information about fields in which financial and other assistance is indicated for pomotion of opportunities for employment and self-employment.

(e) to provide area-wise information concerning manpower resources needed in connection with location and expansion of industries;

(f) to study and collect information regarding manpower content of plan schemes and expansion programmes envisaged for a particular area; and

(g) to provide information needed for manpower, planning at area or 'grass-root' level.

An equilibrium between the demand and supply of manpower could be achieved by regulating the ratio of apprentices to be turned out to the total number of personnel in corresponding categories of personnel in existing industries. Apprenticeship programme and training courses would then be systematised, resulting in adequate utilisation of both material and human resources. Thus the working of apprenticeship training programme can be improved so as to make it more purposeful to both industry and apprentices.

Methods for preparing Manpower for industry:

The two distinct methods of preparing middle level manpower for industry are the statutory apprenticeship tranining programme and the institutional training arrangements.

A trainee who has completed statutory apprenticeship seems to be more acceptable to the industry than one turned out by the I.T.I. This is so because the trainee is able to acquire necessary skills as well as the speed of operation

under the apprenticeship training programme under real life situation in industry. Apprenticeship training is more flexible, responsive to rapid changes in tehnology. Being conducted by instructors and equipments used for production, it calles for much less advance planning. Besides, it may cover a part of its cost by participation in productive activities. The apprenticeship training which entails less wastage from unutilized specific training, is more realistic and appropriate and provides for better co-ordination with demands of the labour market.

A survey of training arrangements at the craftsmen level in some western countries suggests that the task of preparing manpower for industry in those countries has been largely entrusted to the industry itself. The manpower development and training Act 1962 of U. S. A. provides for training on-the-job in co-operative organisations, private and public agencies, employers' trade associations and labour organisations. The industrial Act, 1964 of Great Britan is designed to set up industrial Training Boards to enquire into the extent of training in operation and the estimated future requirements of skilled manpower in industry and to arrange for the training of such manpower in industrial establishments. In West Germany, about 71 per cent of all the students of the age of 16 years are attending part time vocational school are undergoing on-the-job training in industrial establishments. Thus, the experiences of developed countries also strengthen our own experience in the utility of apprenticeship training as against institutional training arrangements. This calls for a bold decision on the part of Government to curtail progressively institutional training arrangements and increase the facilities for training on-the-job under the statutory apprenticeship programme. The role of industrial training institutes would then be complementary to the apprenticeship training programme. With limited financial resources with Government, it may be possible to train a large number of persons under the apprenticeship training scheme.

Perhaps a fruitful combination of the two methods, as indicated below, is more likely to yield optimum results through better cost benefit ratio.

Industry is to provide for shop floor training. Industrial Training Institute are to cater to basic training and related instruction.

The apprenticeship training programme should be considered as a willing partnership among the training institutes, industry and Government. Although the school system has no direct role to play, it nevertheless influences the programme indirectly. Apart from increasing the horizon of individual's knowledge, general education viewed as a foundation for later occupational learning has three major functions (pertaining to pre-vocational education) as under.

(a) to provide a core of knowledge, skills and personality traits, basically important in many occupational roles;

(b) to induce learning attitudes and learning skills; and

(c) to provide general acquaintance with the world of work and with occupational possibilities and requirements; to trainability.

It is hoped that the general education system will be structured to play its role for occupational preparation.

Self-Employment schemes for trained hands:

One of the current objectives of apprenticeship training programme in organising the training is to help the industry in meeting its increasing demand for skilled craftsmen. Such training with suitable adjustments can as well be helpful to apprentices themselves in undertaking self employment. Since the scope for generation of employment opportunities in industry is limited, depending upon its own growth rate, large employment opportunities for the increasing additions to labour force will have, therefore, to be found by inducing trained and qualified persons to undertake self employment. If these premises are accepted, the apprenticeship training programme may be suitably modified by (i) identifying persons from among apprentices, who are enterprising and who possess enterpreneural ability (ii) imparting additional training in industrial management and (iii) helping the youth to obtain requisite institutional finance. The Industry can further play very useful role in reserving the sphere of manufacturing its spares and other consumables to young enterpreneurs trained by it.

Conclusion

Basically, the idea of apprenticeship training is to prepare a body of trained personnel which might be useful for the existing industry (a) to meet its current shortages (b) to replace its own manpower and (c) to meet the prospective needs of contemplated expansion, if any to make this programme a success, to reduce the number of drop outs to avoid wastage and to attract more unemployed youths to the army of trained manpower, apprentices should be offered employment in the same establishment after the successful completion of apprenticeship training. In the statutory apprenticeship system, the recruitment of apprentices is left to the industry itself. Industry is free to select the right type of candidates. This has helped to avoid any friction which might have resulted if any unwanted candidates were directed to the Industry for training. Eventhough there is no compulsion on the Industry to employ the apprentices turned out by it, the Industry should employ the maximum possible apprentices coming out successfully in the same establishment itself. There should be a machinery, to assess the surplus trained man power and to utilise them to fulfil the requirements of trained manpower for prospective industries which are likely to be set up in the near future. It is a matter of fact that the manpower required by the new industrial establishments cannot be trained overright. Any how the success or otherwise of apprenticeship training depends upon the attitude of the Industry. Large employment opportunities for this increasing additions to the labour force will also have to be found by inducing trained and qualified persons to undertake self employment. Commercial banks and other financial institutions in the Public and Private Sector could play a vital role in this area by financing the passed out apprentices to undertake their own projects.

APPENDIX 1

Seat Strength of Trainees in I. T. Is. in Kerala for the year 1977-78

Sl. No.	*Name of Trades*	*Dhanuvachapuram*	*Trivandrum*	*Attingal*	*Quilon*	*Chengannur*	*Idukki*	*Ettumanoor*	*Kalamassery*	*Chalakudy*	*Palghat*	*Malappuram*	*Calicut*	*Cannanore*	*Total*	*Total of Units*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1.	Blacksmithy	32	32	16	32	32	16	32	32	16	16	16	..	16	288	18
2.	Carpenter	48	48	32	32	32	..	32	32	32	16	..	32	32	368	23
3.	Mech. Diesel	32	16	..	16	..	..	..	..	..	..	..	32	..	96	6
4.	Mech. Tractor	..	..	..	..	32	..	..	..	..	32	..	..	..	64	4
5.	Moulder	32	32	..	32	16	..	16	32	32	16	..	..	16	224	14
6.	Painter	..	..	..	16	..	..	..	16	..	..	..	..	..	32	2
7.	Sheet Metal Worker	48	48	32	16	16	..	16	32	16	16	..	16	16	272	17
8.	Plumber	16	16	..	16	32	..	16	16	16	..	..	16	16	160	10
9.	Welder	72	72	48	48	72	12	60	48	60	60	12	24	48	636	53
10.	Stenography	..	..	16	..	16	32	16	16	16	16	16	6	16	160	10
11.	Cutting & Trailoring	..	..	..	..	..	..	16	..	..	..	..	..	..	16	1
	Total	280	264	144	208	248	60	204	224	188	172	44	120	160	2316	158

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Two Year Course																
1.	Draftsman Civil	32	32	32	..	16	..	32	..	32	32	32	32	32	304	19
2.	Draftsman Mechanical	32	32	32	32	..	..	..	..	32	..	32	..	32	224	14
3.	Electrician	32	64	..	64	64	16	64	64	64	64	..	48	48	592	37
4.	Electronics	16	64	32	32	16	16	32	32	..	32	32	32	48	384	24
5.	Electroplater	..	..	..	..	..	..	..	16	..	..	..	..	..	16	1
6.	Mech. Instrument	..	32	..	..	..	..	32	32	..	32	..	..	32	160	10
7.	Mech. (Radio & Television)	32	64	64	..	48	16	32	..	16	48	..	32	64	416	26
8.	Mech. (Ref. & A. C.)		48	48	48	32	..	..	32	..	..	..	32	48	288	18
9.	Fitter	96	64	64	96	64	16	96	96	96	96	32	64	96	976	61
10.	Surveyor	..	32	..	32	16	..	..	..	32	..	..	..	32	144	9
11.	Turner	48	48	24	48	60	12	60	60	48	72	..	24	60	564	47
12.	Machinist	72	48	..	72	60	..	60	48	72	72	..	24	48	576	48
13.	Mech. (M. V.)	32	32	32	32	32	..	32	16	32	32	16	16	32	336	21
14.	Wireman	64	64	32	32	64	..	64	64	64	64	32	64	64	672	42
	Total	456	624	360	488	472	76	504	460	488	544	176	368	636	5652	377
	Grand Total	736	888	504	696	720	136	708	684	676	716	220	488	796	7968	535

APPENDIX II

Number of Students in Industrial Training Institute in Kerala 1975-76 & 1976-77

Name of Districts	1975-76						1976-77					
	Government		Private		Total		Government		Private		Total	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1. Trivandrum	1482	196	351	81	1833	277	1461	210	413	126	1874	336
2. Quilon	669	11	525	10	1194	21	707	22	515	8	1222	30
3. Alleppey	664	7	971	76	1635	83	684	9	1102	77	1750	86
4. Kottayam	561	16	91	..	652	16	643	22	91	..	734	22
5. Idukki	..	..	34	..	34	..	..	..	34	..	34	..
6. Ernakulam	702	..	369	..	1071	..	708	..	399	..	1107	..
7. Trichur	689	16	60	..	749	16	652	48	60	..	712	48
8. Palghat	697	7	..	..	697	7	712	28	..	..	712	28
9. Malappuram	150	5	7	..	157	5	188	8	..	..	188	8
10. Kozhikode	390	..	..	..	390	..	440	21	..	..	440	21
11. Cannanore	645	22	..	..	645	22	687	28	..	..	687	28
Kerala	6649	280	2408	167	9057	447	6846	396	2614	211	9460	607

APPENDIX III

Number of industrial Training Institutes and Intake of Trainees District-wise—1974-75

District	Government		Private		Total	
	No. of I. T. I.	Intake of Trainees	No. of I. T. I.	Intake of Trainees	No. of I. T. I.	Intake of Trainees
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Trivandrum	3	1872	4	352	7	2224
Quilon	1	648	3	272	4	920
Alleppey	1	648	8	1040	9	1688
Kottayam	1	632	2	88	3	720
Idukki	..	..	1	32	1	32
Ernakulam	1	704	8	512	9	1216
Trichur	1	656	1	52	2	708
Palghat	1	672	..	..	1	672
Malappuram	1	160	1	16	2	176
Kozhikode	1	376	..	..	1	376
Cannanore	1	680	1	32	2	712
Total	12	7048	29	2396	41	9444

Source: Fact book on Manpower, 1976.

APPENDIX IV

Distribution of Trainees according to intake in each trade in the I. T. I.—1974-75

Trade	Number of Trainees		
	Government	Private	Total
(1)	(2)	(3)	(4)
1. Draftsman (Civil) ..	160	288	448
2. Draftsman Mechanic ..	256	304	560
3. Draftsman Electrician ..	544	128	672
4. Electronics ..	64	..	64
5. Electroplating ..	16	..	16
6. Refrigeration and Air Conditioning ..	128	..	128
7. Mechanic (Instrument) ..	160	..	160
8. Mechanic (Radio and Telecommunication)	192	176	368
9. Surveyor ..	128	96	224
10. Fitter ..	1152	928	2080
11. Turner ..	600	72	672
12. Machinist ..	672	24	696
13. Wireman ..	432	..	432
14. Tractor Mechanic ..	64	..	64
15. Motor Mechanic ..	368	48	416
16. Mechanic Diesel ..	80	..	80
17. Moulder ..	272	32	304
18. Pattern maker ..	..	32	32
19. Welder ..	672	188	860
20. Sheet Metal Worker ..	256	32	288
21. Carpenter ..	368	16	384
22. Black smith ..	272	32	304
23. Painter ..	32	..	32
24. Plumber ..	160	..	160
Total ..	7048	2396	9444

Source: Fact book on manpower, 1976.

APPENDIX V

Intake and out-turn of trainees in different trades in Kerala

Year	Strength	Number of Students admitted	Number of Candidates appeared	Number of Candidates passed	Private candidates	
					Appeared	passed
1965-66	4993	2810	2661	2449	74	54
1966-67	6127	3980	2668	2347	110	80
1967-68	6604	4593	4055	3490	93	65
1968-69	6654	4985	4434	3565	130	76
1969-70	6236	3723	3857	2714	207	102
1970-71	6246	4399	4312	2957	199	85
1971-72	6620	4540	3571	2363	260	135
1972-73	7016	5371	5424	3407	250	88
1973-74	4392	4876	4938	3300	304	131
1974-75	7048	5515	5238	3493	223	53

Source: Department of Employment and Training.

APPENDIX VI

APPRENTICES ACT 1961

Statement of Objects and Reason

The question of undertaking legislation for regulating the training of Apprentices in industry has been under the consideration of the Government for a long time. Expert Committees which went into the question have recommended such legislation. Although certain establishments in the public and private sectors have been carrying out programmes of training of skilled workers on a systematic basis, industry in general has not as yet fully organised such programmes. In the context of Five Year Plans and the large scale industrial development of the country, there is in increasing demand for skilled Craftsmen. The Government consider that it is necessary fully to utilise the facilities available for the training of apprentices and to ensure their training in accordance with the programmes, standrards and syllabi drawn up by expert bodies. The Bill is intended to give effect to these objects.

(Sd)

GULZARILAL NANDA

Delhi, the 4th August 1961

Gazette of India Extraordinary Part II Section 2, dated, 19th August 1961 P. 747.

APPENDIX VII

List showing the designated trades, Ratio of apprentices to workers, period of training and educational qualifications prescribed under the apprenticeship rules framed under apprentices Act 1961

Sl. No.	*Designated Trade*	*Ratio of apprentices to workers*	*Period of Training*	*Minimum Educational Qualification*
(1)	(2)	(3)	(4)	(5)
I	**Group No. 1 Machine shop trades group**			
1	Fitter	1:7	3 Years	Passed 2 standards below S. S. L. C. or passed the 8th class examination or its equivalent under the 10+2 system.
2	Turner	1:7	3 Years	
3	Machinist	1:7	3 Years	
4	Machinist (Grinder)	1:7	3 Years	
II	**Group No. 2 Foundary Trades group**			
5	Pattern Maker	1:7	3 Years	Passed 2 standards below S. S. L. C. or passed the 8th class examination or its equivalent under the 10+2 system.
6	Moulder	1:7	3 Years	
III	**Group No. 3 Metal working Trades Group**			
7	Blacksmith	1:7	3 Years	Passed 2 standards below S. S. L. C. or passed the 8th class examination or its equivalent under the 10+2 system.
8	Sheet Metal Worker	1:7	3 Years	
9	Welder (Gas & Electric)	1:7	2 Years	
10	Motor Vehicle Body Builder	1:7	2 Years	
IV	**Group No. 4 Electrical Trades Group**			
11	Electrician	1:7	3 Years	Pass in Matriculation examination or its equivalent (SSLC) or the tenth class under the 10+2 system, preferably with Science as one of the subjects.

(1)	(2)	(3)	(4)	(5)
12	Lineman	1:7	3 Years	Passed 2 standards below S. S. L. C. or passed the 8th class examination or its equivalent under the 10+2 system.
13	Wireman	1:7	3 Years	
14	Auto Electrician	1:7	2 Years	Passed 2 standards below S. S. L. C. with Science or passed the 8th class examination or its equivalent with Science under the 10+2 system.
15	Electrician Aircraft	1:10	4 Years	Pass in the Matriculation examination or its equivalent (S.S.L.C.) or the tenth class under the 10+2 system with Science.
V	**Group No. 5 Building and Furniture Trades Group**			
16	Carpenter	1:7	3 Years	Passed 2 standards below S. S. L. C. or passed the 8th class examination or its equivalent under the 10+2 system.
17	Plumber	As in footnote	3 Years	
18	Brick-Mason/Building Constructor	1:7	3 Years	
19	Brick Layer	1:7	1 Year	Passed the 5th class Examination
20	Furniture Maker and Designer	1:4	3 Years	Pass in the Matriculation examination or its equivalent S.S.L.C. or the tenth class under the 10+2 system.
21	Cabinet Maker	1:5	3 Years	Passed 2 standards below S.S.L.C. or passed the 8th class examination or its equivalent under the 10+2 system.
22	Sports Goods Maker (wood)	1:5	2 Years	

(1)	(2)	(3)	(4)	(5)
VI	**Group No. 6 Maintenance Trades Group**			
23	Millwright/Mechanic (Maintenance)	1:2	4 Years	Pass in Matriculation examination or its equivalent (S. S. L. C.) or the tenth class under the 10+2 system preferably with Science as one of the subjects.
24	Mechanic Maintenance (Textile Machinery)	1:7	3 Years	Pass in Matriculation or its equivalent S.S.L.C. or the tenth class under the 10+2 system.
25	Mechanic Maintenance (Chemical Plant)	1:7	3 Years	Pass in Matriculation examination or its equivalent (S.S.L.C.) or the tenth class under the 10+2 system with Science as one of the subjects.
26	Mechanic (Dairy Maintenance)	1:7	3 Years	Passed 2 standards below S. S. L. C. or passed the 8th class examination or its equivalent under the 10+2 system.
27	Sewing Machine Mechanic	1:4	1 Year	
VII	**Group No. 7 Precision Machining Trades Group**			
28	Tool & Die Maker	1:2	4 Years	Pass in Matriculation examination or its equivalent (S. S. L. C.) or the tenth class under the 10+2 system preferably with Science as one of the subjects.
VIII	**Group No. 8 Instrument Trades Group**			
29	Instrument Mechanic	1:3	3 Years	Pass in Matriculation examination or its equivalent (S. S. L. C.) or the tenth class under the 10+2 system, preferably with Science as one of the subjects.

(1)	(2)	(3)	(4)	(5)
30	Mechanic Instrument Air Craft	1:10	4 Years	Pass in the Matriculation examination or its equivalent (SSLC) or the tenth class under the 10+2 system with Science.
IX.	**Group No. 9 Refrigeration and airconditioning Trades Group**			
31	Refrigeration and Air-conditioning Mechanic	1.3	3 Years	Pass in Matriculation examination or its equivalent (SSLC) or the tenth class under the 10+2 system, preferably with Science as one of the subjects.
X.	**Group No. 10 Heat Engine Trades Group**			
32	Mech. (Motor Vehicle)	1:4	3 Years	Passed 2 standards below S.S.L.C. or passed the 8th class examination or its equsvalent under the 10+2 system.
33	Mechanic (Diesel)	1:4	3 Years	
34	Mechanic (Tractor)	1:3	3 Years	
35	Mechanic (Earthmoving Machinery)	1:1	4 Years	
XI.	**Group No. 11 Draftsman and Surveyors Trades Group**			
36	Draftsman (Civil)	1:10	3 Years	Pass in Matriculation examination or its equivalent (SSLC) or the tenth class under the 10+12 system, with Science and Mathematics as elective subjects.
37	Draftsman (Mech.)	1:10	3 Years	
38	Surveyor	1:14	3 Years	
XII.	**Group No. 12 Construction Trades Group**			
39	Fitter Structural	1:8	3 Years	Pass in Matriculation examination or its equivalent (SSLC) or the tenth class under the 10+2 system, with Science and Drawing as subjects.

(1)	(2)	(3)	(4)	(5)
XIII. Group No. 13 Power Plant Trades Group				
40	Boiler Attendant	1:2	3 Years	Pass in Matriculation examination or its equivalent (SSLC) or the tenth class under the 10+2 system with Science as one of the subjects.
XIV. Group No. 14 Printing Trades Group				
	(i) Type Setting Group			
41	Compositor Hand	1:7	2 Years	Pass in Matriculation examination or its equivalent (SSLC) or the tenth class under the 10+2 system with proficiency in English and any regional language.
42	Lino Operator	1:7	3 Years	
43	Mono Operator	1:7	3 Years	
44	Mono Caster	1:7	2 Years	
	(ii) Printing Group			
45	Letter Press Machine Minder (Platen and Cylinder)	1:7	3 Years	Pass in Matriculation examination or its equivalent (SSLC) or the 10th class under the 10+2 system
	(iii) Photo Mechanic Group			
46	Process Cameraman	1:5	3 Years	Pass in Matriculation examination or its equivalent (SSLC) or tenth class under the 10+2 system, with Physics and Chemistry.
47	Retoucher (Lithographic)	1:5	3 Years	
48	Engraver	1:5	3 Years	
	(iv) Binding Group			
49	Book Binder	1:7	3 Years	Passed 2 standards below SSLC or passed the 8th class examination or its equivalent under the 10+2 system.

(1)	(2)	(3)	(4)	(5)
	(v) Litho-offset Group			
50	Plate Maker (Lithographic)	1:5	2 Years	Pass in the matriculation examination or its equivalent (SSLC) or the tenth class under the 10+2 system with Physics and Chemistry as subjects.
51	Litho-Offset Machine Minder	1:7	3 Years	
XV.	**Group No. 15 Hotel and Catering Trades Group**			
52	Cook (General)	1:5	3 Years	Pass in Matriculation examination or its equivalent (SSLC) or tenth class under the 10+2 system
53	Cook (Vegetarian)	(and one)	1½ Years	
54	Steward	more for each 10	2 Years	
55	Baker or confectioner		2½ Years	
56	House Keeper	"	2 Years	
57	Hotel Clerk or Receptionist	"	2 Years	
58	Linen Keeper	1:1	1 Years	
59	Canteen Services Supervisor	1:1	1 Year	
60	Restaurant Hostess	1:1	1 Year	
61	Bill Clerk	1:3	1 Year	
62	Pantryman	1:2	1 Year	
63	Bar Man/Bar Tender	1:2	2 Years	
XVI.	**Group No. 16 Textile Trades Group**			
64	Weaver	1:50	6 Months	Pass 3 standards below SSLC or passed the 7th class examination or its equivalent under the 10+2 system.
65	Doffer-Cum-Piecer	1:50	6 Months	Passed the 5th Class examination
66	Tenter (Drawing and Speed/fly frames)	1:25	6 Months	
67	Winder	1:50	6 Months	
68	Knitter (Hosiery)	1:4	1½ Years	Passed 2 standards below SSLC or passed the 8th class examination or its equivalent under the 10+2 system

(1)	(2)	(3)	(4)	(5)
XVII.	**Group No. 17 Power Plant Trades Group**			
69	Steam Turbine Operator	1:4	3 Years	Pass in Matriculation examination or its equivalent(SSLC)or the tenth class under the 10+2 system.
70	Switch Board Attendant	1:4	3 Years	
XVIII.	**Group No. 18 Chemical Trades Group**			
71	Attendant(Operator)	1:10	3 Years	Pass in Matriculation examination or its equivalent (SSLC) or the tenth class under the 10+2 system with physics, Chemistry and Mathematics.
72	Instrument Mechanic (Chemical)	1:3	3 Years	
73	Laboratory Assistant	1:4	3 Years	
XIX	**Group No. 19. Commercial Trades Group**			
74	Book Keeping and Accountancy	1:4	1 Year	Pass in Matriculation examination or its equivalent (SSLC) or the tenth class under 10+2 system with Commerce as special subject.
75	Store-keeper (including purchaser)	1:4	1 Year	
76	Cashier (General)	1:2	1 Year	
77	Sales Asst. (General)	1:7	1 Year	Pass in Matriculation examination or its equivalent (S S L C) or the tenth class under the 10 + 2 system.
78	Clerk (General)	1:20	1 Year	
79	Export Assistant	1:2	2 Years	
80	Retail Distribution Assistant	1:2	1 Year	
XX.	**Group No. 20 Cutting and Tailoring Trades Group**			
81	Designer and Master Cutter	1:5	2 Years	Pass in Matriculation examination or its equivalent (SSLC) or the tenth class under the 10+2 system.
82	Tailor (-Men)	1:4	1½ Years	Passed 2 standards below SSLC or passed the 8th class examination or its equivalent under the 10+2 system.
83	Tailor (Women)	1:4	1½ Years	
84	Tailor (General)	1:5	2 Years	

(1)	(2)	(3)	(4)	(5)
XXI. Group No. 21 Agriculture Trades Group				
85	Agricultural Mechanic	1:7	2 Years	Passed 2 standards below SSLC or passed the 8th class examination or its equivalent under the 10+2 system.
86	Farm Organisation and Management	1:7	2 Years	Pass in the Matriculation examination or its equivalent (SSLC) or the tenth class under the 10+2 system.
87	Horticulturist	1:7	2 Years	
XXII. Group No. 22 Leather Craft Trades Group				
88	Sports goods Maker (Leather)	1:3	2 Years	Passed 2 standards below SSLC or passed the 8th class examination or its equivalent under the 10+2 system.
89	Leather Goods Maker	1:7	2 Years	
90	Foot Wear Maker	1:4	2 Years	
91	Finished Leather Maker	1:3	2 Years	
92	Maintenance Mechanic for Leather Machinery	1:3	3 Years	
XXIII. Group No. 23 Ship Building Trades Group				
93	Ship Wright (Steel)	1:7	3 Years	Pass in the Matriculation examination or its equivalent (SSLC) or the 10th class under the 10+2 system with Science and Drawing.
94	Pipe Fitter	1:7	3 Years	
95	Rigger	1:7	2 Years	Passed 2 standards below SSLC or passed the 8th class examination or its equivalent under the 10+2 system.
96	Gas Cutter	1:7	2 Years	
97	Ship Wright (Wood)	1:7	2 Years	
98	Painter	1:7	2 Years	
XXIV. Group No. 24 Electronics Trades Group				
99	Mechanic Radio and Radar Aircraft	1:10	4 Years	Pass in the Matriculation examination or its equivalent (SSLC) or the tenth class under the 10+2 System with science.
100	Electronics Mechanic	1:5	3 Years	

(1)	(2)	(3)	(4)	(5)
XXV. Group No. 25 Photography Trades Group				
101	Photographer	1:4	1½ Years	Pass in Matriculation examination or its equivalent (SSLC) or the tenth class under the 10+2 system
XXVI. Group No. 26 Iron and Steel Trades Group				
102	Millwright (Rolling Mills)	1:10	4 Years	Passed 2 standards below SSLC or passed the 8th class examination or its equivalent under the 10+2 system
103	Brick Layer (Refractory)	1:10	3 Years	

Foot Note: In the case of the designated trade of Plumber, the ratio of apprentices to workers other than unskilled workers shall be as follows:

No of workers either than unskilled	*No. of apprentices to be engaged*
Upto 2	Nil
3	2
4	3
5	4
6	5
7	6
8	7
9	8
10	8

Thereafter the number of apprentices shall increase in the ratio 1:2, ie. one apprentice for 2 workers other than unskilled workers.

APPENDIX VIII

Engagement of Ex-industrial Training Institute Trainees as apprentices in trades other than those taught in the Industrial Training Institutes

(A) CREDIT FOR TWO YEARS

The ex-Industrial Training Institute trainees would be entitled to full two years credit towards the total period of training if they join apprenticeship training in the following designated trades connected to the trade in which they had undergone Institutional training. This means that only such ex-Industrial Training Institute trainees who had successfully undergone the two years Industrial Training Institute course may be engaged as apprentices for the remaining period of training in the designated trades as mentioned below. They should satisfy the educational qualification prescribed for the designated trades mentioned in Col. 3.

Sl. No.	*Passed out trainees in Industrial Training Institute trades of*	*Two years credit on engagement as apprentices in the designated trades of*
(1)	(2)	(3)
1.	Mechanic (Instrument)	Mechanic (Radio and Radar Air Craft)
2.	Mechanic (Radio and Television)	Electrician Air Craft. Mechanic Instrument-Air craft.
3.	Mechanic (Radio and Television)	Electronics Mechanic
4.	Mechanic (General Electronics)	
5.	Mechinist (Miller)	Mechinist
6.	Mechinist (S.S.P.)	
7.	Mechinist (Composite)	

(B) CREDIT FOR ONE YEAR ONLY

The ex-Industrial Training Institute trainees would be entitled to one year's credit towards the total period of training if they join apprenticeship training in the following designated trades connected to the trade in which they had undergone institutional training. This means that only such ex-Industrial Training Institute trainees who had successfully undergone one year Industrial Training Institute course or the first year of the two years Industrial Training Institute course may be engaged as apprentices for the remaining period of training in the designated trades as mentioned

below. They should satisfy the educational qualifications prescribed for the designated trades mentioned in Col. 3 below.

Sl. No.	*Passed out trainees in Industrial Training Institute trades of*	*One year credit on engagement as apprentices in the designated trades of*
	(1)	(2)	(3)
1.	Fitter	1. Millwright/Mechanic (Maintenance) 2. Tool and Die maker. 3. Maintenance Mechanic (Textile Machinery) 4. Mechanic (Dairy Maintenace). 5. Fitter Structural. 6. Boiler Attendant. 7. Motor Vehicle Body Builder. 8. Ship wright (Steel) 9. Millwright (Rolling mills).
2.	Turner	1. Mechinist (Grinder) 2. Tool and Die maker
3.	Mechinist (Composite)	1. Mechinist (Grinder)
4.	Sheet Metal Worker	1. Motor Vehicle Body Builder. 2. Ship wright (Steel)
5.	Mechinist (Grinder)	Tool and Die maker.
6.	Welder	Gas cutter (Ship Building).
7.	Electrician	1. Lineman
8.	Wireman	2. Auto Electrician
9.	Carpenter	1. Motor Vehicle Body Builder. 2. Furniture Maker and Designer. 3. Cabinet maker
10.	Plumber	Pipe Fitter (Ship Building)
11.	Brick Mason/Building Constructor	Brick Layer (Refractory).
12.	Mechanic (Motor Vehicle)	Auto Electrician
13.	Mechanic (Tractor)	Mechanic (Earth Moving Machinery)
14.	Painter	Painter (Ship Building)
15.	Millwright Mechanic (Maintenance)	Ship wright (Steel)
16.	Cutting and Tailoring	Designer and Master cutter

(1)	(2)	(3)
17.	Hand Composing and Proof reading	1. Compositor Hand 2. Lino Operator. 3. Mono Operator 4. Monocaster
18.	Printing Machine Operator	Letter Press Machine Minder (Platen and Cylinder).
19.	Manufacture of Footwear.	Foot wear Maker

(C) CREDIT FOR 6 MONTHS

The ex-Industrial Training Institute Electrician trainees would be entitled to six months credit towards the total period of training if they join apprenticeship training in the non-Industrial Training Institute trades viz. Steam Turbine Operator and Switch Board Attendant.

Sl. No.	*Passed out trainees of Industrial Training Institute in the trade of*	*Six months credit on engagement as apprentices in the designated trades of*
	Electrician	1. Steam Turbine Operator 2. Switch Board Attendant.

APPENDIX IX

Statement of Survey of Establishments, Assignments and placement of Apprentices

No. of Institute	No. of establishments as per records available from Industries & Labour Department			Total No. of establishments available in which on the spot survey has been completed			No. of establishments in which facilities are not available on the basis of spot survey conducted so far			No. of establishments when facilities are available on the basis of spot survey conducted so far			No. of assigned seats located so far in the Estt. actually surveyed			No. of seats utilised as on 15-9-1976		
	Pub.	Pvt.	Total	Pub.	Pvt.	Total	Pub.	Pvt.	Total	Pub.	Pvt.	Total	Pub.	Pvt.	Total	Pub.	Pvt.	Total
Trivandrum	24	856	880	24	422	446	..	294	294	24	128	152	433	198	631	433	192	625
Quilon	23	366	389	23	364	387	1	257	258	22	107	129	151	330	481	151	330	481
Chenganoor	52	490	542	52	490	542	28	430	458	24	60	84	77	174	251	77	174	251
Ettumannoor	13	272	285	13	272	285	..	120	120	13	152	165	94	326	420	67	323	390
Kalamassery	24	1414	1338	24	1374	1398	1	1217	1218	23	197	220	304	672	976	427	753	1180
Chalakudi	16	1026	1042	16	206	222	..	84	84	16	122	138	98	251	349	51	253	304
Palghat	18	347	365	18	208	226	1	90	91	17	118	135	15	240	255	8	224	232
Calicut	16	837	853	16	751	767	..	597	597	16	154	170	93	496	589	59	443	502
Cannanore	19	1476	1495	19	1295	1314	1	1223	1224	18	72	90	40	217	257	12	225	237
	205	7084	7289	205	5382	5587	32	4312	4344	173	1110	1283	1305	2904	4209	1285	2917	4202

Source: Director of Training

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APPENDIX X

Statement of Survey of establishments, Assignments and placement of Apprentices

Districts	*No. of establishments as per records available from Industries & Labour department*			*Total No. of establishments available in which on the spot survey has been completed*			*No. of establishments in which facilities are not available on the basis of spot survey*			*No. of establishments where facilities are available on the basis of spot survey*			*No. of assigned seats located in the establishments actually surveyed*			*No. of seats utilised as on 31-12-1976*		
(1)	(2)			(3)			(4)			(5)			(6)			(7)		
	Pub.	*Pvt.*	*Total*	*Pub.*	*Pvt.*	*Total*	*Pub.*	*Pvt.*	*Total*	*Pub.*	*Pvt.*	*Total*	*Pub.*	*Pvt.*	*Total*	*Pub.*	*Pvt.*	*Total*
Trivandrum	23	856	882	26	772	798	..	495	495	26	277	303	485	445	930	485	416	901
Quilon	23	356	389	23	364	387	1	257	258	22	107	129	151	499	650	151	499	650
Alleppey	52	490	542	52	490	542	28	430	458	24	60	84	77	377	454	77	330	407
Kottayam & Idukki	13	272	235	13	272	285	..	120	120	13	152	165	94	603	702	94	592	686
Ernakulam	24	1414	1438	24	1374	1398	1	1177	1178	23	197	220	304	1198	1502	304	1181	1485
Trichur	16	1026	1042	16	206	222	..	84	84	16	122	138	98	352	450	98	349	447
Palghat	18	347	365	18	209	226	1	90	91	17	118	135	15	394	409	15	388	403
Calicut	16	837	853	16	751	767	..	597	597	16	154	170	59	578	637	59	578	637
Cannanore	27	1703	1730	27	1616	164	6	1523	1529	21	93	114	40	315	355	40	315	355
Total	215	7311	7525	215	6953	6233	37	4773	4810	178	1230	1453	1323	4766	6039	1323	4548	5971

Source: Director of Training

APPENDIX XI

Seats located and seats utilised in state sector establishments as on 17th April 1976

Sl. No.	*Name of State*	*Located seats as on 30th June 1975*	(*) *Seats at present utilised*	*Percentage achievement*
1.	Andhra Pradesh	4360	4257	98
2.	Assam	453	734	160
3.	Bihar	4783	4941	103
4.	Chandigarh	185	232	125
5.	Delhi	3500	3525	101
6.	Goa	279	191	70
7.	Gujarat	6249	5862	94
8.	Haryana	3542	2924	80
9.	Himachal Pradesh	267	421	160
10.	Jammu & Kashmir	387	283	72
11.	Karnataka	3675	4081	111
12.	Kerala	1872	3805	200
13.	Madhya Pradesh	2392	2297	96
14.	Maharashtra	11681	14409	123
15.	Orissa	1652	1483	90
16.	Pondicherry	186	298	160
17.	Punjab	1683	2104	123
18.	Rajasthan	1469	1241	84
19.	Tamil Nadu	6387	8322	130
20.	Uttar Pradesh	10025	9643	96
21.	West Bengal	10223	10326	100 (over)
22.	Meghalaya	146	38	33
23.	Tripura	106	38	38
		75250	81455	108

(*) as per reports till 17th April 1976.

3

FISHERMEN AND FISHING IMPLEMENTS IN KERALA

FISHERMEN POPULATION AND FISHING IMPLEMENTS IN KERALA

1. Until recently, there were no reliable statistics on fishermen population and fishing implements in the State. Conventioned estimates formulated on the basis of corroborative data were being used for administrative and planning purposes. A census of fishermen was taken for the first time in the State only in 1972. This was done as part of the Eleventh All India quinquennial Live stock census. In addition to the fishermen households in the marine taluks of the State, different types of fishing craft and gear were also enumerated in the course of the census. It may however, be pointed out that the census of fishing implements was not the fist of its kind in the State. A similar census of craft and gear had already been taken along with the Tenth All India Quinquennial Livestock census conducted in 1966. But this census was confined to the fishing implements and it did not cover fishermen population.

2. Thus, the statistics of fishing implemets in the State have been complied for both 1966 and 1972, whereas those of fishermen population are available for 1972 only. The twelfth round of the quinquennial livestock census is currently in operation, and the data for 1977 will be available on completion of the compilation and tabulation of the census.

3.1 The fisheries statistics contained in the Eleventh quinquennial Livestock census have been analysed and presented in the tables appended. Tables 1 and 2 relate to the fishermen population in the State. District-wise population with male-female and rural-urban classification has been furnished in these tables. The total fishermen population in the State is 5.508 lakhs, of which 2.789 lakhs are adults and the remaining 2.719 lakhs are children. Of the 2.789 lakhs adults, 1.410 lakhs are males and 1.379 lakhs are females. The details of rural and urban break up of the fishermen population have been presented in table 2.

3.2 The occupational aspects and the employment particulars of the fishermen in the State are given in tables 3 to 9. The total number of fishermen employed in actual fishing operations are 1.105 lakhs. Of this, 0.673 lakhs are having full time employment and the remaining 0.432 lakhs are employed only on part time basis. It is also found that the employment among rural fisher-folk is more than thrice that of their urban counterpart. The rural and urban employment in fishing operations are 0.854 lakhs and 0.251 lakhs respectively. But fishing is not the only occupation in which the fishermen of the State are employed. Marketing, processing, repairing of fishing implements etc., are the other occupations involving the participation of fishermen on a large scale. District-wise information on the rural urban break-up of the employment in the allied sector has been furnished in tables 7 and 8

3.3 The adult male Fishermen constitute the active sea going fishing population. Only 47.7% of them are engaged in full time fishing operations in the State. There is naturally a great deal of inter district variation in the percentage of employment. The variation ranges from 72.8% in Quilon District to 23.4 in Kottayam District. Idukki and Palghat, the two interior districts have no marine fishing population. Part time employment in fishing is 15% of the total adult fishermen population including both male and female.

3.4 As already mentioned in 3.2 above the fishermen are also engaged in occupations other than, but closely allied with, fishing. Processing, marketing, repairing of fishing implements etc., are examples. The total employment in this allied sector is 1.007 lakhs out of the total adult population of 2.789 lakhs. In terms of percentage, 36.1% of the total adult population is employed in occupations allied with fisheries. The intensity of fishing operations as well as the availability of allied occupations is not uniform throughout the State. These are subject to a great deal of natural fluctuations from district to district. Therefore resultant variations are also noticed in the participation ratio of the fishing labour force in the different districts. In Alleppey District it is 70.8% which is almost double the State level estimates whereas at the other extreme end stands Kozhikode with only 7.5% which is only about one fifth of it. Taluk-wise details of fishermen population and their employment have been furnished in tables 11 and 12.

4.1 Mechanised fishing boats operating in Kerala waters are 2636 They fall into the following four main categories.

	Below 30'	*30' and above*	*Total*
1. Gill netters (Nos.)	594	394	988
2. Trawlers (Nos.)	66	57	123
3. Liners (Nos)	512	264	776
4. Others (Nos.)	519	230	749
Total (Nos.)	1691	945	2636

The above table shows that gill netters are the largest single component of the entire fleet. Next come liners. Trawlers are the least in number. More than 25% of the mechanised vessels are operating in Ernakulam District. Quilon and Alleppey are the other districts in the order of concentration of the fleet.

4.2 Non-mechanised fishing craft number 30594. Dug out canoes and catamarans together account for three-fifth of the total fleet. Plank-built boats are only about one in thirty. As in the case of mechanised boats,

the concentration of non-mechanised vessels is also the highest in Ernakulam District. The main categories of non-mechanised craft are the following:

1.	Beach seine	3020 Nos.
2.	Plank-built boats	1104 ,,
3.	Dug-out canoes	9865 ,,
4.	Catamarans	9719 ,,
5.	Others	6886 ,,
	Total	30594 Nos.

4.3. There has been a phenomenal increase in the number of mechanised boats during the period from 1966 to 1972. The number of boats were 692 and 2636 during these two years. The percentage of increase is nearly 400. The details of different types of gears in use during 1972 and 1966 have been furnished in tables 15 and 17.

5. The basic information on fishermen and fishing implements in the State as on 1972 are presented below for reference at a glance.

1. *Fishermen population*

(a)	Adult male	1,41,004
(b)	Adult female	1,37,899
(c)	Total Adults	2,78,903
(d)	Children	2,71,938
(e)	Total (c&d)	5,50,841

2. *Employed Fishermen*

(a)	Fishermen with full time employment in fishing		67,303
(b)	Fishermen with part-time employment in fishing		43,189
(c)	Total number of fishermen employed in fishing (a+b)		1,10,492
(d)	Fishermen employed in occupations other than fishing	1,00,685	
(e)	Total number of employed fishermen	2,11,177	

3. *Fishing craft*

(a)	Mechanised fishing craft	2,636
(b)	Non-mechanised fishing craft	30,594
(c)	Total (a+b)	33,230

4. *Fishing gears*

(a)	Dragnets	19,988
(b)	Gill nets	35,919
(c)	Trawl nets	16,500
(d)	Cast nets	11,273
(e)	Traps	18,418
(f)	Shore seine	8,224
(g)	Spawn collecting nets	977
(h)	Others	23,554
(i)	Total	1,34,853

List of Tables

TABLE 1

Fishing population in Kerala 1972

District	Adults		Children	Total
	Male	Female		
(1)	(2)	(3)	(4)	(5)
Trivandrum	23734	20905	43239	87878
Quilon	9633	8479	18494	36606
Alleppey	22550	20829	42065	85444
Kottayam	2840	2624	5043	10507
Idukki	..	..	..	..
Ernakulam	13497	13271	25482	52250
Trichur	12574	13334	26394	52302
Palghat	..	..	..	..
Malappuram	5044	5159	7396	17599
Kozhikode	26517	26993	56863	110373
Cannanore	24615	26305	46962	97882
Laksha- State	141004	137899	271938	550841

Source: *Eleventh quinquennial Livestock Census*—1972

TABLE 2

District-wise details of Rural and Urban Fishing population in Kerala 1972

District	Adults		Children		Total
	Rural	Urban	Rural	Urban	
(1)	(2)	(3)	(4)	(5)	(6)
Trivandrum	32421	12218	29963	13276	87878
Quilon	14614	3498	15316	3178	36606
Alleppey	39634	3745	38409	3656	85444
Kottayam	5159	305	4777	266	10507
Idukki	..	..	..	..	..
Ernakulam	15350	11418	20999	4483	52250
Trichur	25908	..	26394	..	52302
Palghat	..	..	..	..	..
Malappuram	6160	4043	4899	2497	17599
Kozhikode	14356	39154	14246	42617	110373
Cannanore	42635	8285	39777	7185	97882
State	196237	82666	194780	77158	550841

Source: Eleventh quinquennial Livestock Census—1972.

TABLE 3

Fishing population employed in actual fishing operations in Kerala 1972

District	*Number of Fishermen employed in Fishing operations*		
	Fulltime	*Part-time*	*Total*
(1)	(2)	(3)	(4)
Trivandrum	13034	7798	20832
Quilon	7014	4273	11287
Alleppey	15352	9234	24586
Kottayam	664	1794	2458
Idukki	..	..	..
Ernakulam	8917	5611	14528
Trichur	4391	2647	7038
Palghat	..	..	..
Malappuram	2381	1788	4169
Kozhikode	8929	5807	14736
Cannanore	6621	4237	10858
State	67303	43189	[illegible]

Source: Eleventh quinquennial Livestock Census - 1972.

TABLE 4

Rural fishing population employed in actual fishing operations in Kerala 1972.

District	*Number of Fishermen*		
	Full-time	*Part-time*	*Total*
(1)	(2)	(3)	(4)
Trivandrum	8620	6912	15532
Quilon	5590	3125	8715
Alleppey	14248	9103	23351
Kottayam	628	1704	2332
Idukki	..	..	..
Ernakulam	7115	2952	10067
Trichur	4391	2647	7038
Palghat	..	..	..
Malappuram	1992	780	2772
Kozhikode	3839	3431	7270
Cannanore	4389	3890	8279
State	50812	34544	85356

Source: Eleventh quinquennial Livestock Census—1972.

TABLE 5

Urban fishing population employed in actual fishing operations in Kerala 1972

District	*Number of Fishermen*		
	Full-time	*Part-time*	*Total*
(1)	(2)	(3)	(4)
Trivandrum	4414	886	5300
Quilon	1424	1148	2572
Alleppey	1104	131	1235
Kottayam	36	90	126
Idukki	..	..	..
Ernakulam	1802	2659	4461
Trichur	..	..	..
Palghat	....	..	..
Malappuram	389	1008	1397
Kozhikode	5090	2376	7466
Cannanore	2232	347	2579
State	16491	8645	25136

Source: Eleventh Quinquennial Livestock Census, 1972

TABLE 6

Fishing population employed in occupations other than fishing in Kerala 1972.

District	Number of Fishermen employed in				
	Marketing of fish	*Marketing/ Repairing of Nets*	*Marketing/ processing of fish*	*Others*	*Total*
(1)	(2)	(3)	(4)	(5)	(6)
Trivandrum	7231	4637	2468	10797	25133
Quilon	1507	1918	769	7631	11825
Alleppey	3265	5234	2458	19756	30713
Kottayam	1240	196	242	1156	2834
Idukki	..	..	..	..	..
Ernakulam	2203	1357	1934	4435	9929
Trichur	725	733	953	2661	5072
Palghat	..	..	..	..	..
Malappuram	183	374	504	1365	2426
Kozhikode	697	618	315	2397	4027
Cannanore	2439	617	1501	4169	8726
State	19490	15684	11144	54369	100685

Source: Eleventh Quinquennial Livestock Census, 1972.

TABLE 7

Rural fishing population employed in occupations other than fishing in Kerala 1972

District	*Number of Fishermen employed in*				
	Marketing of fish	*Marketing/ Repairing of Nets*	*Marketing/ Processing of fish*	*Others*	*Total*
(1)	(2)	(3)	(4)	(5)	(6)
Trivandrum	5641	3397	2201	7160	18399
Quilon	1296	926	684	6995	9901
Alleppey	2986	4975	2353	19317	29631
Kottayam	1201	181	222	1079	2683
Idukki	..	..	..	..	..
Ernakulam	1997	1191	1711	4179	9078
Trichur	725	733	953	2661	2072
Palghat	..	..	..	..	..
Malappuram	158	323	501	1343	2325
Kozhikode	260	133	128	669	1190
Cannanore	1739	442	1325	2687	6193
State	16003	12301	10078	46090	84472

Source: Eleventh quinquennial Livestock Census 1972.

TABLE 8

Urban fishing population employed in occupations other than fishing in Kerala 1972

District	*Number of Fishermen employed in*				
	Marketing of fish	*Marketing/ Repairing of Nets*	*Marketing/ Processing of fish*	*Others*	*Total*
(1)	(2)	(3)	(4)	(5)	(6)
Trivandrum	1590	1240	267	3637	6734
Quilon	211	992	85	636	1924
Alleppey	279	259	105	439	1082
Kottayam	39	15	20	77	151
Idukki	..	..	..	..	..
Ernakulam	206	166	223	256	851
Trichur	..	..	..	..	..
Palghat	..	..	..	..	..
Malappuram	25	51	3	22	101
Kozhikode	437	485	187	1728	2837
Cannanore	700	175	176	1482	2533
State	3487	3383	1066	8277	16213

Source: Eleventh Quinquennial Livestock Census 1972.

TABLE 9

Percentage of fishermen employed in fishing in Kerala 1972

District	*Adult Male Fishermen*		
	Total No.	*No. employed in full-time fishing*	*Percentage of (3) to (2)*
(1)	(2)	(3)	(4)
Trivandrum	23734	13034	54.916
Quilon	9633	7014	72.812
Alleppey	22550	15352	68.079
Kottayam	2840	664	23.380
Idukki	..	..	..
Ernakulam	13497	8917	66.066
Trichur	12574	4391	34.921
Palghat	..	..	..
Malappuram	5044	2381	47.204
Kozhikode	26517	8929	33.672
Cannanore	24615	6621	26.898
State:	141004	67303	47.731

Source: Eleventh Quinquennial Livestock Census, 1972.

TABLE 10

Percentage of adult fishing population engaged in occupation other than fishing in Kerala 1972

District	*Adult fishing population*	*Fishermen engaged in occupation other than fishing*	*Percentage of (3) to (2)*
(1)	(2)	(3)	(4)
Trivandrum	44639	25133	56.302
Quilon	18112	11825	65.288
Alleppey	43379	30713	70.803
Kottayam	5464	2834	51.866
Idukki	..	..	..
Ernakulam	26778	9929	37.078
Trichur	25908	5072	19.576
Palghat	..	..	..
Malappuram	10203	2426	23.777
Kozhikode	53510	4027	7.525
Cannanore	50920	8726	17.136
State:	278903	100685	36.10

Source: Eleventh Quinquennial Livestock Census, 1972.

TABLE 11

Taluk-wise details of fishermen population in Kerala 1972

District/ Taluk	*Adults*		*Children*	*Total*
	Male	*Female*		
(1)	(2)	(3)	(4)	(5)
I TRIVANDRUM DISTRICT	23734	20905	43239	87878
1. Neyyattinkara	7274	6361	14465	28100
2. Nedumangad	..	..	..	..
3. Trivandrum	10969	10252	21418	42639
4. Chirayinkil	5491	4292	7356	17139
II QUILON DISTRICT	9633	8479	18494	36606
1. Quilon	5701	5322	11496	22519
2. Kottarakkara	..	..	..	..
3. Pathanapuram	..	..	..	..
4. Pathanamthitta	..	..	..	..
5. Kunnathur	..	..	..	..
6. Karunagappally	3932	3157	6998	14087
III ALLEPPEY DISTRICT	22550	20829	42065	85444
1. Ambalapuzha	8635	8467	15444	32546
2. Sherthalai	7320	6502	14127	27949
3. Mavelikkara	1066	913	2162	4147
4. Chengannur	428	346	638	1412
5. Kuttanad	816	749	2014	3579
6. Thiruvalla	157	161	384	702
7. Karthigappally	4128	3691	7290	15009
IV KOTTAYAM DISTRICT	2840	2624	5043	10507
1. Kottayam	1264	1177	2218	4659
2. Changanacherry	156	135	303	594
3. Kanjirappally	..	..	..	..
4. Meenachil	..	..	..	..
5. Vaikom	1420	1312	2522	5254
V IDUKKI DISTRICT	..	..	..	..
VI ERNAKULAM DISTRICT	13497	13271	25482	52250
1. Alwaye	..	..	..	..
2. Parur	..	..	..	..

(1)	(2)	(3)	(4)	(5)
3. Cochin	10224	10266	20011	40501
4. Kanayannur	3273	3005	5471	11749
5. Kunnathunad	..	..	..	..
6. Muvattupuzha	..	..	..	..
7. Kothamangalam	..	..	..	..
VII Trichur District	12574	13334	26394	52302
1. Thalappally	..	..	..	..
2. Trichur	..	..	..	..
3. Kodungalloor	5601	5408	11024	21493
4. Mukundapuram	..	..	..	..
5. Chavakkad	5973	7926	15370	30809
VIII Palghat District	..	..	..	..
IX Malappuram District	5044	5159	7396	17599
1. Ernad	..	..	..	..
2. Perinthalmanna	..	..	..	..
3. Tirur	3356	3088	5081	11525
4. Ponnani	1688	2071	2315	6074
X Kozhikode District	26517	26993	56863	110373
1. Badagara	7531	7228	17446	32205
2. Quilandy	9152	8809	19161	37122
3. South Wynad	..	..	..	..
4. Kozhikode	9834	10956	18256	313046
XI Cannanore District	24615	26305	46962	97882
1. Kasaragod	7169	7554	15662	30385
2. Hosdurg	2886	2806	5030	10722
3. Taliparamba	..	..	..	..
4. Cannanore	12214	13576	22400	48190
5. Tellicherry	2346	2369	3870	8585
6. North Wyanad	..	..	..	..

Source : Eleventh Quinquennial Livestock Census, 1972.

TABLE 12

Taluk-wise details of employed Fishermen in Kerala 1972

District/Taluk	Number of family members engaged in different fishing operations					
	No. of members engaged in actual fishing or fish seed collection		Marketing of fish	Mark ting/ repairing of Nets	Marketing/ processing of fish	Others
	Full time	Part time				
(1)	(2)	(3)	(4)	(5)	(6)	(7)
TRIVANDRUM	13034	7798	7231	4637	2468	10797
1. Neyyattinkara	4675	2450	3174	2699	1332	6194
2. Nedumangad	..	..	..	..	..	..
3. Trivandrum	5225	3362	2290	1099	237	3700
4. Chirayinkil	3134	1986	1767	839	899	903
QUILON	2014	4273	1507	1918	769	7631
Quilon	4373	4037	1225	1175	350	5154
1. Kottarakara	..	..	..	..	..	..
2. Pathanapuram	..	..	..	..	..	..
3. Pathanamthitta	..	..	..	..	..	..
4. Kunnathur	..	..	..	..	..	..
5. Karunagappally	2641	236	282	743	419	2477
ALLEPPEY	15358	9234	3265	5234	2458	19756
1. Ambalapuzha	6540	2653	906	1952	1032	4023
2. Sherthalai	5179	3677	1236	1514	1103	11000
3. Mavelikara	101	260	125	3	..	186
4. Chengannur	145	27	127	34	..	100
5. Kuttanad	70	48	7	3	4	35
6. Thiruvalla	82	65	93	4	..	50
7. Karthigappally	3255	2504	771	1724	356	4362
KOTTAYAM	664	1794	1240	196	242	1156
1. Kottayam	314	817	592	84	117	564
2. Changanacherry	18	80	28	14	4	14
3. Kanjirappally	..	..	..	..	..	..
4. Meenachil	..	..	..	..	..	..
5. Vaikom	332	897	620	98	121	578
IDUKKI	Nil					
ERNAKULAM	8917	5611	2203	1357	1934	4435
1. Alwaye	..	..	..	..	..	..
2. Parur	..	..	..	..	..	..

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3. Cochin	7813	3345	867	962	1711	2626
4. Kanayannur	1104	2266	1336	395	23	1809
5. Kunnathunad	..	..	..	..	..	..
6. Muvattupuzha	..	..	..	..	..	..
7. Kothamangalam	..	..	..	..	..	..
TRICHUR	4391	2647	725	733	953	2661
1. Thalappally	..	..	..	..	..	..
2. Trichur	..	..	..	..	..	..
3. Kodungallor	1775	712	137	73	694	241
4. Mukundapuram	..	..	..	..	..	..
5. Chavakkad	2616	1935	588	660	259	2420
PALGHAT	..	..	..	..	..	..
MALAPPURAM	2381	1788	183	374	504	1365
1. Ernad	..	..	..	..	..	..
2. Perintalmanna	..	..	..	..	..	..
3. Tirur	1878	972	114	326	489	1026
4. Ponnani	508	816	69	48	15	339
KOZHIKODE	8929	5807	697	618	315	2397
1. Badagara	2088	1692	176	171	84	599
2. Quilandy	2979	1937	235	308	107	799
3. South Wynad	..	..	..	..	..	..
4. Kozhikode	3263	2178	286	239	124	999
CANNANORE	6621	4237	2439	617	1501	4169
1. Cannanore	1201	2457	786	206	137	2194
2. Hosdurg	1717	265	1036	94	123	447
3. Taliparamba	..	..	..	..	..	..
4. Cannanore	2645	1374	476	234	1183	919
5. Tellicherry	1058	141	141	83	58	609
6. North Wynad	..	..	..	..	..	..

Source: Eleventh Quinquennial Livestock Census, 1972.

TABBLE 13

District—wise Details of Mechanised Fishing Crafts in Kerala 1972

State/District	Gill netters Nos.		Trawlers Nos.		Liners Nos.		Others Nos.		Total Nos.
	Below 30'	30' and above	Below 30'	30' and above	Below 30'	30'and above	Below 30'	30' and above	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Trivandrum	57	35	3	5	34	20	46	20	220
Quilon	81	68	10	12	95	37	92	49	444
Alleppey	113	47	13	8	70	34	68	54	407
Kottayam	16	..	..	..	11	..	3	1	31
Idukki	..	..	..	..	..	..	..	..	..
Ernakulam	145	90	25	24	122	60	149	83	698
Trichur	16	1	..	..	..	15	5	..	37
Palghat	3	..	..	..	..	..	6	1	10
Malappuram	25	37	3	..	42	27	24	5	163
Kozhikode	72	53	6	3	63	33	66	9	305
Cannanore	66	63	6	5	75	38	60	8	321
Kerala	594	394	66	57	512	264	519	230	2636

Source: Eleventh Quinquennial Livestock Census, 1972.

TABLE 14

District-wise details of non-mechanised fishing craft in Kerala 1972

State/District	Beach seine Nos.	Plank built Nos.	Dug out canoes Nos.	Catamarans Nos.	Others Nos.	Total Nos.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Trivandrum	189	75	1242	1094	329	2929
Quilon	253	108	1556	1478	507	3902
Alleppey	217	117	1369	1597	1236	4536
Kottayam	52	50	730	..	344	1176
Idukki	..	..	..	..	..	..
Ernakulam	837	257	1527	2055	2193	6869
Trichur	114	..	353	562	253	1282
Palghat	..	..	312	..	..	312
Malappuram	85	137	557	613	557	1949
Kozhikode	577	167	1022	1126	675	3567
Cannanore	696	193	1197	1194	792	4072
Kerala	3020	1104	9865	9719	6886	30594

Source: Eleventh Quinquennial Livestock Census, 1972.

TABLE 15

District-wise details of different types of Gears in Kerala 1972

District	*Drag Nets*			*Gill Nets*			*Trawl Nets*		*Cost Net*		*Trags*	*shore seine*	*Spawn collecting Nets*	*Others*	*Total*
	Cotton twine	*Hemp twine*	*Synthetic twine*	*Cotton twine*	*Hemp twine*	*Synthetic twine*	*Cotton twine*	*Synthetic twine*	*Cotton twine*	*Synthetic twine*					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1. Trivandrum	1068	38	285	1736	107	1613	489	1135	453	436	2130	675	25	1475	11665
2. Quilon	1509	93	509	2552	285	2255	718	2137	762	641	3062	988	77	3282	18870
3. Alleppey	3680	124	482	2187	403	2364	745	1331	547	866	2465	1615	134	3906	20849
4. Kottayam	713	27	123	554	37	323	128	..	213	172	733	126	..	1314	4463
5. Idukki	..	..	..	102	..	..	11	..	114	..	..	..	..	286	502
6. Ernakulam	2114	567	1081	2345	512	3875	1251	3399	1181	2023	3141	1550	173	3998	27210
7. Trichur	953	63	118	172	34	617	57	115	152	135	616	657	10	1752	5351
8. Palghat	237	..	..	120	..	..	..	..	170	..	343	..	..	346	1216
9. Malappuram	604	42	525	736	317	1238	137	1050	345	537	1724	787	303	2400	10745
10. Kozhikode	1764	180	793	1168	456	3808	648	1300	476	765	2318	867	108	2417	17068
11. Cannanore	1365	97	834	1289	479	4235	685	1175	429	856	1986	959	147	2378	16914
State	14007	1231	4750	12961	2630	20328	4858	11642	4842	6431	18418	8224	977	23554	134853

Source: Eleventh Quinquennial Livestock Census, 1972.

TABLE 16

District-wise details of Fishing craft in Kerala 1966

District	*Non-mechanised crafts*					*Mechanised boats*
	Catamarans	*Dughout canoes*	*Big-size 32 ft. & above*	*Small size less than 32 ft.*	*Total*	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Trivandrum	5500	1030	329	298	7157	1
Quilon	174	1378	625	719	2896	151
Alleppey	49	2048	1165	2027	5289	91
Kottayam	..	715	196	479	1390	7
Ernakulam	199	1166	413	1641	3419	278
Trichur	41	502	351	572	1466	32
Palghat	2	346	210	119	677	7
Kozhikode	12	1130	1126	1167	3435	107
Cannanore	79	649	431	608	1767	19
Kerala	6056	8964	4846	7630	27496	693

Source: Tenth Quinquennial Livestock Census, 1966.

TABLE 17

District-wise details of fishing tackles in Kerala—1966

District	*Fishing Tackles*									
	Fixed or stationery	*Bag and purse*	*Boat seine*	*Shore seine*	*Draft and gill*	*Scoop*	*Trawl type*	*Cast*	*Others*	*Total*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Trivandrum	19	1658	172	1356	5479	1348	694	5505	1186	17417
Quilon	73	700	182	423	1713	1791	251	3460	320	8913
Alleppey	596	3340	149	615	4571	3430	394	23072	2319	38486
Kottayam	347	617	60	16	834	1283	203	1148	336	4844
Ernakulam	567	2122	306	416	2823	3456	453	3005	3064	16212
Trichur	59	928	212	1057	4666	1653	731	1601	2503	13410
Palghat	12	341	84	166	1221	1820	356	19345	510	23855
Kozhikode	175	1556	714	1481	5710	2302	3880	18636	1821	36275
Cannanore	70	1222	1030	1087	3890	1163	593	23499	5357	37911
Kerala	1918	12484	2909	6617	30907	18246	7555	99271	17416	197323

Source: Tenth Quinquennial Livestock Census, 1966.

4

TECHNICAL MAN POWER IN FISHERIES SECTOR IN KERALA

TECHNICAL MANPOWER IN FISHERIES SECTOR IN KERALA

1. Introduction

1.1 Low level of income and employment is a characteristic feature of under developed economics. The problem of unemployment in developing countries is so alarming that it calls for the formulation and implementation of employment-oriented development programmes. The achievement of mere physical targets ought not to be the sole aim of planned economic development. The employment potential of a project is to be regarded as the real criterion of its usefulness from the point of view of the over all development strategy. The scientific process of project formulation therefore calls for a sector-wise assessment of the utilisation of the different categories of manpower.

1.2 The difficulties encountered by the planners of manpower resources have been discussed in detail in the draft Fifth plan. It has been pointed out therein that a shift of emphasis from quantitative to qualitative aspects is most needed in order to facilitate a meaningful assessment of skills required in different sectors and areas. But there are at present artificial surpluses and shortages of different categories of manpower in different regions. This is due mostly to the existence of impediments to inter State mobitity of skills for which even international markets could normally be assumed. These impediments manifest themselves in the form of restrictive recruitment practices based on knowledge of local languages or duration of the candidates' residence in a particular region or State. This type of restrictions on mobility adversely affects the successful implementation of plan schemes in different sectors. Another risk involved in the barriers to mobility is that the employment markets for even higher skills would artificially get delimited to State jurisdictions, resulting in interstate manpower imbalances on a large scale.

1.3 It is not advisable in the present context to confine the manpower planning process to the national level alone. The States are in a better position not only to identify sectoral manpower imbalances but also to take vital developmental decisions in the field of education, industrial and craftsman training etc. Each department of the State has therefore to assume an increasing responsibility in manpower planning coming under the purview of its duties and functions. In view of the growth of educated unemployment, effective action is required to regulate the supply of different categories of manpower through an appropriate admission policy. What is required is a regulatory policy of expansion or curtailment, as the case may be of training facilities available at the regional and the State levels. A study of the perspective supply and demand position of the various categories of trained and technical personnel is therefore an imperative necessity.

1.4 The stock of technical and trained manpower in the fisheries sector in the State is dealt with in this paper in relation to their prospective employment opportunities.

2. Mechanisation of fishing craft

2.1 The Mechanisation of fishing craft has been the greatest single factor responsible for the development of marine fisheries in the State. The range of operation of non-mechanised canoes is very narrow and is practically confined to the inshore waters of 10 to 12 km. The regions lying outside this range remained mostly unexploited in the pre-mechanisation period. Introduction of mechanised craft capable of doing fishing operations in the offshore regions was therefore essential for the exploitation of the marine fishery resources.

2.2.1 Foreign technical assistance has played a significant role in the introduction and popularisation of power fishing in the State. Aid comprising capital equipment and technical advice was received under various programmes and agencies of which mention may be made of the T. C. M. Aid programme, FAO Technical Assistance programme, and the Indo-Norwegian Project.

2.2.2 Marine Diesel engines for mechanisation of fishing vessels, various types of gear including synthetic twines, insulated vans and insulated containers for transport and distribution of fish etc., were received as gift under the T.C.M. programme. Other items supplied under the programme included a gill net boat, a shrimp trawler, a Danish Seiner, a motor vessel for dory fishing and the machinery for 2 ice plants one each at Vizhinjam and Kayamkulam.

2.2.3 Under the Economic and Technical Assistance programme of the FAO, the services of two harbour specialists were rendered available for the State for advising on the development of fishing harbours. Messrs. C. R. Bjuke and C. S. Bjuke who were the experts assigned to the State for the purpose conducted the survey and investigation of the fishing harbours at Vizhinjam and Beypore. Besides, two navel architects were allotted for short periods to assist the State in the mechanisation of fishing crafts. The pablo types of fishing boats were designed by the architect Mr. Paul Zeiner, and other two types of boats were designed by Mr. A. A. Gurtner, the other naval architect. It was again an FAO Master Fisherman, Mr. Illugason who demonstrated the possibilities of purse-seining for shoaling fishes like sardine and mackerel in the waters of Malabar coast.

2.2.4 The Indo Norwegian Project which was first started at Neendakara in Kerala has been the chief agency which made the most notable contribution to the mechanisation of fishing in the State. The Project started functioning in Kerala consequent on a tripartite agreement signed between the Government of Norway and India and the U. N. in October 1952. The objects aimed at helping India in her economic development in the field of Fisheries. For achieving this purpose it was envisaged to increase production by impriving the methods of fishing. Other projects sought to be achieved, were increasing producers' profit by arranging better utilisation of produce

improving the health and sanitary conditions of the fishermen population and raising the standard of living of the community. The Norwegian Government provided material, equipment, and expertise and endeavoured to make the project function as a catalyst for the development of fisheries.

2.3 The experiments made by the Indo-Norwegian project and the F.A.O experts proved that the existing types of indigenous craft were not suitable for the installation of engines. New types of modern vessels were therefore specially designed and developed by them for mechanisation, and with the help of these mechanised boats the fishermen could have wider range of operation and wider choise of fishing methods.

2.4 The mechanised boats commissioned for operation in Kerala waters are of various types and sizes. Among them are 22' - 28' boats, 32' and 33' pablo, 32'-36' decked boats, and 40' decked boats. Whereas the small mechanised boats of 22'-25' operate gill nets and drift nets, all other types of boats operate trawl nets of various sizes. It has been found that trawling is a very successful method of fishing to be adopted in the State for the efficient exploitation of the fisheries in both offshore and inshore waters.

2.5 Eventhough the programme of mechanisation was started only during the second plan period it made a conspicuous impact on the fishing industry of the State in a very short time. The mechanised boats issued by the department together with a large number of additional fleet operating in the private sector exceed 2000 at present excluding boats which are not in working condition. Of late increasing emphasis is being laid on deep sea fishing with bigger trawlers. The Kerala Fisheries Corporation which is a fully Government owned company formed for promoting fishing industry in the State has already acquired 8 trawlers of which 6 are indigenous and 2 are Mexican. These trawlers can go out for into the sea and do fishing operations for several days continuously.

3. Fishermen Training Programme

3.1 The programme of mechanisation of fishing has brought about certain special types of problems in its wake. The supply of technically trained manpower capable of operating mechanised boats was the most important of them requiring immediate attention. Repair and service facilities, supply of spare parts, adequate facilities of landing and berthing etc., were problems of lower priority in the sense that they made their existence felt only in the course of time. It was therefore considered necessary to introduce a regular programme for training fishermen with a view to ensuring steady supply of trained crew to man the mechanised craft.

3.2 The fishermen training programme was conceived, designed and originated along with the mechanisation programme itself. In fact, the FAO technical assistance programme for mechanisation of fishing also covered the field of fishermen training which was considered to be an integral part of the former. Under the programme FAO experts were assigned to the State for organising fishermen training. Special mention may be made in this context of the services of the expert Mr. Lusvane who organised the fishermen training

centre at Ernakulam which is one of the five fishermen training centres functioning in the State at present. Necessary equipments for the training were also supplied by the FAO. The comprehensive programme of fisheries development initiated by the INP also included the starting of a fishermen training centre at Neendakara along with a Boat Building yard and workshop, an Ice Factory and Cold storage, and a Health centre. The other three Training Centres are functioning at Vizhinjam, Beypore and Cannanore.

3.3 The Fishermen Training Programme is a part of the larger programme of modernisation of fisheries in the country. Hence it exists not only in Kerala, but in all maritime States of India except West Bengal. The programme Evaluation Organisation of the Planning Commission has conducted an evaluation study of the programme and has incidentally made certain observations on the fishermen training programme in the different States as well. These are incorporated in paras 3.4.1 and 3.4.2 (*See* Foot note-1).

3.4.1 The number of Fisherman Training Centres started by the State Government varied between 1 each in Orissa and Andhra Pradesh to 6 in Tamil Nadu. "These centres started functioning first in Gujarat and Maharashtra in 1955 followed by Tamil Nadu and Kerala in 1956, with Orissa being the last in 1966-67. The number of centres rose subsequently, the present total being 23. The training Centres, in general, offered one course a year but two courses were provided in Andhra Pradesh and Orissa. The training course was for six months in Maharashtra and Mysore, ten months in Orissa Tamil Nadu and Kerala, one year in Andhra Pradesh and 10 to 15 months in Gujarat Stipends varying between Rs. 50 and Rs. 100 were given in all the States except Andhra Pradesh. Besides, sea allowance of 50 paise per day was provided in Mysore, Tamil Nadu and Gujarat. In Andhra Pradesh the trainees had free accommodation. Mysore extended additional incentives like travelling allowance from and to the training centre and life insurance against risks at Government cost. Besides, in Mysore mechanised boats were allotted to trained fishermen while in Tamil Nadu they were allotted to groups of fishermen one of whom had received training at a centre".

3.4.2 These training centres in the various States provided training to 7167 fishermen since their inception. The training imparted to them broadly covered theoretical and practical aspects of mechanised fishing like elements of navigation, engines and their upkeep, fishing gear, fishing craft, boat building and knowledge of different types of fishes. The contents of the training did not vary much between the States. The training centre at Tutikorin in Tamil Nadu provided advanced course for fishermen boys besides a course for the juniors. The training, as reported, was of a general nature and there was no follow up of the trainees for ensuring that it was beneficial to them either in their profession or for seeking employment.

Foot Note-1: Section 5.4 of chapter V of the Evaluation of the programme of Mechanisation of Fishing Boats—published by the programme Evaluation Organisation of the Planning Commission. Government of India, in February-1971.

3.5 References have been made earlier in this chapter to the five Fishermen Training Centres functioning in Kerala. The year of start and the total No. of fishermen trained in each of the centres are presented in table I.

TABLE 1

Fishermen training Centres in Kerala

Sl. No.	*Location of the centre*	*Year of start*	*Total No. of Fishermen trained as on 31-3-1977*
1.	Vizhinjam	1961	707
2.	Neendakara	1967	335
3.	Ernakulam	1956	886
4.	Beypore	1956	864
5.	Cannanore	1963	553
	Total		3345

The Centres at Ernakulam and Beypore are the oldest of the whole lot and naturally they have turned out the largest number of successful trainees. The Fishermen Training Centre, Neendakara is of the latest start and the number of fishermen trained in the centre is inevitably the least. The total No. of fishermen trained under the programme in the State till date is 3345. The centrewise percentage distribution of the trainees shows that the Ernakulam and Beypore Centres have to their credit 26.5% and 25.8% of the total respectively. The corresponding percentage relating to Neendakara Training Centre is only 10.0. The details of the percentage distribution are presented in table 2. The duration of the course in the State is 38 weeks and the number of seats in each training centre are 40 per batch. The trainees are selected by the Regional Advisory Committee concerned from among the nominees sponsored by the producers' Cooperative societies. The trainees are paid stipend at the rate of Rs. 125 per mensem. A sea-going allowance of Rs. 15 p.m. is also paid, in addition to the regular stipend, when practical training involving sea-going is conducted.

TABLE 2

Percentage of Fishermen Trained

Sl. No	*Name of Centre*	*% of Fishermen Trained*
1	Fishermen Training Centre, Vizhinjam	21.14
2.	Fishermen Training Centre, Neendakara	10.01
3.	Fishermen Training Centre, Ernakulam	26.49
4.	Fishermen Training Centre, Beypore	25.83
5.	Fishermen Training Centre, Cannanore	16.53
	Total	100.00

3.6 There appears to have been a distorted priority in the development of the training programme in the State. Neendakara which is one of the largest mechanised fishing centres was the last to have the facilities of a training centre whereas the less important mechanised fishing centres of Vizhinjam and Beypore have had the fishermen training centres started much earlier. It appears to be a paradox that 21.1% of the total fishermen trained were at Vizhinjam with practically no operation or mechanised vessels in contract to 10.0% at Neendakara where mechanised fishing is in vogue. The fishermen are a tradition-ridden community with its characteristic immobility. The supply of trained fishermen at one fishing centre may not therefore meet the demand for their services at a far off fishing centre.

3.7 The incidence of drop out in the training programme is quite insignificant. Out of the total number of 3402 trainees admitted to the course, 3345 have successfully completed the training. The cases of drop-out reported are maximum in the Training Centre, Neendakara and it is minimum in the Vizhinjam Training Centre. It is observed that most of the candidates admitted to the course stick to it to the last. Instances of casualty of any type are noticed only very seldom. The low percentage of drop-out is presumbaly due to the non-availability of gainful employment or alternate course of better advantage. The centre-wise details of drop-out are presented in table 3 below.

TABLE 3

The Drop-out of Trainees

Sl. No.	*Location of Centre*	*Trainees admitted*	*Trainees who completed the course*	*Dropout*
1.	Vizhinjam	710	707	3
2.	Neendakara	347	335	12
3.	Ernakulam	899	886	13
4.	Beypore	870	864	6
5.	Cannanore	576	553	23
	Total	3402	3345	57

3.8 It is becoming increasingly evident that the fishermen training course is losing its popularity and that it fails to attract candidates to the extent of its sanctioned capacity. The sanctioned strength of a batch of

trainees in each of the five institutions is 40. The number of candidates admitted to the various centres in the preceding five years are given in table No. 4.

TABLE 4

Number of candidates admitted

Location of Training centre	*Year*				
	1972	1973	1974	1975	1976
1. Vizhinjam	36	39	40	40	39
2. Neendakara	40	40	39	37*	20
3. Ernakulam	40	40	35	39	31
4. Beypore	40	40	45†	40	18
5. Cannanore	40	43†	72†	..	7

*An additional number of 11 candidates have been trained under T.T.P. Programme which is a special programme sponsored by Government for the rehabilitation of the fishermen families evicted for the expansion of the Travancore Titanium Products.

†The sanctioned capacity of 40 has been exceeded on account of additional admissions made under special programmes.

3.9 The total admissions for training under the programme during 1975 and 1976 are 156 and 115 respectively whereas the total admission capacity under the programme for a year is 200. This falling trend in admissions is indicative of the fact that the course is losing its popularity with the fishermen of the State. If the admissions for a stipendary course of training go begging, the only possible inference is that candidates of the eligible age group prescribed for the training are capable of earning better income by engaging themselves in non-mechanised fishing or allied occupations. The uncertainty about the future prospects of the course may also be operating as a disincentive for the fishermen to undergo the course. The existance of an unutilised capacity in the training centres is, however, an economic waste emphasising the need for re-orientation of the course. (see foot note 1)

Foot note 1:—The Producer's Co-operative Societies which nominate the candidates to be selected for training are facing liquidation and hence are unable to send up nominations in time. This is said to be an additional factor contributing to the underfulfilment of the admission targets.

3.10 An attempt was made as part of this study to assess the employment potentialities of the training. The details of about 300 unemployed fishermen who have successfully completed training have been traced out. This works out to nearly 8.8% of the total number of trained fishermen. Enquiries also reveal that large number of trained fishermen have migrated to gulf countries in search of employment. Instances of trained fishermen engaged in traditional fishing for want of employment opportunities in mechanised fishing boats are also numerous. These corroborative evidence go to show that the actual No. of trained and unemployed fishermen are much more than the 300 specific cases which could be traced out. A better way of estimating the volume of unemployment in this sector is by correlating the number of trained fishermen with the total number of mechanised boats operating in Kerala waters. Whereas the trained fishermen exceed 3000, the mechanised fishing boats employed in the marine waters of the State are about 2000. (see foot note 2)

Assuming that each mechanised vessel is manned by a crew consisting of atleast one trained fishermen, roughly 2000 trained fishermen may be taken to be employed in mechanised fishing in the State at present. This is bound to be an over estimation of the utilisation of the trained man-power since the basic assumption of each boat having one trained fishermen in its crew is not invariably valid. Inspite of the statutory requirements of having certificated personnel for sea going vessels under the Indian Merchant Shipping Act 1958, there are likely to be mechanised boats manned by fishermen not trained in any of the fishermen training centres, but having only practical experience in their operation. Even ignoring this possibility, it may be stated that the existing level of employment of the trained manpower is about 2000 out of 3000 or 66.7%.

3.11. The employment potential of trained manpower is often estimated on the basis of the anticipated expansion of the mechanisation programme or, for that matter, of any development programme. Eventhough this is an apparently rational method, it is subject to serious limitations. Most of the mechanised boats issued by the department in the early years are old and condemned, and not in working order. Hence there has been a shift of emphasis in recent times from issuing new mechanised boats to making replacements of engines and other equipments of the condemned boats. The impact of this new trend in the mechanisation of fishing, on the employment potential of the trained manpower is bound to be discouraging. This means that the target of 1040 mechanised boats already fixed in the Fifth Plan as well as the additional targets anticipated for future

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Foot note:- The total number of mechanised boats issued by the Department is about 1150 out of which only 570 are at present in working condition. About 200 boats which form 17% of the boat issued were already either condemned or auctioned. The total number of boats in working condition are estimated to be above 2000 including those in the private sector.

Five Year Plans can only reemploy, at the most, the technical hands thrown out of employment from the condemned boats. The generation of additional employment on account of future mechanisation programme is therefore a matter of remote possibility. The attempt at correlating enhanced production target with the creation of employment opportunities is also equally illogical. The introduction of additional fleet of medium size mechanised boats is not capable of achieving higher production targets. For, the insore belt of the Arabian sea is already over exploited on account of the agglomeration of fishing efforts in this region. Over fishing and consequent depletion of stock are the menacing problems to be tackled in this area, and the introduction of additional fleet of small mechanised vessels is for going to be of no help for enhancing production. On the contrary, only big trawlers capable of going far into the sea and conducting deep sea fishing can exploit the rich marine resources and make substantial addition to the fish production of the State. But trawler fishing is a capital intensive, rather than a labour intensive programme. Its job requirements may not therefore create an employment market for the trained manpower supplied by the fishermen training centres. The Central Institute of Fisheries Nautical and Engineering Training, Cochin may better cater to the manpower requirements of trawler fishing through its advanced courses of training.

3.12 The failing trend of admissions prevailing in the training centres is attributable to the poor employment prospects of the course offered. Further, the increase in earnings obtained by a fisherman working in mechanised boat compared to his earning from country boat is negligible. The Programme Evaluation Organisation of the Planning Commission has made a comparative assessment of these earnings in its report on the Evaluation of the Mechanisation programme of fiishing boats. (Chapter IX, Section 9.4 of the Report). It is stated therein that the fishermen of a country boat was employed for 206.6 days during the year which was slightly less than the one working on the mechanised boat (210 days). The earnings of the country boat fishermen in 1968-69 were Rs. 3166.6 compared to the earnings of the fisherman of a mechanised boat (Rs. 3322.3). The same trend is reflected in the per capita income which worked out to Rs. 448.9 in respect of the country boat and Rs. 471.6 for a mechanised boat. The increase in income and earnings appears to be too meagre to attract trained fishermen belonging to a particular place for employment in mechanised fishing boats operating elsewhere.

3.13 The availability of trained fishermen in the State is therefore no guarantee for the effective supply of trained manpower at the particular fishingc entres requiring their services. This fact has been taken into account in suggesting the source and means of supply of trained manpower for the integrated project for the development of fishing harbours at Vizhinjam, Neendakara and Beypore in the State. The trained manpower strength required for Vizhinjam harbour is 1956 and those for Neendakara and Beypore are 1200 and 1836 respectively. It is envisaged in the Project

reports to meet the requirement of trained manpower by launching a crash programme of training 200 additional persons every year by doubling the intake capacity of the five fishermen training centres during the period of 0-3 years of each of the projects. A crash programme of this type is contemplated on account of the fact that manpower supply in the normal course is expected to meet only 50% of the requirement. The implicit assumption underlying the above estimation of demand and supply is that the stock of fishermen already trained in the pre-project period is not likely to be available for employment in the project areas, presumably for want of mobility on their part. This is a really rational approach to the problem. The details of manpower requirement contemplated in the project reports for the fishing harbours are presented in tables 5, 6 & 7.

TABLE 5

Fishing Personnel for Vizhinjam Fishing Harbour Project

Sl. No.	*Category*	*Number*
1.	Skipper (8m)	210
2.	Skipper (16m & 23m)	87
3.	Engineer (16m & 23m)	87
4.	Mate (16m & 23 m)	87
5.	Radio Operator (23m)	12
6.	Bosun (23m)	12
7.	Engine Driver (16m & 23m)	87
8.	Oiler [16m (1) & 23m (2)]	99
9.	Dock hand	1176
10.	Cooks [16m (2) & 23m (2)]	99
	Total	1956

TABLE 6

Fishing Personnel for Neendakara Fishing Harbaur Project

Sl. No.	*Category*	*Number*
1.	Skipper (8m)	210
2.	Skipper (18m)	30
3.	Engineer (16m)	30
4.	Mate (16m)	30
5.	Engine Driver (16m)	30
6.	Oiler (6m)	30
7.	Deck hands/Cooks (8m & 16m)	840
	Total	1200

TABLE 7

Fishing Personnel for Beypore Fishing Harbour Project

Sl. No.	*Category*	*Number*
1.	Skipper (10m)	210
2.	Skipper (16m)	48
3.	Engineer (16m)	48
4.	Mate (16m)	48
5.	Engine Driver (16m)	48
6.	Oiler (16m)	48
7.	Deck hand/Cooks	1386
	Total	1836

3.14 The second assumption made in the project reports is that in the project implementation period the entire supply of trained fishermen available in the normal course of training would to meet the additional requirement generated by the Project. The validity of such an assumption is open to question. The fishermen trained in the centres of Vizhinjam, Neendakara and Beypore may constitute a ready supply in the employment market of the concerned project area. But the trained manpower supplied through the training centres of Ernakulam and Cannanore may not reach any of the projects. Most of the trainees are likely to be local fishermen and they may not be inclined to seek employment in mechanised fishing boats operating elsewhere especialy in view of the meagre difference in income between traditional and mechanised fishing.

3.15 The Planning Commission has commented on the practical utility of the fishermen training programme in the country. (see foot note). They found that most of the boat owners considered that the training given, particularly on the practical side, was inadequate. In view of this finding it is necessary to make the training more practical and helpful to the fisherman on the job. It is also necessary to relate the training facilities to the man-power requirements of the mechanised fishing. It would also be desirable to assess the needs of the fishing industry and mould the contents of the training programme so as to include necessary specialist skills in it. Besides proper liaison between the training institutions and the beneficiaries would provide a feed back of the experiences and problems and enable the training to be more purposeful and complete.

4. Technical and Scientific Personnel

4.1 The present stock of technical and scientific personnel in the public sector of Kerala Fisheries is estimated to be 319. The qualification-wise percentage distribution of the stock is as follows:

1.	Post-graduates	67.33%
2.	Graduates	13.37%
3.	Others	19.30%
	Total	100.00%

The State Department of Fisheries accounts for only 17.56% of the total technical manpower. Others are deployed in institutions like Kerala Fisheries Corporation, Central Marine Fisheries Research Institute, Central Institute of Nautical and Engineering Training, Integrated Fisheries Project, Pelagic Fisheries Project and Central Institute of Fisheries Technology. Institution-wise distribution pattern of these personnel is as follows:

1.	The State Fisheries Department	24.36
2.	The Kerala Fisheries Corporation	3.15
3.	Central Marine Fisheries Research Institute	40.12
4.	Central Institute of Fisheries Nautical and Engineering Training	3.72
5.	Integrated Fisheries Project	2.29
6.	Pelagic Fisheries Project	12.03
7.	Central Institute of Fisheries Technology	14.33
8.	Marine Products Export Development Authority	N. A.
	Total	100.00%

4.2 The strength of technical staff in the State Fisheries Department is 85. Of this, post-graduates degree holders are 20. In addition to this, there are 8 persons who have undergone the two-year diploma course conducted by the Central Institute of Fisheries Education, Bombay. This diploma course is regarded equivalent to M. Sc. for all practical purposes and has been recognised as such as by Government. The number of post-graduates including these diploma holders comes to 28 which is 32.92% of the total. It is however reduced to 23.5 if the diploma holders are excluded from the total number of post-graduates. It may be noted that the percentage of post-graduates in the entire Fisheries Sector in the State is 58.

Foot Note:—Chapter 5, section, 5.4.3 of the Report on the Evaluation of the Programme of Mechanisation of Fishing Boats 1971, by PEO, of the Planning Commission.

4.3 The Fisheries Department has research programmes under Inland Fisheries Research, Marine Fisheries Research and Technological Research and maintain Research Stations for the purpose. The important among them are the following.—

(i) Marine Biological Station, Calicut.
(ii) Marine Survey Station, Vizhinjam.
(iii) Estuarine Research Station, Ayiramthengu
(iv) Fisheries Research Station, Edathua
(v) Lime shell Research Station, Kumarakom
(vi) Fish Breeding Centre, Azhikode
(vii) Lobster Research Station, Vizhinjam
(viii) Mussel Culture Research Station, Vizhinjam
(ix) Pearl Culture Research Station, Vizhinjam
(x) Fisheries Technological Station, Calicut.
(xi) Fresh water & Biological Research Station, Malampuzha

Research Schemes on a variety of topics are allotted to these stations every year by the Kerala Fisheries Research Committee. There are proposals for the reorganisation of the various research Projects and to bring them under the control and supervision of single coordinating agency. The development of the research schemes on the expected lines will considerably enhance the technical bias of the department and boost the employment potential of technical manpower in this sector.

5. Perspective Demand and Supply

5.1 Assuming that the five Fishermen Training Centres maintain their prevailing annual in-take capacity of 40 trainees each, the estimated supply of trained fishermen for the coming 10 years is 2000. The basic qualifications of the scientific personnel in fisheries sector being graduation/post-graduation, as the case may be, the Marine Biology, Zoology etc. their supply is not going to be a problem for fisheries development in the State. The Universities in the State and outside offer courses of instructions in these subjects and will continue to make regular and steady supply of qualified candidates in sufficient numbers. Since the supply of candidates qualified in these subjects is not exclusively intended for the fisheries sector, an estimation of the quantum of supply is not attempted here.

5.2.1 The recent trends in mechanisation of fishing with its likely impact on the employment potential of trained manpower have been broadly indicated in para 3.11. However, the scheme of small boat mechanisation

has got its own scope of expansion. The Fifth Five Year Plan envisaged the enhancement of annual fish production in the State to the level of 7 lakh tonnes and the introduction of an additional fleet of 1040 mechanised boats. However, the achievements made so far prove beyond doubt that these targets are not going to be fully achieved within the stipulated period. Still, it is reasonable to assume that in the coming decade the Fisheries Development programmes will make rapid strides and that the annual fish production will easily hit the mark of 10 lakh tonnes. This programme is also expected to involve the introduction of a fleet of not less than 2000 mechanised boats in addition to trawlers engaged in deep sea and off shore fishing. This will generate employment for a minimum of 2000 trained fishermen during the period.

5.2.2 The attrition of the trained fishermen already employed will also generate corresponding additional demand in the employment market. But the exact rate of attrition of the employed personnel could not be calculated for want of detailed information on their age composition. The alternative is to accept the annual average attrition rate of 1% as suggested in the guide-lines issued by the Ministry of Agriculture, Government of India. The additional employment based on this is roughly 200 for the coming ten years.

5.3 Consequent on the proposed development of harbour facilities for fishing vessels in the State, increasing number of larger vessels are likely to be introduced in Kerala waters in the coming years. On a modest estimate, it may be assumed that not less than 300 large vessels of various sizes will be introduced afresh in the State in the coming decade. This will generate additional demand for employment of different categories of trained personnel. Not less than 300 hands each of skippers, Engineers, Mates, Engine Drivers etc. will be required for employment in these vessels.

6. Summary and conclusion

6.1 The Fishermen Training Programme of the Department has an annual intake capacity of 200. The recent trend of downfall in the rate of admission is indicative of an unutilised capacity in the programme. This leaves behind an element of waste into the programme which should be eliminated through a proper reorientation of the course of training.

6.2 The supply of trained manpower through the fishermen training programme of the department has exceeded the intake capacity of the fishing industry. The consequent unemployment of the trained manpower is becoming a waste of precious human resources. This calls for a liaison between the training institutions and the successful trainees so as to provide a feed-back of the experiences and problems of the latter. This would enable the authorities to review and revise the content of the training programme so as to cater to the needs of the industry.

6.3 The future programme of marine fisheries development in the State has to rely increasingly on the exploitation of the deep sea and the offshore resoures. This calls for a diversion of the fishing efforts now concentrated in the inshore belt to the farther regions. Large vessels capable of operating in the off-shore regions have to be introduced in larger numbers in the years ahead. It is therefore imperative to develop training facilities in the State to meet the requirement of qualified crew to man large trawlers.

6.4 Out of a total number of 1150 mechanised boats issued by the Department only 570 are in working condition at present. About 200 boats are, already condemned. The remaining 380 boats are not in working order evidently for want of proper repair and service facilities. This underlines the need for imparting training to fishermen in the repairing of mechanised fishing boats also, as a part of the fishermen training programme.

6.5 The basic qualification of the technical and scientific personnel in the Fisheries Sector is graduation/post-graduateion in Zoology/Marine Biology, besides other science subjects. They acquired experience and expertise in fisheries through subsequent training in the various Fisheries Training Institutes both in India and abroad. Since the supply of scientific manpower with the minimum basic qualification is almost unlimited, no attempt at its estimation is made.

LIST OF TABLES

TABLE 1.1

Fishermen Training Centre, Vizhinjam

Trainees admitted		*No. of trainees who completed the course*	*No. of drops-out*	*Remarks*
Year of admission	*No. of trainees*			
(1)	(2)	(3)	(4)	(5)
1961	30	30	..	
1962	60	60	..	
1963	90	89	1	
1964	60	60	..	
1965	80	80	..	
1966	37	37	..	
1967	39	39	..	
1968	40	40	..	
1969	40	40	..	
1970	..	..	..	
1971	40	40	..	
1972	36	36	..	
1973	39	39	..	
1974	80	80	..	
1975	..	..	..	
1976	39	37	2	
Total	710	707	3	

TABLE 1.2

Fishermen Training Centre, Neendakara

Trainees admitted		*No. of trainees who completed the course*	*No. of drops-out*	*Remarks*
Year of admission	*Number of Trainees*			
(1)	(2)	(3)	(4)	(5)
1968	40	39	1	
1969	40	40	..	
1970	40	40	..	
1971	40	38	2	
1972	40	38	2	
1973	40	38	2	
1974	39	39	..	
1975	48	43	5	
1976	20	20		
Total	347	335	12	

TABLE 1.3

Fishermen Training Centre, Ernakulam

Trainees admitted		*No. of trainees who completed the course*	*No. of drops-out*	*Remarks*
Year of admission	*No. of trainees*			
(1)	(2)	(3)	(4)	(5)
1956	20	20	..	
1957	40	40	..	
1958	40	40	..	
1959	40	39	1	
1960	39	39	..	
1961	50	50	..	
1962	60	60	..	
1963	30	30	..	
1964	120	118	2	
1965	40	39	1	
1966	40	39	1	
1967	35	34	1	
1968	40	40	..	
1969	40	40	..	
1970	40	40	..	
1971	40	40	..	
1972	40	39	1	
1973	40	39	1	
1974	35	33	2	
1975	39	36	3	
1976	31	31	..	
Total	899	886	13	

TABLE 1.4

Fishermen Training Centre, Beypore

Trainees admitted		*No. of trainees who completed the course*	*No. of drops-out*	*Remarks*
Year of admission	*No. of trainees*			
(1)	(2)	(3)	(4)	(5)
1956	10	10	..	
1957	10	10	..	
1958	25	25	..	
1959	32	32	..	
1960	20	20	..	
1961	30	30	..	
1962	63	63	..	
1963	93	93	..	
1964	60	59	1	
1965	39	39	..	
1966	40	37	3	
1967	35	35	..	
1968	40	40	..	
1969	39	39	..	
1970	40	40	..	
1971	86	86	..	
1972	40	40	..	
1973	40	40	..	
1974	45	45	..	
1975	65	63	2	
1976	18	18	..	
Total	870	864	6	

TABLE 1.5

Fishermen Training Centre, Cannanore

Trainees admitted		*No. of trainees who completed the course*	*No. of drops-out*	*Remarks*
Year of admission	*No. of trainees*			
(1)	(2)	(3)	(4)	(5)
1963	60	60	..	
1964	60	60	..	
1965	75	75	..	
1966	42	42	..	
1967	44	44	..	
1968	45	45	..	
1969	45	45	..	
1970	Nil	Nil	..	
1971	43	41	2	
1972	40	37	3	
1973	43	37	6	
1974	72	62	10	
1975	Nil	Nil	..	
1976	7	5	2	
Total	576	553	23	

TABLE 2.1

Scientific and Technical Manpower in Fisheries Sector at the end of the year 1975-76

Name of Institution: Central Marine Fisheries Research Institute

Category	*Stock in the beginning of the year*	*Addition during the year*	*Total*	*Loss due to retirement*	*Stock at the end*
(1)	(2)	(3)	(4)	(5)	(6)
Scientific and Technical Personnel	140	..	140	..	140
Details of qualification of the staff					
1. Post Graduates	121	..	121	..	121
2. Graduates	13	..	13	..	13
3. Others	6	..	6	..	6
Total	140	..	140	..	140

TABLE 2.2

Scientific and technical manpower in fisheries sector at the end of 1975-76

Name of Institution: Central Institute of Fisheries Nautical and Engineering Training

Category	*Stock in the beginning of the year*	*Addition during the year*	*Total*	*Loss due to retirement etc.*	*Stock at the end*
(1)	(2)	(3)	(4)	(5)	(6)
Scientific and Technical Staff	13	..	13	..	13
Details of Qualification of the Staff					
1. Post Graduates	2	..	2	..	2
2. Graduates	10	..	10	..	10
3. Others	1	..	1	..	1
Total	13	..	13	..	13

TABLE 2.3

Scientific aid and Technical man power in Fisheries sector at the end of 1975-76

Name of Institution: Integrated Fisheries Project

Category	*Stock in the beginning of the year*	*Addition during the year*	*Total*	*Loss due to retirement*	*Stock at the end*
(1)	(2)	(3)	(4)	(5)	(6)
Scientific and Technical Staff	8	..	8	..	8
Details of qualifications of staff					
1. Post Graduates	7	..	7	..	7
2. Graduates	1	..	1	..	1
3. Others	..	..	..	..	..
Total	8	..	8	..	8

TABLE 2.4

Scientific and technical man power in Fisheries sector at the end of 1975-76

Name of Institution: Pelagic Fisehry Project, Cochin-16.

Category	*Stock in the beginning of the year*	*Additions during the year*	*Total*	*Loss due to retirement, etc.*	*Stock at the end*
(1)	(2)	(3)	(4)	(5)	(6)
Scientific Staff (Gazetted)	7	1	8	..	8
Other Technical Staff	34	..	34	..	34
Total	41	1	42	..	42
Details of qualifications of Staff					
1. Post Graduates.	5	1	6	..	6
2. Graduates	3		3	..	3
3. Others	33	..	33	..	33
Total	41	1	42	..	42

TABLE 2.5

Scientific and technical manpower in public sector undertakings—1975-76

Name of Institution: Kerala Fisheries Corporation

Category	*Stock in the beginning of the year*	*Addition during the year*	*Total*	*Loss due to retirement*	*Stock at the end*
(1)	(2)	(3)	(4)	(5)	(6)
Scientific and Technical Staff	11	..	11	..	11
Details of qualifications of Staff					
1. Post Graduates	1	..	1	..	1
2. Graduates	7	..	7	..	7
3. Others	3	..	3	..	3
Total	11	..	11	..	11

TABLE 2.6

Scientific and technical manpower in Fisheries sector at the end of 1975-76

Name of Institution: Central Institute of Fisheries Technology.

Category	*Stock in the beginning of the year*	*Addition during the year*	*Total*	*Loss due to retirement*	*Stock at the end*
(1)	(2)	(3)	(4)	(5)	(6)
Scientific and Technical Staff	50	..	50	..	50
Details of qualifications of the Staff					
1. Post Graduates	38	..	38	..	38
2. Graduates	10	..	10	..	10
3. Others	2	..	2	..	2
Total	50	..	50	..	50

TABLE 2.7

Technical manpower in Fisheries sector at the end of 1975-76

State: Kerala *Department:* Fisheries

Discipline	*Stock in the beginning of the year*	*Addition during the year*	*Total*	*Loss due to retirement etc.*	*Stock at the end of the year*
(1)	(2)	(3)	(4)	(5)	(6)
Fishery:					
1. Post Graduates					
(a) Marine Biology/Zoology etc.	20	..	20	..	20
(b) Graduate with 2 years Bombay Training	8	..	8	..	8
(c) Total	28	..	28	..	28
2. Graduates	15	..	15	..	15
3. (a) Graduates with Diploma in Fishery	5	..	5	..	5
(b) Diploma holders	37	..	37	..	37
(c) Total	42	..	42	..	42
4. Others	..	..	..	..	..
Total	85	..	85	..	85

5

A REPORT ON MAN POWER UTILISED BY PUBLIC WORKS DEPARTMENT KERALA BY ITS ACTIVITIES DURING 1976-77

37|2913|MC.

CHAPTER I

INTRODUCTION

The general set up and functioning of the Public Works Department during 1976-77 were as follows:—

The State Public Works Department functioned during the year under four wings.

(i) General, Buildings and Roads

(ii) Projects

(iii) Irrigation, and

(iv) National Highways

Each of these wings functioned under a separate Chief Engineer; the Chief Engineer, (General, Buildings and Roads) exercising the powers relating to establishment matters.

The Buildings & Roads wing attended to all the works relating to Roads and Buildings (Except National Highways) and the building works for various other sister Departments of the State Government. This wing also rendered services to Panchayats, N. E. S. Blocks, Municipalities etc. for the finalisation of estimates, execution of works etc. The valuation of buildings, issue of rent certificates required for the accommodation of Government offices etc., issue of utilisation certificate in respect of construction of houses under loan schemes, electrification of Government buildings, installation and maintenance of community listening sets and Public Address Equipments for the State functions etc. were also attended to by this wing.

The works taken up by this wing for construction and maintenance of Roads can be broadly classified as follows:—

(i) Development of Roads and Bridges under 'Transport and Communication'—Plan.

(ii) Maintenance works on Roads and Bridges—Non plan

(iii) Roads of Inter State or Economic Importance and Central Road Fund Works which are carried out under the grant-in-aid of the Government of India

(iv) Investigation and Planning and

(v) Highway Research

The Project wing and the Irrigation wing functioned together and their activities during the year can be broadly classified as follows. The Project wing mainly attended to:

(i) Maintenance of Medium and Major Irrigation Projects which have been completed and Commissioned.

(ii) Construction works of Projects which have been commissioned, but the construction works of which have not yet been completed.

(iii) Continuing the construction of works to Projects which have been taken up already.

(iv) Construction works relating to new projects taken up during the Fifth Plan Period, and

(v) Investigation and Planning of new projects.

The Irrigation wing attended to the following categories of work during 1976-77:—

(i) Minor Irrigation works

(ii) Lift Irrigation works

(iii) Flood control works

(iv) Anti sea erosion works

(v) Inland Water Transport Navigation, Embankment and drainage works

(vi) Land Improvement works

(vii) Yela programme

(viii) Deepening of Wells and Tanks

Chapter II

OBJECT OF THE STUDY AND TECHNIQUE OF INVESTIGATION

2.1. *The Object of the study*

Many factors influence the pace and direction of the progress of a nation. The Individual and his activities are more important than capital, Natural Resources, Foreign aid, International trade, Government and Social Institutions, which also play important roles in modernising the country. Manpower studies have thus acquired due importance nowadays. The Man Power Planning Unit of the Bureau of Economics and Statistics of the State have taken up several studies in respect of Agricultural Manpower, Engineering Personnel, Medical Personnel etc. and has brought forth the Reports.

The object of the present study is to estimate the Man-power utilised by the activities of the Kerala Public Works Department during 1976-77.

2.2. *Technique of Investigation.*

As earlier pointed out the P. W. D. is the agency which meets the demand in construction activities—construction of buildings, bridges, Irrigation projects, Roads,—maintenance of Roads and Irrigation projects the works of which have already been completed, electrification of Government buildings and so on. Hence the Number of schemes undertaken during the year, which have attained different stages of progress during the period,—both plan and Non-plan—are innumerable. To calculate the labour input in each of these schemes one by one and to estimate the total labour input for the year for all the schemes is therefore not practicable. There are 'General' norms to find out the labour component of each of the broad activities into which all these schemes can be grouped viz construction of new Roads, construction of canals, construction of buildings with R. C. C. and so on. Besides, the Manpower unit working in the office of the Chief Engineer (General, B. & R.) undertook a study of selected schemes—each scheme to be representative of one of the groups already mentioned, as far as possible and the labour Input cost Ratio of these schemes were calculated. The study also helped to ascertain the employment pattern of the different schemes. The expenditure incurred during 1976-77 under major categories—expenditure incurred for works only—was ascertained. The 'General' norms and the cost ratios were used to estimate the employment generated during 1976-77, by the activities of the P. W. D. taking into consideration the physical achievement of these activities.

The details of the physical and financial aspects of the activities of the Department are furnished in Chapter 3.

The details of the study on labour input Cost Ratio of selected schemes is furnished in chapter 4.

The estimation of Manpower generated by the activities of the State P. W. D. during 1976-77 is furnished in chapter 5.

2.3. *Limitations*

1. The actual labour input in the implementation of a scheme can be ascertained only by field verification. The officer in charge of this work should be in the work-site to record daily, the labour utilised each day. Due to lack of funds such an elaborate arrangement for the study of labour input Cost Ratio of selected scheme, became impracticable. The study has to be based on the records available in the offices of the Executive Engineers who were in charge of the implementation of these schemes.

2. Each scheme has its own special problems. In some cases, earthwork will be more than what is generally expected. In a few other cases materials have to be conveyed through longer distances then what is generally expected and so on. Hence to estimate labour input considering only the group instead of each scheme using the norms and labour input Cost Ratios will not be realistic—it will fit in only with schemes of modal characteristics.

3. In calculating the Labour Input Cost Ratio, the work done or supplies made by the contractor are furnished in the final bill for payment were considered. Specifications given in the "Standard Data Book" were used to estimate the labour input, and the rates as furnished in the "Schedules of Rates" published by the Public Works Department were used in arriving at labour input Cost Ratio.

The rates given in the 'schedule of rates' is slightly less than the local rates, for example when a Mason is to be paid Rs. 15 per day in Ernakulam District, the rate given in the schedule is only Rs. 12.50. Low rates are furnished in the schedule with a definite purpose—to check the inflationary trend in expenditure . Hence estimates of labour input calculated on the basis of these rates will be slightly greater than the number of labourers actually employed, since the local rates are slightly high.

4. The estimate does not include the Departmental staff who were supervising/inspecting the work.

The details of the Engineering Personnel who were working in the Department as on 1-4-1976 is furnished in Appendix I.

5. The number of technical personnel/supervisory staff employed by the contractor to supervise the work also is not included in the estimate

6. The details of Administrative and other non-technical personnel working in the Department is also not included in the Report.

In spite of these limitations the attempt is worthwhile since it will give a fairly good idea of the Manpower utilised by the activities of the State Public Works Department for one year viz 1976-77.

CHAPTER III

THE FINANCIAL AND PHYSICAL ASPECTS OF THE ACTIVITIES OF THE PUBLIC WORKS DEPARTMENT—KERALA DURING 1976-77

During 1976-77, the Public Works Department functioned under four wings (as already mentioned in chapter-I) and the activities of the P.W.D. for the year are discussed in this chapter as the activities under each of these wings.

Buildings and roads wing

3.1 *Roads*

The following points may be noted before pursuing the report on the activities of this wing, given below:

1. The number of schemes which were taken up under this wing during 1976-77 are too many to be mentioned in the report. A complete list can be had by referring to Appendix-II to Budget Estimates P.W.D. for the yaer 1976-77.

2. Many schemes were in the initial stages of execution viz, preparation of estimates, steps to obtain Administrative sanction and Technical sanction, Land Acquisition, tendering etc. Details of such schemes are not included in this report. Only those schemes which have made some physical progress and which have incurred expenditure of more than Rs. 500 during the year have been considered for the preparation of this Report.

3. The details of schemes have been compiled from the progress report received from the Executive Engineers. In the reports the schemes are classified under different Heads of Account such as "537-Capital Outlay on Roads and Bridges" etc. Moreover the reports contained data relating to both plan and non-plan schemes. Since we are concerned with 'works' only to study the labour input, the paln, Non-plan distinction or classification according to Head of Account are not considered. Schemes are grouped under the following groups, and the progress of schemes in each group is discussed.

(a) Roads of economic or Inter State Importance.
(b) State Highways.
(c) Major District Roads.
(d) Village Roads.
(e) Railway safety works.
(f) Roads Intended for the Development of Fisheries.
(g) Central Road Fund Works.

4. Details of schemes, expenditure of each of which is above Rs. 1 lakh, is furnished in Table 3.1.1.

(a) *Roads of Economic or Inter-State Importance.*

The major schemes taken up during the year were:

(1) The reconstruction of the suspension bridge at Punalur.

(2) Construction of Palghat-Pollachi Road.

(3) Semi grouting N.S. Road 5/0 to 10/0.

(4) Calicut - Vythiri - Gudallur Road - KM. % to 97/07 strengthening and reconstructing the existing bridges and culverts.

(5) Strengthening carriage way - Nedumangad - Shorlakode Road K.M. 16/0 to 30/4.

With regard to the first, the bridge work proper was completed. The second scheme was completed the other three schemes were in good progress during the year.

(b) *State Highways.*

(1) *New works*

The New works taken up during the year are:—

(i) Improvement to T.K. Road up to Moorkattilppady to provide necessary facilities to News Print Factory, Velloore.

(ii) Closing the existing Road between Quilon District Hospital and Victoria Hospital and forming a new deviation.

(iii) Construction of Ambanthanam - Kallingalkadavu Road.

(iv) Widening and Special surfacing Thiruvalla-Pulikkeezhu Road—M.G.M.H.S. to Kavumbhagom.

All the schemes were in progress during the year.

(2) *Development and Improvement*

The schemes consisted of those work for easing curves, widening the existing roads, and improving the surface of existing roads by remetalling and semigrouting. 8 Schemes were taken up. 2 works were completed and the other works were in progress during the year.

The details of major works are furnished in Table 3.1.1.

(3) *Bridges and Culverts.*

During the year, reconstruction of 18 bridges and construction of four bridges were taken up. The works relating to Thadipalam bridge (Ernakulam - Ettumanoor Road) Nagambadom bridge (96/4 M. C. Road), Kanjikkuzhy bridge at 2/5, K.K. Road and 3 other bridges were completed, during the year. The other bridges were under construction.

The construction of a causeway at Lakkidi and was completed during the year.

The major works relating to reconstructing/construction of damaged new culverts in (1) Ernakulam-Ettumanoor Road (2) State Highways in Palghat District and (3) Puthur-Manamangalam Roads. All these schemes were in good progress during the year.

Details of Major Schemes are furnished in table 3.1.1

(C) DISTRICT ROADS

(1) *New Construction*

During 1976-77, 15 new works were taken up. Only one work was completed. The details of important works are furnished in Table 3.1.1.

(2) *Development and Improvement.*

During 1976-77, 61 works were taken up. 17 works were completed while the remaining works were in progress. The details of important works are indicated in Table 3.1.1.

(3) *Bridges and Culverts.*

Construction of 46 bridges and reconstruction of 24 bridges were taken up/continuing during the year. Construction of 19 bridges and reconstruction of 8 bridges were completed during the year. The construction/reconstruction of bridges which were completed during 1976-77 include the following.

1. Bridges at Varattur in the road from 76th Mile M.C. Road to Eraviperoor.
2. Reconstruction of 3 wooden bridges in Meppadi-Chooral Mala Road.
3. Bridges on Pamba River at Athikayam crossing.
4. Birdge at Aruvippuram across Neyyar.
5. Bridge at Kadakkavoor Thodu.
6. Bridge at Kuttur across T.S. Canal.
7. Mundupalam in the road from 82nd Mile M.C. Road to 5th Mile C.W. Road.
8. Construction of 2 bridges in Ranni.
9. Reconstruction of Pattarkulam bridge at 3/700 of Vaniyamkulam Kothakkurussi Road.

With regard to construction/reconstruction of culverts, notable achievements of the year are the following.

Reconstruction of culverts in the 3rd K.M. of Chengal Chowara Road and that of the narrow culverts in Parur-Alwaye Road were completed during the year. Reconstruction of narrow culverts in Thrippunnithura Town Roads was in progress during the year. Construction of culverts in Nelliampathy ghat Road and Tellicherry - Bavali Road, was completed during the year. The work relating to other culverts was in progress during the period.

(d) *Village Roads.*

(1) *New Constructions.*

25 New works were taken up during the year out of which only 2 works were completed. The details of all important works are provided in Table 3.1.1.

(a) *Development and Improvement.*

46 works were taken up/continued during the year. 14 works were completed during the year. They include the following:

1. Panamaram - Beenazhi Road - 0/0 to 4/8—Improvements
2. Puthayalappara - Rajakkad Road 9th to 12th K.M.—Improvements
3. Neerattupuram - Arthisseri Road—Improvements
4. Feroke - Kadalundi Road—Improvements
5. Sultan Battery - Pulpally Road - K.M. 11/2 to 27/0—Improvements
6. Balusseri–Koorachundu Road—Improvements

Table 3.1.1 provides the details of all improvements items taken up under this group.

(3) *Bridges and Culverts*

The works taken up during the year consisted of reconstruction of weak bridges, widening and strengthening of existing bridges and construction of new bridges. During 1976-77, 29 works were taken up / in progress. 18 works were completed. The other works were in progress. The details of important works are furnished in Table 3.1.1

(e) *Railway safety works*

Construction of over bridges, opening of level crossing etc., constructed the works taken up during the year. 9 schemes were taken up/in progress during the period. One work was completed and 3 other works were almost completed. The details of all important items can be had from Table 3.1.1

(*f*) *Roads Intended for the Development of Fisheries*

Besides construction of Roads, the schemes under this sub group include schemes for construction of bridges to facilitate quick transportation of fish, and another for povision of guide lights at Azhikode, Blangad, Nattika and Kadappuram. Altogether 13 works were taken up/continued during the year. The details of important items are furnished in Table 3.1.1

(*g*) *Central Road Fund works*

During the year 9 works were taken up/continued. 2 works viz. Sancheyathukadavu bridge and improvments to approach road to Olavara bridge were completed. The other works were in progress. One important work taken up during the year was 'Forming and Improvments to Road from Kunnamangalam via Manassery Arcacode Road'. The work was in progress during the year.

TABLE 3.1.1

Public Works Department Kerala—Details of Schemes Implemented by buildings and Roads Wing during 1976-77 (Schemes with expenditure of Rs. 1 lakhs and above)

Sl. No.	*Name of Scheme*	*Budget provision* 1976-77	*Expenditure* 1976-77	*Physical Achievements*
(1)	(2)	(3)	(4)	(5)
(a)	*Roads of Economic or Inter State Importance*			
1	Palghat-Pollachi Road	10,000	2,68,281	work completed
(b)	*State High ways*			
(i)	*New Works*			
1	Common Facilities to News Print Project. Improvement to T. K. Road up to Moorkattilppadi	5,00,000	5,46,373	work in progress
2	Closing existing Road between Quilon District Hospital and Victoria hospital and Forming a New Deviation Road	1,00,000	2,55,346	do.
(2)	*Development and Improvement*			
1	Improvement to Edathua—Thakazhi Road	1,000	2,44,891	work completed
2	Remetalling and Semigrouting Munnar—Kumili Road	50,000	1,85,037	work on 16.4 Km. completed. work on 6 Km. to be completed
(3)	*Bridges and Culverts*			
1	Reconstruction of Thadipalam Bridge in Ernakulam—Ettumanoor Road	1,00,000	4,37,940	work completed
2	Do. Puthenpalam bridge do.	1,00,000	2,54,957	Contractor expired. Steps are being taken to rearrange the work
3	Raising the road and reconstructing the culverts in the Ernakulam portion of Ernakulam—Ettumanoor Road	1,00,000	5,20,724	Work almost completed.
4	Construction of a bridge at Thathamangalam at 1/7 of Nedupanny Road	5,00,000	22,69,572	work in progress

(1)	(2)	(3)	(4)	(5)
5	Constructing a new deviation Road to Madras Calicut Road and constructing a bridge across Kalpathy river	1,00,000	5,01,049	work almost comp'eted. Approach Road to be formed
6	Constructing a bridge at Areacode on Kunnamangalam Mukkom Road	1,00,000	1,42,537	work completed
7	Construction of Aryanad Bridge in 7/3 N.S. Road	1,98,000	3,33,328	work in progress
8	Reconstruction of Nagambadom bridge at 96/4 M.C. Road	3,00,000	3,39,564	work completed
9	Reconstructing Kanjirakkuzhi Bridge at 2/5 K. K. Road	2,00,000	2,71,455	work completed
(c)	*District Roads*			
(1)	*New Constructions*			
1	Perumpanachy—Thottakkad Road (6.2 K.m.)	10,000	1,93,805	work in progress. Earthen Road completed for 2 Km. length,
2	Kozha—Neezhoor Road from 0/0 to 2/0.	10,000	1,37,546	work in progress. Earthen Road completed. Tenders are invited for spreading materials etc.
3	Construction of a road from Pudiangadi to Ulleri portion from Purakkatteri to Ulleri	..	1,97,100	work almost completed.
4	Vythiri Tharavana Kuthirapandi Road—Ghat section	..	1,93,793	work completed.
5	Road from Kalamasseri to Irimpanam—forming and surfacing	2,00,000	1,21,532	work in progress
(2)	*Development and Improvement*			
1	Improvements to Eroor—Edamon Road	50,000	1,64,531	work in progress
2	Metalling of Adoor—Thumpamon Road	50,000	1,28,933	do.
3	Widening Thommana Road (portion of Railway station Road)	50,000	2,71,651	work in progress
4	Improvements to Badagara—Thiruvallur Perambra Road Km. 0/0 to Km. 13/0	25,000	2,39,666	Balance of work to be taken up.
5	Improvements to Meppayur—Nelliadikollam Road	23,500	3,98,663	work completed
6	Improvements to Paika—Changalam Road. Remetalling and black topping (5.29 Km.)	1,00,000	1,32,401	do.
7	Improvements to Ayoor—Eravipuram Road miles 10/0 to 19/0	25,000	1,18,900	work almost completed
8	Improvements to Thottappally—Thrikkunnapuzha Road	1,000	1,59,426	work in good progress
9	Improvements to Anakatti to Sholayar Road and Thavalamally Road	10,000	2,27,655	do.

(3) *Bridges and Culverts*

1	Constructing Bridge at Varattur from 76th Mile M. C. Road to Eraviperoor	1,15,000	1,05,297	work completed
2	Constructing 3 bridges in A. C. Road, at Muttar, Nedumudy and Pallathuruthy	10,00,000	42,61,684	work in progress
3	Ittimala bridge across Pamba river in Chengannur Mannar Road	10,000	3,08,621	do.
4	Constructing bridge at Karutha Vadasseri kadavu	1,50,000	2,68,884	Bridge proper completed. A portion of approach road is also completed.
5	Do. at Vilanguparakadavu	1,00,000	1,06,200	Land Acquisition completed. Work tendered
6	Do. at Poochackal	25,000	1,89,516	work in progress
7	Repairs to Madommozhy bridge in 4/4 in Attingal Venjaramoode Road	35,000	2,35,538	do.
8	Reconstruction of Edakkara bridge, K.m. 86/120 in Calicut—Nilambur—Gudallur Road	1,00,000	4,92,540	do.
9	Reconstruction of Eranhithodupalam at 63/2 C. N. G Road, Malappuram	1,000	2,61,055	work in progress
10	Reconstruction of wooden decked bridge on Meppadi—chooral mala Road at K.m. 3/6.	25,000	2,82,733	work completed
11	Do. K.m. 6/2.	25,000	4,78,961	do.
12	Bridge on Pamba River at Athikayam crossing	2,00,000	1,92,401	work completed
13	Bridge at Aruvippuram across Neyyar	25,000	1,39,828	do.
14	Bridge at Kadakkavoor Thodu	50,000	2,37,723	do.
15	Bridge at Kuttur across T. C. Canal	2,00,000	1,23,428	work in progress
16	Construction of Pathalam bridge	2,15,000	5,00,487	work in progress
17	Reconstructing Wadakkancherry Bridge at K.m. 18/800 of Trichur—Shoranur Road	--	5,07,181	Bridge work completed. Approach road work in progres.
18	Construction of a bridge across Pazhayangadi river in Baliapattam—Madayi Road	1,00,000	1,77,740	work almost completed.
19	Do. at 13/1 of Manthody—Pakranthalam Road (Mekkiad Bridge)	1,00,000	2,21,693	work completed

(1)	(2)	(3)	(4)	(5)
20	Constructing a bridge at Puthut across Ithikkara river	5,000	1,16,590	Bridge work completed. Work of approach road in progress.
21	Kaloor bridge over Kaliyur river	60,000	2,33,407	Bridge work completed Approach Road work arranged.
22	Construction of a new bridge in Muvattupuzha Town	1,00,000	3,57,173	Abutment at Kottayam side completed.
(d)	*Village Roads*			
(1)	*New Constructions*			
1	Extension of road from Manjapra to Malayattur	1,00,000	1,34,453	work in progress
2	Construction of a Road from Karadippara to Mangala Devi Temple	100	10,67,810	4.25 K.m. of Road work completed.
3	Mannakkanad—Kurichithani Road	25,000	2,11,776	work in progress
4	Road from Pallikkottumma in Alleppey—Changanacherry Road to Neelamperoor via Pulinkunnu, Kavalam, Cherukara	25,000	19,91,405	work in progress
5	Cherpu—Chennam Road	1,000	1,46,084	work nearing completion
6	Moorkanikkara—Kannara Road	10,000	1,40,210	work in progress
7	Opening a road from Aleppad to Pullut Island	1,00,000	1,05,541	do.
8	Do. Kattur to Karalam	1,00,000	2,35,302	do.
9	Constructing approach Road to aerodrome, Karippur	90,000	2,82,584	do.
10	Constructing Kavil Theekuni Kuttiadi Road	3,00,000	3,16,622	do.
(2)	*Development and Improvement*			
1	Improvement to Kallayam Kutchery Road	50,000	1,16,167	R. E. sanctioned
2	Improvement to Onninmoodu Mylavila—Kadampattukonam Road	10,000	2,68,340	Estimate under scrutiny.
3	Improvements to Parambil kadavu Pullalor Narikuni Road	1,00,000	3,60,731	work in progress
4	Do. Pattazhi Pidavoor Road	50,000	2,19,383	do.
5	Do. Arunassery Kuravilangad Road Via Kooveli	40,000	1,75,555	do.
6	Chittur—Angumoozhi Road portion from Seethathodu to Chittur	1,00,000	2,26,416	do.

7	Enathu—Vayala Road	..	4,07,766	do.
8	Improvements to Mangalappady Baded Road	1,00,000	1,50,164	Wo k almost completed
9	Improvements to Panamaram Beenachi Road 0/0 to 4/8	10,000	2,52,552	Work completed
10	Metalling and Two cost surface dressing 9th to 12th K.m. of Puthayalappara—Rajakkad Road	73,000	2,11,264	Work completed.
11	Improvements to Neerathupuram Arthisseri Road	25,000	1,42,845	Work completed
12	Balance portion of W. F. Road to Mazhuvannoor	50,000	2,04,107	Road work completed. Bridge Work in progress
13	Improvements to Thirurangadi Kondotty Road	10,000	1,36,777	Balance work to be arranged.
14	Do. Makkaraparambu—Mankada Road	..	1,14,818	do.
15	Do. Olekkara—Peruvallur Road	50,000	1,17,213	Work in progress
16	Improvements to Feroke—Kadalundi Road	100	10,11,551	Work completed
17	Improvements to Sultan Battery—Pulpally Road Km. 11/2 to 27/0	1,00,000	2,59,312	Work completed
18	Do. Balussery Koorachund Road	1,65,000	6,57,191	do.
(3)	*Bridges and Culverts*			
1	Construction of a bridge at Adakasathala including improvements to Adakasathala—Panaji Road	93,300	1,37,122	Work completed
2	Do. at M1/1, Bheenamady—Cherupuzha Road	1,000	1,63,527	do.
3	Construction of a bridge across Ramanthali river at Punnekadavu	1,00,000	4,27,001	Work completed
4	Do. at Chembra on Perambra—Chembra—Koorachundu Road	25,000	2,31,417	do.
5	Pathipalam bridge at M 4/5 of Meenapram—Kuthumparamba Road	25,000	1,45,831	do.
6	Reconstructing Chalode bridge on Puthiangadi—Irriganmur Road	7,200	1,65,508	do,
7	Construction of Bengara Bridge in Manjeswar	5,00,000	3,07,678	Work in progress
8	Constructing a bridge at 8th K.m. A. V. Road to Kizhakkambalam	10,000	1,04,059	Work completed

(1)	(2)	(3)	(4)	(5)
9	Constructing a bridge across Barappuzha at Katcherikadavu in Aralam village	10,000	1,94,134	Bridge proper completed. Approach Road to be constructed.
(e)	*Railway Safety works*			
1	Construction of overbridge at T. B. Junction, Quilon	100	5,61,188	Work almost completed
2	Do. at 1/4 in lieu of existing level crossing. (Kadappakkada overbridge)	2,00,000	7,00,526	do.
3	Overbridge at 4/5 of Alamcode Meerankadavu Road	50,000	1,06,266	Work in progress
(f)	*Roads Intended for the Development of Fisheries*			
1	Azhithala—Valiavalappu Road	4,50,000	3,80,947	Work in progress
2	Road from Cheruvathur to Padanakadappuram	10,000	1,04,287	do.
(g)	*C. R. F. Works*			
1	Forming and Improvements to Road from Kunnamangalam Manjeri Via Manassery Areacode Road	..	5,07,956	Work in progress

TABLE 3.1.2

PUBLIC WORKS DEPARTMENT—KERALA

Expenditure Incurred in 1976-77 by Buildings and Roads Wing

Sl. No.	*Budget Head*	*Item*	*Expenditure (Rs.)*
(1)	(2)	(3)	(4)
I	259—Public Works—Non-Plan	(a) Direction and Administration	4,26,91,213
		(c) Construction	31,04,149
		(d) Maintenance and Repairs	1,12,62,332
		(f) Lease charges	17,05,536
		(g) Government Engineering workshops	
		(1) Management	5,04,441
		(2) Operation	27,09,472
		(3) Other expenses	91,921
		(h) Machinery and Equipment	28,52,073
		(i) Suspense	
		(1) Stock (B & R) Portion	11,14,519
		(2) Miscellaneous P. W. advance	40,81,973
		(k) Other	
		(1) Properties leased out at subsidised or concessional rate of rent	2,808
		(3) Interest payments to financial institutions giving loans to Housing Board	1,37,914
		(8) Loss on stock	25,324
II	337 Roads and Bridges	(b) Planning and Research (Establishment)	
		(i) Special units for Investigation and Planning (Minimum Needs programme)—(Plan)	25,44,387
		(ii) Kerala Highway Research Institute/ (Non-Plan)	4,60,538

(1)	(2)	(3)	(4)
		Works:	
		(d) Roads of Inter State Importance (Non-Plan)	24,47,769
		(f) State Highways (Plan)	3,38,970
		(g) District and other Roads (Plan)	27,36,414
		(h) Railway safety works (Plan)	8,53,909
		(m) Other Expenditure (Non-Plan)	
		(1) Repairs and Renewals to Communication	8,81,60,313
		(3) Flood damage works	12,94,346
		(4) Ferry Service grant in aid	21,325
		(5) Erection and maintenance of traffic sign boards	79,709
III	459—Capital outlay on Public works—Plan	*Works*	
		(e) Construction—(voted)	1,42,77,330
		do. —(charged)	1,01,865
		(f) Other Expenditure	
		(1) Sainik School Works—Voted	97,670
		(2) Construction Corporation, Kerala Investment	10,00,000
IV	537—Capital outlay on Roads and Bridges—Plan	*Works*	
		(c) Roads of Inter State Importance	5,97,286
		(d) Strategic or border Roads	Nil
		(e) State Highways	70,35,001
		(f) District and other Roads	2,96,45,227
		(i) Other expenditure	
		(1) Roads Intended for development of fisheries	10,34,770
		(2) Roads in Sugar Factory area	12,792
		(3) Ferry—Jangar Service (Non-Plan)	152
		(6) Adjustment of Kerala State Electricity Boards Roads—taken over	1,07,86,414
V	283—Housing Non-Plan	C. Government Residential Buildings	
		(b) Construction	1,79,750
		(c) Maintenance and Repairs	23,29,010

VI	483—Capital outlay on Housing—Plan	A—Government Residential Buildings (b) Construction	82,36,008
VII	277—Education	Construction—Plan	16,39,343
		do. —Non-Plan	4,73,726
VIII	477—Capital outlay on Education	do. —Plan	1,17,71,605
IX	278—Art and Culture	do. —Plan	..
		do. —Non-Plan	60,568
X	280—Medical	Construction—Plan	2,26,699
		do. —Non-Plan	2,91,649
I	281—Family Planning	do. —Plan	1,31,151
XII	480—Capital outlay on Medical	do. —Plan	48,88,311
XIII	481—Capital outlay on Family Planning	do. —Plan	5,34,343
XIV	305—Agriculture	do. —Plan	22,129
XV	505—Capital outlay on Agriculture	do. —Plan	429
XVI	310—Animal Husbandry	do. —Plan	68,424
		do. —Non-Plan	3,469
XVII	510—Capital Outlay on Animal Husbandry	do. —Plan	2,53,926
XVIII	511—Capital outlay on Dairy Development	do. —Plan	7,63,173
XIX	312—Fisheries	do. —Plan	7,518
XX	512—Capital outlay on Fisheries	do. —Plan	4,65,800
XXI	339—Tourism	do. Non-Plan	1,93,729
XXII	544—Capital outlay on Transport and other Communication	do. —Plan	40,883
XXIII	Capital outlay on Social Security and Welfare	do. —Plan	62,928

3.2 Buildings

As mentioned earlier, P.W.D. attended to the building works of other sister Departments of the State Government. Hence the number of schemes taken up/continued during the 76-77 were too many. The details of schemes taken up/continued during the first half of the year are furnished in Table 3-2.1, 3-2.2 and 3-2.3 The details of Expenditure incurred during the year for construction are given in Table 3-1.2 (from item No. III and V on wards). Each item provides details of expenditure relating to buildings of the sister Departments like Education, Medical etc.

TABLE 3.2.1

Details of dwellings—Residential and non-residential—New construction for the half year ending 30-9-1976

Stage of construction	1 *room unit*	2 *room unit*	3 *room unit*	4 *or more room unit*	*Total*
(1)	(2)	(3)	(4)	(5)	(6)
1. Started during the period but not completed	Nil	88	40	21	149
2. Continued from previous period but not completed	8	338	159	250	755
3. Completed during the period	10	4	45	11	70

The data relate to construction projects with work in building portion

TABLE 3.2.2

Details of building construction—New construction—Details for the Half Year ending 30-9-1976

Construction type/stage	Building Portion						Sanitary and water supply installations		Electrical installations	
	No. of project	Total plinth area (Sq. M)	Total floor area Sq. M	Total estimated cost (Rs.)	Value of work done during the period (Rs.)	Value of (work done since the beginning of the project (Rs.)	No. of projects	Total estimated cost (R .)	No. of projects	Total estimated cost (Rs.)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1. *Residential Buildings—Dwellings*										
1.1. Started during the period but not completed	13	11,732	9,534	37,23,401	1,49,753	3,00,915	11	4,61,442	11	2,16,000
1.2. Continued from the previous period and not completed	57	63,274	46,833	169,04,052	8,96,864	97,38,989	45	12,58,906	44	20,20,429
1.3. Completed during the period	9	5,812	4,854	23,04,337	13,345	22,44,363	2	6,395	2	8,278
2. *Other Residential Places*										
2.1. Started during the period and not completed	3	5,763	4,609	10,37,843	3,658	4,279	2	1,04,810	2	60,000
2.2. Continued from the previous period and not completed	19	11,763	9,323	50,85,304	8,44,432	35,98,341	12	2,42,937	13	2,10,300
2.3. Completed during the period	1	1,447	1,203	2,80,700	..	3,47,602	1	24,000	1	24,300

3. *Industrial Buildings*										
3.1. Started during the period and not completed	..	..	..	..	..	..	..	..	..	..
3.2. Continued from the previous period and not completed	3	2,997	2,698	7,33,850	1,283	6,97,417	2	3,800	2	14,350
3.3. Completed during the period	..	..	..	..	..	..	..	..	..	..
4. *Commercial Buildings*										
4.1. Started during the period and not completed	21	16,217	12,735	50,04,039	5,87,702	5,94,411	7	4,48,500	7	99,500
4.2. Continued from the previous period and not completed	63	1,43,208	1,16,360	5,18,64,495	16,82,862	2,13,74,236	31	7,15,838	32	8,93,025
4.3. Completed during the period	4	1,155	976	4,16,449	56,187	6,20,096	2	36,847	2	50,829
5.0. *Institutional Buildings*										
5.1. Started during the period and not completed	64	20,537	17,234	62,82,336	4,20,852	5,10,260	11	1,18,417	17	85,383
5.2. Continued from the previous period and not completed	209	1,18,349	74,541	4,16,83,540	45,96,678	1,93,58,643	62	9,16,685	62	9,93,994
5.3. Completed during the period	26*	14,197	10,997	17,91,630	3,05,529	26,31,037	3	37,000	4	13,000

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
6. *Other Buildings*										
6.1. Started during the period and not completed	..	..	..	..	..	..	..	..	..	..
6.2. Continued from the previous period and not completed	3	7,279	6,375	11,33,834	26,372	6,73,077	1	17,996	1	11,700
6.3. Completed during the period	..	..	..	..	..	..	..	..	..	..

* Includes two works which started and completed during the period

TABLE 3.2.3

Details of building construction—Addition to the existing buildings—Details for the half year ending 30-9-1976

Construction type/stage	Building Portion						Sanitary and water supply installations		Electrical installations	
	No. of Projects	Total plinth area (Sq. M)	Total floor area (Sq. M)	Total estimated cost (Rs.)	Value of work done for the period	Value of work done since the beginning of the project	No. of projects	Total estimated cost	No. of projects	Total estimated cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1. *Residential Buildings*										
1.1. Continued from the previous period and not completed	1	52	41	64,000	..	52,669		..	..	..
2. *Other Residential places*										
2.1. Continued from the previous period and not completed	1	390	351	11,11,000	2,310	1,12,453	..	..	..	..
3. *Commercial Buildings*										
3.1. Started during the period and not completed	2	132	107	87,880	137	375	1	500	1	500
3.2. Continued from the previous period and not completed	9	3,151	2,404	16,98,380	1,40,903	3,80,049	4	16,700	5	13,550
3.3. Completed during the period	1	314	281	91,500	..	83,680	1	3,000	1	2,000

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
4. *Institutional Buildings*										
4.1. Continued from the previous period and not completed	5	1,278	1,127	5,65,511	48,107	4,39,758	2	10,489	3	9,800
4.2. Completed during the period	4*	611	458	1,25,800	20,064	78,578	2	8,200	2	4,000
5. *Other Buildings*							..	..	..	..
5.1. Continued from the previous period and not completed	1	182	162	96,700	..	99,431	..	..	..	..

* Includes one work which started and completed during the period.

3.3 Projects and Irrigation wings

Agriculture is the backbone of our country's economy, since more than 70% of the population depends on agriculture for their livelihood. Even-though four Five year plans have been implemented, still our agriculture is 'a gamble of the monsoons'; our agricultural operations still depend on monsoons considerbly. In order to get over the vagary of these monsoons irrigated water has to be made available to the cultivator more or less on a steady basis. Moreover in these days, when scientific methods of cultivation are practised by farmers, irrigation plays a significant role in maximising agricultural production. The State Government had given due importance to this vital sector and several irrigation schemes have been started/ are being implemented/are under investigation.

The details of the 10 schemes which have been completed and commissioned are furnished in Table 3.3.2

The details of the continuing schemes like Revised Estimated cost, Expenditure upto 1975-76, Allotment for 1976-77, and expenditure for 1976-77 are furnished in Table 3.3.3 Other details such as year of commencement, District benefitted, ultimate irrigation potential, and year-wise cumulative achievements are furnished in Table 3.3.4. Short notes on the salient features of each scheme and its physical achievement up to the end of 1976-77 are furnished separately.

Details of 4 new schemes viz. Edamalayar, Chimney, Meenachil and Moovattupuzha are furnished separately.

The details of expenditure of all schemes under projects and irrigation are furnished in Table 3-3.1

CONTINUING SCHEMES

Kallada Irrigation Project

This project consists of a masonry dam 335m long with a maximum height of 73.5 m across Kallada river at Parappar to form a reservoir having a gross storage of 524 Mm3, a pickup weir at Ottackal 4.6 km. down stream of the dam 118 m long and 9 m height, a Right Bank canal 82.08 km. long and a left Bank canal 96 km. long both taking off from the pick-up weir and a net work of distributing system.

Physical Progress

(*a*) *Dam at Parappar*

Block-I upto+390' and Block II upto +367' including the special foundation treatment of the fault zone have been completed. Blocks VI and VII have reached upto an average level of +215' Blocks VIII, IX and X (Part) have also been raised upto an average level of +215 except a portion of Block VIII. Works on Blocks IV and V are in progress.

(*b*) *Pick up weir a Ottackal*

All the works pertaining to the weir except the last span, where the head regulator has to be constructed have been completed.

(*c*) *Canals*

The Right Bank Main Canal up to the 53rd km. has been taken up in different reaches and are in various stages of execution. The Sasthamkotta branch canal for the first 15 km. is under execution.

Pumba Irrigation Project

The projects consists of a barrage at Maniyar of length 115.25 m and height 16.67 m across the Kakkad River with the main canal taking off from the left bank. This main canal bifurcates at the 20th km. into Right Bank canal (20.25 km.) and left Bank canal (46.6 km.), each of which has canal system with distributories.

Physical Progress

1. Barrage at Maniyar.

   Work completed in all respects.

2. Canals

   (i) Main canal 20 km. in length—work completed except some finishing works.

   (ii) The R.B.C. for the full length has been completed except some minor finishing works.

   (iii) Twelve Branches in R.B.C. have been completed and the work in three branches are in progress.

   (iv) The left Bank Main Canal work are in various stages of progress up to the 25th km. out of this 14 km. length of canal have been completed so far.

   (v) Three branches of L.B.C. have been completed and the work on another 7 branches are in progress.

Periyar Valley Irrigation Project

The project consists of a barrage across Periyar at Planchode for utilising the tail race waters of existing hydel waters in the Muthirapuzha group and to utilise the tail race waters of Edamalayar Hydro-Electric Project when completed. The Main canal takes off from the left bank. At the 8th Kilometer it bifurcates into the Low Level Main canal (20.8 km.) and a High Level canal (23km.) and a net work of branches and distributories.

Physical Progress

The barrage and head-regulator at Bhoothathankettu have been completed as per original proposal. The work of strengthening the barrage and raising the height of barrage to increase the storage capacity and F.R.L. are being taken up. Full length of Main canal (8km.) and low level main canal (20.8km.) have been completed including a canal system of 360 km. of branches and distributories. The remodelling of the Main canal to increase the capacity is in progress. Construction of Alwaye Aqueduct and investigation and execution of branch canals and distributories are also in progress.

Chitturpuzha Irrigation Project

This project envisages the reconstruction of existing Moolathara and Thembaramadekku weirs in Chitturpuzha river and remodelling and extension of existing canal system for utilising 7250 m.c. ft. of water/year released by Tamilnadu Government from P.A.P. System.

Physical Progress

The construction of Moolathara Regulator has been completed, except for some small item. The construction of Thembaramadekku weir has been completed.

Canal

(a) *Moolathara Right Bank Canal*

The total length of the canal to be remodelled is 24.04 km. The work is almost completed.

(b) *Thambaramadekku Main Canal*

Total length to be remodelled is 10.10 km. work on 4.53 km. length is in progress.

(c) *Branches and Distributories*

Total length is 162 km. upto 1975-76 work on 122.14 km. has been completed. Work in 31 km. is in progress.

Kanhirapuzha Irrigation Project

The project consists of an earth dam with a central masonry spillway across Kanhirapuzha River at Pullikkal. Total length of the dam is 2128m. The length of the masonry portion is 231.6 m. There are two main canals taking off from the head works. The left Bank Main canal is 56.5 km. long with 21 distributories. The Right Bank canal is 9.36 km. long and has 5 distributories.

Physical Progress

Earth dam

On the left side 0 to 640 m has come up to +60 against the top level +100.28. The right saddle formation is just underway. D-T. pitching to the upstream side branch 85 to 280 m is in progress.

Masonry Dam

Work is in progress.

Canals

11 km. of L.B.C. have been completed. From 11 to 16 km. work is in good progress. R.B.C. has been excavated for the full length except for the 1.5 km. in the initial reach. Works on the distribution of R.B.C. is progressing.

No Ayacut has been achieved till date. It is proposed to be partially commissioned in 1977-78

Kuttiadi Irrigation Project

This scheme consists of a masonry dam 1.12 m. long at Peruvannamuzhy across Kuttiadi River and 13 saddle dams. The main canal runs for 1.81 km. and then bifurcates into L.B.C. 40 km. and R.B.C. 40.4 km.

Physical Progress

The work on the main mansory dam and 13 saddle dams have been completed. The major portion of work on the L.B.C. has been completed and the balance is in progress. With regard to the right bank canal only very small portion of the work has been completed.

Pazhassi Irrigation Project

The project consists of a barrage 228.6 m. long across Valapattanam river near Kuilur, a main canal 54.72 km. long and a canal system consisting of 6 branches and distributories.

Physical Progress

The works relating to the Head sluice and main barrage will be completed soon. The main canal work and the work relating to the distrbutories are in different stages of progress.

NEW SCHEMES

Attappady Irrigation Project

The project consists of a masonry dam at Chittur across Siruvani river in Attappady and the canal system consisting of L.B.C. 36 km. and R.B.C. 27 km. and the distributories to irrigate the tribal area.

Physical Progress

The construction of quarters, office buildings and store at Agali were completed. The formation of approach road has been taken up. Major components of the project are yet to be taken up.

Karapuzha Irrigation Project

The project consists of a masonry dam across Karapuzha at Vazhuvatta with earth flanking dams on either side with 3 earthern saddle dams. The main canal (4.1 km.) taking of from the left bank bifurcates into L.B.C. (16km.) and R.B.C. (9 km.) and which have a net work of canal system.

Physical Progress

The work relating to the main components of the project have not been take up. Approach road to Dam site and quarters at Kalpetta have been completed.

Edamalayar Scheme

This project envisages utilisation of tail race waters of Edamalayar Hydro-Electric Project. A 90m. high dam is constructed by the Kerala State Electricity Board at Ennakkad in Periyar River. The water that would be released from the Edamalayar is proposed to be diverted by the barrage of P.V.I.P. at Planchode into a new canal to be constructed under the Edamalayar Scheme on the right bank of Periyar. Main canal for a 29 km. a link canal for 8 km. and a low level canal for 12 km. with necessary branches proposed in the project will benefit an ultimate area of 20,200 hectares (net) *

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* in Ernakulam district, which includes 9700 hectares now being fed by the Chalakudy Left Bank Canal System. The investigation regarding the Canal System is in progress and the work will be started soon after the finalisation of the project report. The work relating to head works which is undertaking by K.S.E.B. is in progress.

Chimni Scheme

This project envisages supplying water to 13,000 Hectares (net) (26,000 Hect. gross) Kole land and its peripheral lands for the second and third crop season, in Trichur District. A masonry dam with an earth dam on the right flank across Chimni river, a tributory of Karuvannur river, forms the head works. The dam will be 54 m. long and the capacity of the reservoir is 179.24 Mm3. No canal system is envisaged. Water from the reservoir released to the river, which will be diverted to the Kole lands by the existing regulators. The work of this project was commenced in 1975.

Physical Progress.

Earth work, excavation and rock blasting for foundation of masonry dam is in progress. Works relating to approach road, construction of culverts building for workshop, store, office building, quarters, etc. are in different stages of progress.

Moovattupuzha Scheme

This project envisages the utilisation of the tail race waters of Idikki Hydro Electric Project. The head work consists of a dam across Thodupuzha river at Malankara. The reservoir will also act as a balancing reservoir and will moderate the vast fluctuations in the tail race waters from the Moolamattom Power House. The canal system consists of Right Bank canal 30 km. long and Left Bank canal 41 km. long and a net work of canal system to irrigate an ayacut of 52,200 Hectares gross/17,400 hect. net in Idikki, Ernakulam and Kottayam Districts.

Physical Progress

Dam masonry in central part completed up to the site level in Coffer Dam area. Foundation work, concreting of stilling basin, drainage etc. are in progress. Excavation for the R.B.C. is completed and tenders are invited for dam work. Cut off trench for earth dam completed. Work is in good progress.

Investigation of New Schemes

Investigation of the following New Schemes were in various stages of progress during 1976-77.

1. Kakkadavu Irrigation Project.
2. Payaswini Irrigation Project.
3. Vamanapuram Irrigation Project.
4. Kuriarkutty-Karappara Scheme.
5. Silent Valley Irrigation Project.
6. Palakkazhipuzha Irrigation Project.

7. Beyporepuzha Scheme (Areacode Scheme).
8. Banasurasagar Irrigation Project.
9. Aralam Irrigation Project.
10. Manjot Irrigation Project.
11. Noolpuzha Irrigation Project.
12. Thondar Irrigation Project.
13. Thirunelli Irrigation Project.
14. Marathappuzha Irrigation Project.
15. Arali Irrigation Project.
16. Thalayar Irrigation Project.
17. Moonnamkadavu Scheme.

TABLE 3.3.1

PUBLIC WORKS DEPARTMENT—KERALA

Expenditure Incurred in 1976-77

By Irrigation and Project Wings

Sl.No.	*Head of Account*	*Name of Scheme*	*Expenditure works proper*	*Total expenditure including establishment charges etc.*
(1)	(2)	(3)	(4)	(5)
		PLAN		
1.	306(b)-1	1.3—*Minor Irrigation—Ground water survey and Development*		
		Deepening of wells and Tanks	19,176	19,176
2.	506(a)-2	Lift Irrigation works	47,11,129	63,00,899
3.	506(a)-1	Minor Irrigation Class-I	39,57,576	52,93,178
4.	506(a)-3	Minor Irrigation Class—II	41,64,627	41,64,627
5.	306(d)-5	Repairs to damages caused to M.I. Structures	2,35,143	2,35,143
6.	306(d)-1	M. I. Work in Intensive Paddy Development work M. I. Works in Yela programmes	50,97,998	50,97,998
		1.4—*Soil and Water conservation*		
7.	533 B(h)	Thanneermukkom	10,58,774	15,43,987
8.	533 B(v)	Kattampally	1,37,625	1,81,593
		3.1—*Water Development—Research Survey and Investigation*		
9.(b)	333-B(o)8 (ii)	Investigation and Research, M. I. Works	7,49,108	7,49,108
10.	Do. (2)	Machinery and Equipment	..	2,00,663
11.	Do. (1)	Investigation Circles and Divisions establishment	.	23,48,014
12.	533-B(d)	Development of K. E. R. I. Peechi II stage	32,672	32,672

3.2—*Irrigation and Flood Control Projects*

		A-Irrigation Projects—Completed Projects		
13.	533-B(u)	Moolathara R. B. C.	15,13,980	19,97,666
14.	533-B(x)	Moovattupuzha	39,69,778	45,94,698
		Continuing Projects		
15.	533-A(i)	P. V. I. Schemes	2,65,80,404	2,94,57,030
16.	533-B(j)	Pamba	3,81,81,513	4,24,68,146
17.	533-B(i)	Kallada	2,67,46,940	3,15,97,438
18.	533-B(p)	Kuttiadi	3,55,81,008	3,88,71,767
19.	533-B(m)	Chitturpuzha	91,84,936	1,09,18,102
20.	533-B(o)	Kanhirapuzha	1,25,86,845	1,48,69,938
21.	533-B(q)	Pazhassi	2,90,63,509	3,16,23,076
		New Projects		
22.	533-B(s)	Karapuzha	4,23,426	5,58,702
23.	533-B(n)	Attappady	18,08,776	23,86,644
24.	533-B(t)	Edamalayar	30,900	40,772
25.	533-B(v)	Cheroni	16,39,077	19,01,655
26.	533-B(y)	Thottappally	—53,612	—53,612
		Other Projects		
27.	533-A(y)(h) (j)(i)	Completed projects under 533 (A)	7,85,059	10,35,870
28.	533-B(y) (k)(l)	do. under 533 (B)	12,92,744	17,05,749
		B. Flood Control and Anti-sea Erosion Projects		
		Flood Control		
29.	333-G(c)	Studies on coastal erosion	9,08,332	9,08,332
30.	533-G(d)(ii)	Flood Control works	35,88,494	47,99,639

(1)	(2)	(3)	(4)	(5)	
		Anti-Sea Erosion			
31.	333-G(d)4	Investigation of Anti-sea Erosion and Flood control works		5,936	5,936
32.	533-G(d)1	Anti-sea erosion works		2,19,88,265	2,94,08,865
		Inland water Transport			
33.	533-D(d)ii	State Sector Schemes		7,13,169	9,53,849
		Expenditure met out of central Assistance sanctioned for Drought Relief Works			
34.	306-M.I(d)-6	M. I. Works under I. P. D. (Spill over works)		17,14,936	17,14,936
35.	Do. —8	M. I. Class II (Spill over works)		16,25,581	16,25,581
36.	Do. -9	M. I. Class II works—new works		1,69,423	1,69,423
		Centrally Sponsored Schemes			
37.	533-D(d)(i)	Inland water transport—Central Sector scheme		44,06,468	58,93,562
38.	512C(i)	Fishing Harbour and landing facilities		2,71,668	3,44,173

NON-PLAN

Sl.No.	*Head of Account*	*Item*	*Expenditure during* 1976-77
(1)	(2)	(3)	(4) (5)
1.	333A-(Commercial)—Non-Plan(e)	Peechi scheme-works	4,62,758
		do. Maintenance	6,57,235
2.	do. (f)	Chalakudy river diversion scheme—works	5,85,549
		do. Maintenance	4,44,327
3.	do. (h)	Cheerakkuzhi scheme—works	74,942
		do. Maintensance	1,12,883
4.	do. (i)	Malampuzha Project—works	2,07,083
		do. Maintenance	9,45,859

5.	do. (j)	Mangalam Project—works	47,914
		do. Maintenance	1,62,065
6.	do. (k)	Walayar Project—Works	2,78,900
		do. Maintenance	1,22,849
7.	do. (l)	Meenkara Project—works	19,501
		do. Maintenance	2,64,036
8.	do. (j)	Periyar Valley Irrigation Project—Maintenance	2,99,469
9.	333 A-a(i)	Direction—C.E's office, Irrigation	27,54,804
10.	333 A-a(2)	Supervision	26,95,064
11.	333 A-a(3)	Execution	2,50,19,327
12.	333 A-(b)	Machinery and Equipments—Non-Plan	2,70,557
13.	Do.	Repairs and carriages	22,09,149
14.	333 B—(d)1	R. E. S.S. (Non-plan)	190
15.	Do. (d)2	Post-graduate course for Departmental Engineering Graduates	755
16.	Do. (d)3	Irrigation Advisory committee (Non-Plan)	4,413
17.	Do. (d)7	Maintenance and Repairs of other Irrigation works (Non-Plan)	7,09,829
18.	Do. (c)	Suspense.	
		Stock debit	4,07,36,411
		M. P. W. A.	39,61,984
		Workshop suspense	9,69,907
19.	Do. (e)	Neyyar dam	4,25,905
20.	333 B—(f)	Kuttanad Development scheme	61,439
21.	Do. (g)	Wadakkancherry scheme—works	1,22,869
		Do. Maintenance	1,56,318
22.	Do. (k)	Kattampally scheme	22,180
23.	Do. (i)	Pothundy scheme	2,85,280
24.	333 D-(d)	Navigation projects—Other expenditure works	12,58,170
25.	333 G—(d) 2	Maintenance of Anti sea erosion and flood control works	33,34,523
26.	333 G—(d)3	Repair due to flood damages	42,24,368

TABLE 3-3.2

Details of Major and Medium Projects, which have already been completed

Sl.No.	*Name of Project*	*Classification*	*Year in which first commissioned*	*Cumulative achievement till the end of* 1976-77
1.	Chalakudy	Major	1952	13,670
2.	Peechi	do.	1953	17,286
3.	Malampuzha	do.	1955	19,748
4.	Mangalam	Medium	1956	3,305
5.	Walayar	do.	1956	3,685
6.	Vazhani	do.	1957	2,190
7.	Neyyar	Major	1959	8,539
8.	Gayathri	Medium	1960	4,868
9.	Cheerakkuzhi	do.	1968	927
10.	Pothundy	do.	1968	5,098

Note: The cumulative achievement—furnished is net area irrigated by the project in hectares.

TABLE 3-3.3

Major and medium irrigation

Financial Targets and Achievements for 1976-77

(*Rs. in lakhs*)

	Name of scheme	*Revised estimated cost*	*Expenditure upto the end of* 1975-76	*Allotment for* 1976-77	*Expenditure for* 1976-77
1.	Completed projects	2789.43	2399.555	25.00	27.42
2.	Research and Investigation	..	72.070	30.00	33.30
3.	Kallada	7360.00	823.178	260.00	315.97
4.	Pampa	2016.00	1170.832	430.00	424.66
5.	Periyar valley Irrigation Project	1795.00	988.422	200.00	294.57
6.	Chitturpuzha	624.00	356.809	100.00	109.18
7.	Kanjirappuzha	1052.00	482.953	140.00	148.70
8.	Kuttiadi	1520.00	1716.742	400.00	388.72
9.	Pazhassi	1482.00	652.883	295.00	316.24
10.	Attappady	670.00	21.336	17.00	23.86
11.	Karepuzha	760.00	9.00	20.00	5.58
12.	Edamalayar	1750.00	..	10.00	0.42
13.	Chimney	632.75	3.54	85.00	19.02
14.	Meenachil	1000.00	..	3.00	..
15.	Muvattupuzha	2086.00	14.77	60.00	45.95
16.	Mulathara	..	27.18	..	19.98

TABLE No. 3-3.4

Details of continuing Irrigation Projects

Sl. No.	Name of scheme	Year of commencement	District benefited	Ultimate irrigation potentials	IVth Plan	Cumulative benefit to the end of			Remarks
						1974-75	1975-76	1976-77	
1.	Kallada	1961	Quilon	105.20	..	..	..	..	..
2.	Pamba	1961	Alleppey&Quilon	41.68	..	..	2.93	9.99	Partially commissioned in 1976.
3.	P.V.I.P.	1955	Ernakulam	85.60	35.80	39.54	42.83	47.26	Partially commissioned in 1966
4.	Chitturpuzha	1963	Palghat	32.55	3.72	10.92	20.92	23.17	Commissioned in 1972
5.	Kanhirapuzha	1961	Palghat	21.87	..	..	..	..	Not yet commissioned
6.	Kuttiadi	1962	Calicut	31.16	4.20	4.80	9.07	14.61	Commissioned in 1973
7.	Pazhassi	1961	Cannanore	32.37	..	..	..	..	Will be partially commissioned in 1977-78.

Details of Area benefted are given in '000 hectares gross.

MINOR IRRIGATION

The Minor Irrigation Circle, Trivandrum with 10 Divisions at all district headquarters except Idukki (works in Idukki District was attended to M. I. Division at Kottayam), attended to the following categories of works

1. Construction and Renovation of Irrigation Tanks.
2. Construction of Diversion works from Natural streams.
3. Salt exclusion works.
4. Reclamation of Kayals (back waters)
5. Improvements and protection works in streams and channels serving Irrigation drainage.
6. Lift Irrigation works.

The Minor Irrigation works are generally divided into 3 categories.

1. M.I.Class I works.
2. M.I. Class II works . and
3. Land Improvement works.

Works costing above 2 lakhs and below and up to 25 lakhs is classified as Class I works. The upper limit is raised to Rs. 30 lakhs in hilly areas.

Works other than petty works costing up to Rs. 2 lakhs are brought under class II works. Considering the enormous potential for the exploitation of both surface and ground water through M.I. Projects and their quick maturing nature, a collective effort has been launched in the state with the participation of beneficiary farmers. Fifty per cent of the cost of each project would be met by the Government, while another 25 per cent would be provided by CARE in the form of wheat; the remaining 25 per cent being the contribution by the beneficiaries. The Collectors and Block Development Officers have been given overall responsibility for organising beneficiary committees to take up these works and P.W.D. is rendering necessary technical and personnel help.

During 1976-77 23 M.I. class I works were completed and 150 works were in progress. The physical target for the year for both class I and class II works together was 10,000 hectares net; the achievement was 2644 hectares net (3966 Hectares gross).

166 M.I.class II works were completed during the year, while 221 works were in progress. The physical target was 10,000 hectares (for both class I and class II works together) and the achievement was 3103 Hectares net and gross.

Anti Sea Erosion

A serious problem facing Kerala is coastal erosion. The long coast line of Kerala ranging to 560 Km. is being progressively eroded in many segments. A sizeable extent of land has already been lost. To avoid further loss sea walls

are being built at several places, which are threatened with sea erosion. At present, the sea wall costs about Rs. 30 lakhs per Kilometre. During the year 8 works were completed and 62 works were in progress.

Flood Control

The flood havoc is an annually recurring meanace to us; hence flood control works are being implemented to minimise the damages. The works mainly aim at protecting river banks and thus restricting flood damages. Due to public demand, a large number of works were taken up during 1976-77. During the year 20 works were completed and 59 works were in progress.

Inland Water Transport

The Central Government is providing loans for the following schemes:

1. Champakara Canal.
2. Neendakara-Cheriazheekal canal.

The Champakara Canal is the water route to F.A.C.T. Division at Ambalamugal and the work aims at providing 2.5 metres depth suitable for heavy mechanised barged traffic. The work is in progress.

Work in Neendakara-Cheriazheekkal canal is now held up due to the proposals of Kerala Minerals and Metals Ltd., to deviate the existing canal to facilitate their mining operations.

In the Inland water transport state sector, there is a provision of 10 lakhs which is intended to do such works as construction of foot bridges, petty improvements, desilting shallow portions, side protection etc. During the year 8 works were completed and 44 works were in progress.

Land Development Schemes

1. *Kattampally Project.*

This is a multi purpose scheme for irrigation, provision of salt water intrusion, flood control, navigation and communication. The first stage was completed during the fourth Plan period. The second stage envisages reclamation of 410 Hectares of marshy area. A pilot scheme costing about Rs. 5 lakhs is being taken up in the second stage now.

Thanneermukkom Project

Revised Estimate of the scheme is Rs. 458.50 lakhs. Except for central 1/3 portion, Regulator has been completed. And the central portion is now protected by a bund. The question of constructing the regulator in this portion has to be decided by the Government.

The details of Minor Irrigation Schemes for 1976-77 are furnished in Table 3-3.5

TABLE 3-3.5

P.W.D. Details of Minor Irrigation Schemes 1976-77

Sl. No.	Scheme	Allotment 1976-77 (Rs. in lakhs)	Expenditure 1976-77 (Rs. in lakhs)	Physical target	No. of works completed	No. of works in progress	Physical achievement (hect)	
							Net	Gross
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1.	Minor Irrigations class I	65.00	52.93	10,000 hect	33	150	2644	3966
2.	Minor Irrigation class II	45.00	59.60	net	166	221	3103	3103
3.	Yelah Programme	50.00	68.13	12,000 hect	169	200	3495	3495
4.	Lift Irrigation	73.00	63.01	gross	55	137	1681	2522
5.	Deepening of wells and tanks	3.00	0.19	..	1	4	166	16
6.	Repairs to M.I. Structures	20.00	2.35	..	..	..	..	..
7.	Anti sea erosion	290.50	294.13	12 Km.	8	62	12.418 Km.	..
8.	Flood control	49.80	57.07	750 hect	20	59	750 hect.	..
9.	Inland Water Transport (State)	8.00	9.53	..	8	44	..	..
10.	Do. (Central)	45.00	58.94	..	4	9	..	..
11.	Thanneermukkom	15.00	15.44	..	..	..	..	..
12.	Vizhinjam Harbour Project	1.70	..	..	..	..	..	..
13.	Kattampally	3.00	1.82	..	..	..	..	..
	Total	669.00	683.14					

3.4 National Highway Wing

National Highways in Kerala

The National Highways in the State consists of N.H. 47 and N.H. 17. The N.H. 47 enters Kerala State at Walayar on the Northern border and passes through Palgaht, Trichur, Ernakulam, Alleppey, Quilon and Trivandrum and goes to Kanyakumari in Tamil Nadu. The N.H. 17 was from Kalapady near Mangalore and connected Trichur via. Kasaragode,, Cannanore, Calicut and Ernakulam. However in 1974, a realignment of the N.H. 17 was approved by the Government of India. According to this the existing portion of N.H. 17 from Kuttippuram to Trichur via. Kunnamkulam has been denationalised and the coastal road from Kuttippuram to Edappally via. Pudupponnani, Chowghat, Cranganore and Parur becomes part of N.H. 17.

The present length of the National Highways in the State is as furnished below:

N.H. 47	416.8 K.M.
N.H. 17	22.0 K.M.
Total	438.8 K.M.

The activities of the wing mainly relate to the widening and strengthening of single lane section to two lane section of the different reaches of the National Highways in the State, construction of bye-passes in conjusted areas, re-construction of bridges, construction of new bridges, reconstruction of old culverts, construction of new culverts, maintenance of State Highways within the Municipal limits and works relating to Roads of Economic or Inter-State importance and Roads constructed/maintained out of allocation received from Central Road Fund.

The activities of this wing relating to Roads of Economic or Inter-State Importance and Roads constructed/maintained out of allocation received from C.R.F. are furnished along with the activities of the Buildings and Road wing.

The present position of National Highway works in the state is as follows:

1. *Land Acquisition Work*

For strengthening and widening the single lane sections to two lane sections and also for improving the geometrics of the existing National Highway, it is proposed to acquire 100 ft. land width initially. At present the sanction for land acquisition for acquiring 100 ft. width has been made in the following reaches.

1.	Walayar —Palghat	K.M. 180/2 m	203/8
2.	Palghat —Vaniampara	M.K. 215/4	248/8
3.	Vaniampara —Trichur	K.M. 248/8	260/7

4. Trichur	—Karukutty	K.M. 284/4	312/6
5. Aroor	—Alleppey	K.M. 366/4	408/7
6. Alleppey	—Quilon	K.M. 416/2	500/4
7. Quilon	—Kazhakkuttom	K.M. 500/4	552/8

Of the above, land acquisition has been almost completed in the first five sections and the same is pending in Thottappally-Quilon-Kazhakkuttom sections. This is mainly due to the withdrawal of the special staff posted for the land acquisition works sometime back. Steps are being taken to post the necessary special staff and speed up land acquisition work.

As regard the land acquisition for the bye passes, the same has been completed with respect to Palghat, Trichur, Alwaye and Cochin bye-passes. For the Chalakudy bye pass the land acquisition was sanctioned some years back but the same was not taken up due to financial stringency.

2. *Road Formation Works*

Valayar - Palghat Section

The road formation works was sanctioned in 5 sections in 1971-72. Except in one reach in K.M. 190/0—193/2, in all the cases the work was not completed since the contractor has stopped work and has gone for arbitration. However the works were arranged through the Kerala State Construction Corporation and are in good progress.

2. *Palghat - Vaniampara Section*

Road formation works in this reach are sanctioned in 8 job numbers during the year 1971. The road formation work has been completed in about four reaches except for the 50 mm bitumen macadam work for the road from K.M. 243/8 to 248/9. The balance of work has been recently arranged and the work is in progress. However for the sections in K.M. 232/0 to 238/4 and in K.M. 241/7 - 243/8 the balance of work could not be arranged since there was no response from the contractors during the tenders and negotiations on various occasions. Hence arrangements are being made to entrust the work to the Kerala State Construction Corporation.

3. *Vaniampara Trichur Section*

There are four numbers of road formation works in this reach of which works in two numbers have been completed except for the 50 mm bitumen macadam works. For the reach from K.M. 256/4 - 260/7, the balance of work has been arranged recently and it is in progress. However with regard to one section in K.M. 248/5 - 251/3, the balance of work has not been arranged since there was no response during various tender calls and also on negotiation. Arrangements are being made to entrust this work also to the Kerala State Construction Corporation.

4. *Trichur - Karukutty Section*

The road formation works in this section was sanctioned during 1973 and there are 5 works in this section. The work has been almost completed in two cases,. In the remaining cases, the works are in progress.

5. *Alleppey - Aroor Section*

In this reach the road formation works have been completed in all the five sections except for the bitumen - macadam works. The 50 mm bitumen-macadam work and 25 mm asphaltic concrete has been sanctioned and the work has been started in a few places.

6. *Alleppey - Thottappally Section*

In this section, 3 road formation works estimates have been sanctioned during 1973. The road formation works for the first section in K.M. 416/2 421/4 have been almost completed except for finishing works. As regards the other two job numbers the works are in progress.

7. *Quilon - Trivandrum Section*

As at present three works have been sanctioned. Work has been arranged in one case and the other two works are in progress.

Bye-pass works

1. *Palghat Bye-Pass*

The land acquisition has been completed and the road formation work arranged in first four sections. The earth work road formation has been completed for the above four sections and metalling has been done for the first two sections. There are two bridges works in the bye-pass. The road overbridge over Chittur road has been started. The design for the railway overbridge is being finalised.

2. *Trichur Bye-pass*

The land acquisition has been almost completed. Estimates for road formation are to be sent to Government of India.

3. *Chalakudy Bye-pass*

The land acquisition has not been taken up due to financial stringency.

4. *Koratty Bye-pass*

Both the land acquisition and road formation has been completed and the bye-pass opened to traffic in 1975.

5. *Alwaye Bye - pass*

In this case also both land acquisition and road formation have been completed and the bye-pass has been opened for traffic.

6. *Cochin bye-pass*

The land acquisition has been completed and the road formation work is in progress.

Bridge works

The three major bridges at Neendakara, Kurumali and Chalakudy have been completed in all respects and opened to traffic. In addition to it, works relating to about 10 major bridges were taken up and the position of work of these bridges is furnished below.

Of the 5 bridges coming under the Cochin bye-pass, works on two major bridges viz. bridge between Kumbalam and Aroor and the bridge between Panangad and Kumbalam which are entrusted to Kerala State Construction Corporation are in progress. Of the other 3 bridges, bridge over Nettoor Thodu and bridge between Maradu and Nettoor have been completed and the construction of bridge over Champakara Thodu will be completed soon.

The bridges at Mangalathazham, Naragampally, Poovampara and Ithikara have been completed and opened to traffic.

As regards minor bridges in total about 20 numbers were sanctioed and 14 of them have been completed while 2 bridges are nearing completion. Works have been started in all other cases and are in various stages of progress.

The financial and physical achievements of the various schemes relating to National Highways are furnished in Table 3-4-1.

The details of expenditure incurred by the National Highway wing is furnished in Table 3-4.2.

TABLE 3-4.1

Details of National Highway works

(Rupees in lakhs)

Sl. No.	*Name of work*	*Estimated cost*	*Expenditure upto 31-3-1977*	*Overall physical progress*	*Physical progress during 1976-77*	*Remarks*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	N.H. DIVISION, QUILON					
	A. Road Works					
1.	N.H. 47-Widening and strengthening of single lane sections to two lanes from Km. 462/0 to 472/0 Km. 472/0 to 482/0 Km. 482/0 to 491/2, Km.500/4 to 508/4, Km. 509/9 to 513/0, Km. 513/0 to 519/5 and Km. 519/5 to 554/22. Land Acquisition.	261.704	235.390	..	..	..
2.	Approaches to Ithikara bridge	8.134	9.057	98%	4%	Work will be completed soon
3.	Do. Poovampara bridge	8.606	6.300	75%	18%	do.
	Quilon-Trivandrum Section					
4.	Road Formation Km. 509/7 to 520/4	27.426	..	20%	20%	Earth work in progress
5.	Approaches to Neendakara bridge	8.369	5.671	100%	..	
6.	C.D. Works	5.194	..	100%	..	
	B. Bridges					
1.	Poovampara bridge	8.316	7.037	100%	..	
2.	Ithikara bridge	8.445	9.028	100%	..	
3.	Neendakara bridge	39.280	N.A.	100%	..	
	N.H. DIVISION, ALLEPPEY					
	A. Road Works					
1.	Km. 366/4 to 461/0 Land Acquisition	..	..	97%	..	

Alleppey-Aroor Section					
1. Road Formation Km. 366/4 to 387/0	45.613	46.441	95%	..	Road formation completed only B.M. works to be taken up
2. Do. Km. 393./8 to 400/4	11.079	14.158	91%	..	do.
3. Do. Km. 400/4 to 408/7	14.746	23.696	93%	..	do.
4. **Shertallai Deviation Alleppey-Thottappally Section**	14.926	21.208	100%	..	
1. Road Formation Km. 416/2 to 421/4	17.861	15.206	82%	58%	Work almost completed
2. Do. Km. 421/4 to 428/2	19.945	14.143	45%	29%	Work in progress
3. Do. Km. 428/2 to433/8	24.002	13.626	48%	39%	do.
4. Approaches to Krishnapuram bridge	5.890	4.138	60%	..	Earth work formation completed.
5. Do. Kannalippalam Bridge	7.562	4.936	50%	50%	Metalling work in progress
6. Do. Kakkazham Bridge	3.452	N.A.	100%	..	
B. Bridges					
1. Krishnapuram bridge	3.690	3.788	100%	41%	
2. Kannalippalam bridge	3.807	4.033	62%	..	
3. Kakkazham bridge	0.878	N.A.	100%	..	
C. C. D. Works.					
1. C.D. Works	1.238	N.A.	100%	..	
N.H. DIVISION, PALARIVATTOM					
1. Reconstruction of bridges at Mangalathazham, Chandiroor, Ponnamveli, K.M. 391/8 Shertallai bye-pass and Kuthiathode	13.517	17.206	100%	3%	
2. Reconstruction of bridge over Chambakara Thodu in Cochin bye-pass	16.533	9.841	60%	3%	Work in Progress

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3.	Construction of bridge between Maradu and Nettoor in Cochin bye-pass	10.923	12.730	99%	24%	Work completed except for the approach slab.
4.	Construction of bridge over Nettoor Thodu	4.245	4.084	100%	9%	Work completed
5.	Construction of bridge Panagad and Kumbalam	48.488	16.015	10%	10%	Pile formation in progress
6.	Construction between Kumbalam and Aroor	212.774	58.326	20%	15%	Work in progress
7.	Approaches to Chandiroor bridge, Ponnamveli bridge, Chalakudy bridge, Karumali bridge, Bridge at Mile 2/2 A.N. Road, Kalamasserry bridge and Mangalathazham bridge	49.565	44.108	100%	10%	
8.	Construction of bridge at Chalakudy	9.845	..	..	..	
9.	,, Kurumali	5.111	..	..	..	
10.	Approaches to Kuthiathodu bridge	6.243	..	..	..	
11.	Construction at Mile 2/2 A.N. Road	0.598	..	100%	..	
12.	Approaches to Nettoor thodu bridge	15.016	3.073	20%	20%	Earth work formation in progress
13.	,, Chambakara bridge	25.330	9.025	20%	20%	do.
14.	,, Maradu- Nettoor bridge	26.414	13.350	35%	35%	do.
15.	Cochin bye-pass–Land Acquisition	155.208	112.995	100%	..	Land acquisition completed.
16.	Cochin bye-pass–Road Formation	63.110	26.075	60%	20%	Work in progress
17.	Alwaye bye-pass–Land Acquisition	26.408	22.477	100%	..	
18.	Alwaye bye-pass–Road Formation	7.230	7.987	100%	..	Work completed and road opened for traffic.
	N. H. DIVISION –TRICHUR–A. ROAD WORKS					
1.	Land Acquisition Km. 248/825 to 298/4, Km. 305/4 to 308/2 and 311/2 to 312/6	84.385	64.874	99.9%	..	
2.	Koratty bye-pass–Land Acquisition	..	..	100%	..	
3.	Chalakudy bye-pass–Land Acquisition	37.365	..	..	..	Land Acquisition not yet taken up.
4.	Trichur bye-pass–Land Acquisition	43.863	42.350	95%	..	Land Acquisition almost completed.

5. Koratty bye-pass–Road Formation	14.938	15.010	100%	1%	Work completed and opened for traffic
6. **Trichur–Vaniampara Section**					
(i) Road formation Km. 248/875 to 251/310	6.341	7.180	78%	4%	There were no response during tender calls and negotiations works to be arranged.
(ii) Do. 251/310 to 256/487	17.059	21.727	100%	..	Balance of work arranged and in progress.
(iii) Do. Km. 259/487 to 260/750	16.285	11.370	93%	4%	
7. **Trichur Karukutty Section**					
(i) Road formation Km. 284/560 to 288/800	13.884	19.550	85%	13%	
(ii) ,, Km. 288/800 to 292/0	11.298	11.300	98%	3%	Work completed
(iii) ,, Km. 292/0 to 298/4	19.354	21.890	72%	14%	Work in progress.
(iv) ,, Km. 305/4 to 308/2	5.886	8.280	77%	9%	Work in progress
(v) ,, Km. 311/2 to 312/6	3.300	5.100	100%	38%	Work completed.
8. Culverts Km. 248/875 to 260/756	9.423	..	100%	5%	
B. Bridges					
1. Constructing bridge at ch 1716 of Koratty bye-pass	1.633	1.610	..	..	
2. Reconstructing Thadom bridge at Km. 292/400	2.412	2.253	98%	..	
N.H. DIVISION, PALGHAT A. ROAD WORKS					
1. Land Acquisition for widening and strengthening N.H. 47 from Km. 182/258 to Km. 243/886	111.070	75.797	..	..	
2. **Valayar Palghat Section**					
(i) Road formation Km. 182/2 to 186/9	11.322	14.575	55%	8%	Balance of work entrusted to Kerala State Construction Corporation and the work is in progress.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ii.	Road Formation Km. 186/9 to 190/2	9.014	5.683	43%	21%	
iii.	Do. Km. 190/2 to 193/2	2.266	7.312	98%	16%	Work almost completed.
iv.	Do. Km. 193/2 to 196/0	6.770	9.184	58%	16%	
v.	Do. Km. 196/0 to 202/0	10.065	8.146	70%	35%	Balance of work arranged through K.S.C.C.
3.	Road Formation Km. 203/8 to 215/4 Palghat bye-pass	33.914	34.317	96%	60%	
4.	**Palghat- Vaniampara Section**					
1.	Road Formation Km. 215/6 to 219/0	10.048	7.469	100%	..	
ii.	Do. 219/0 to 224/2	14.193	9.347	82%	..	Balance of work arranged.
iii.	Do. Km. 224/2 to 227/0	8.382	6.598	85%	..	
iv.	Do. Km. 227/0 to 232/0	12.348	11.289	100%	10%	Work completed
v.	Do. Km. 232/0 to 238/4	14.300	14.299	78%	..	Old contractor terminated work. Balance work not yet arranged
vi.	Do. Km. 238/4 to 241/7	8.230	8.949	100%	..	
vii.	Do. Km. 241/7 to 243/8	5.243	4.910	67%	..	Balance of work could not be arranged since there was no response from contractors during the tenders and negotiation.
viii.	Road Formation Km. 243/8 to 248/9	14.821	17.165	78%	..	Balance of work arranged and the work is in progress.
5.	Approaches to Naragampally bridge	4.353	4.373	100%	..	
6.	Construction of culverts	21.566	..	100%		..
7.	C.D. Works	4.434	..	100%	..	
B. Bridges						
1.	Reconstruction of bridges at Chullimala, Kanjikode, Naragampally and Ermayoor.	15.069	12.032	100%	..	

2. Construction of bridges at Thrippalur, Malampuzha canal bridge (Palghat bye-pass), Kannanur, Yakkara, Maratharode, bridge at Km. 222/0 across Chullarur canal, Mangalam bridge at 239/2	31.593	24.103	100%	..	..
Other Works.					
1. Puthenthode bridge at Km. 386/0	25.320	..	..	..	
2. Widening the Edappally bridge at Km. 342/100	1.466	0.957	70%	..	Work nearing completion.
3. Bridge at ch 4755 of Palghat bye-pass–Palghat–Koduvayoor	5.003	..	..	..	Work started
N.H. 17					
1. Baliapattom bridge at Km. 147	96.263	40.395	50%	10%	Work in progress
2. Puduponnani bridge (balance work)	19.081	..	..		Work not yet arranged.

TABLE-3.4.2

Details of Expenditure—N.H. Wing 1976-77

Sl.No.	*Head of account*	*Item*	*Works expenditure* Rs.	*Other expenditure* Rs.	*Remarks*
1.	337 (R &B) C(1) C.E.N.H.	Supervision	..	6,36,573	
2.	Do. C(2)	Supervision and execution	..	73,91,735	
3.	337(c)2	Machinery and equipment	..	10,40,168	
4.	337 (R & B) C (3)	Maintenance within Municipal limits	12,09,793	..	Expenditure met by State Government.
5.	337 (R & B) (d)	C.R.F. Works	24,47,770	..	do.
6.	537 (R & B)	E & I Works	5,98,476	..	do.
7.	537 (Central)	N. H. ORIGINAL Works	2,18,21,486	15,83,415*	*Land acquisition charges.
8.	337 (Central)	N. H. Maintenance	59,19,204	..	

CHAPTER IV

Labour input cost ratio of selected schemes

The general particulars of the schemes selected for the study on labour Input Cost Ratio are furnished in Table 4-1.

The manpower utilised in the implementation of the schemes is given in Table 4-2.

The rates as given in the Schedule of Rates (1976) for the different categories of labourer which have been used in the calculation of the labour cost is given in Table 4-3, for reference. In some cases the rates as given in previous schedules have been used since the work was implemented during that period.

The results of the study are furnished in Table 4-4.

TABLE 4-1

General & Particulars of Schemes Selected for the Study on Labour input cost Ratio

Sl. No.	*Name of scheme*	*Location*			*Date of commencement*	*Date of completion*	*Expenditure*
		Division	*Sub-Division*	*Section*			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1.	Maintenance of N.H. within Quilon Municipal limit for 75-76. Providing 20 mm chipping carpet from K. M. 494/700 to 496/000 supplying and laying	N.H. Division Quilon	N. H. sub division Quilon	N. H. section Quilon	15-12-1975	20-5-1976	84,032
2.	Providing sand seal coat from KM 468/0 to 469/0 in Oachira section	do.	do.	N.H. section Karunagapally	1-8-1976	1-1-1977	19,888
3.	Rain damags. Urgent protective works to Kothamangalam-Thrippunithura Road at KM 27/100	B & R Ernakulam	B & R Perumbavoor	B & R Puthencruz	10-1-1977	10-3-1977	24,681
4.	Construction of a new building to Girl's High School, Mulamthuruthy	B & R Ernakulam	Addl. Bldgs. sub-division Ernakulam	Addl.Bldgs. section Ernakulam	2-8-1976	25-3-1977	1,41,602
5.	Flood control works for upper reaches of Mamom river	Irrigation division Trivandrum	Irrigation North sub-division Trivandrum	Irrigation section Attingal	29-12-1975	15-4-1976	99,684
6.	Periyar valley irrigation project. Forming branch canal from ch 780 m. to 960 m.	P.V.I.P. Division II Alwaye	P.V.I.P. sub division VIII Kolencherry	P.V.I.P. section I/ VIII Kolencherry	22-11-1976	21-3-1977	1,12,783
7.	Flood control works—Constructing retaining wall in the Neyyar river to protect the banks near Thrippalanur Temple	Irrigation division Trivandrum	Irrigation south sub-division Trivandrum	Section No. I Irrigation Trivandrum	10-1-1977	11-2-1977	76,438

TABLE 4.2

Scheme-wise details of Manpower utilised in the Implemeptaion of each Selected Schemes

I. N. H. within Quilon Municipal limit—Providing 29 mm premixed chipping carpet from km. 494/700 to 496/000

Sl. No.	*Name of work*	*Lorry Driver*	*Roller Driver*	*Special Mazdoor*	*Man*	*Woman*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Conveyance of materials and stacking	25	..	75	474	400
2	Extra conveyance to the mixing plant and then to the work spot	..	..	..	100	150
3	Providing chipping carpet including preliminary works	..	15	1525	70	446
	Total	25	15	1600	644	996

TABLE 4.2 [*Contd.*]

2. Providing sand seal coat from km. 468/0 to 569/0 in Oachira Section

Sl. No.	*Item of work*	*Lorry Driver*	*Roller Driver*	*Special Mazdoor*	*Men*	*Women*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Supply of stacking of sand and lime and conveyance of Bitumen	5	..	30	105	120
2	Providing sand seal coat including preliminary works	..	9	962	..	408
	Total	5	9	992	105	528

TABLE 4.2 (*Contd.*)

3. Rain Damages—Urgent protective works to Kothamangalam—Thrippunithura Road at Km. 26—100

Sl. No.	*Item of work*	*Lorry Driver*	*Mason*	*Carpenter*	*Man*	*Woman*
1	Conveyance of materials	13	..	..	122	80
2	Earthwork	..	..	..	443	105
3	Dry stone masonry including fixing of cement concrete guard stones	..	312	8	272	33
	Total	13	312	8	837	218

TABLE 4.2 [*Contd.*]

4. Construction of a new building to Girls' High School, Mulamthuruthy

Sl. No.	*Item*	*Wood-cutter*	*Sawyer*	*Driver*	*Stone cutter*	*Welder*	*Painter*	*Fitter*	*Black-smith*	*Carpe-nter*	*Mason*	*Special Mazdoor*	*Men*	*Wo-men*	*Boys*
1	Building	10	120	7	..	..	12	10	28	307	292	30	655	593	107
2	Compound wall	..	..	..	..	3	2	..	2	..	173	2	482	676	35
3	Watersupply	..	..	..	..	..	..	11	..	..	..	11	42	..	..
4	Extra Items	..	..	..	..	..	10	..	1	155	83	2	214	123	..
5	Laying foundation stone	..	..	..	5	..	..	..	..	..	1	10	13	2	..
6	Conveyance of materials	..	..	27	..	..	..	..	..	..	..	..	290	520	..
	Total	10	120	34	5	3	24	21	31	462	549	55	1696	1914	142

TABLE 4.2 [*Contd.*]

5. Flood Control works for upper reaches of Mamom River

Sl. No.	*Item of work*	*Lorry Driver*	*Pump Driver*	*Sawyer*	*Wood-cutter*	*Carpenter*	*Mason*	*Special Mazdoor*	*Men*	*Women*
1	Preliminary work such as clearing the site, cutting and removal of screw-pine from the river side, cutting and removal of logs from the foundation trenches, construction of ring bund, bailing outwater, earth work, etc.	..	58	25	21	10	—	16	573	474
2	Construction of retaining wall including earth work	..	..	..	..	..	992	2	1235	1372
3	Conveyance of materials etc.	27	..	..	..	..	..	..	344	448
	Total	27	58	25	21	10	992	18	2152	2294

TABLE 4.2 [*Contd.*]

6. Periyar Valley Irrigation Project—Branch canal from Ch. 780 m to 960 m.

Sl. No.	*Item of work*	*Roller Driver*	*Quarry man*	*Hammer man*	*Man*	*Woman*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Canal formation—Earthwork etc.	..	..	..	5746 192	3806
2	Do. Blasting and removal of Hardrock	2	.. 419	37		..
	Total	2	419	37	5938	3806

TABLE 4.2 [*Contd.*]

7. Flood control works—Constructing retaining walls in the Neyyar river to protect the Banks near Trippalanur temple

Sl. No.	*Item of work*	*Pump Operator*	*Lorry Driver*	*Blacksmith*	*Carpenter*	*Mason*	*Special Mazdoor*	*Man*	*Woman*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Earthwork including clearing the site etc.	..	44	..	..	..	..	1417	2766
2	Construction of retaining wall including all preliminary works	25	..	2	10	479	12	966	501
3	Conveyance of materials etc.	..	9	..	..	..	..	110	100
	Total	25	53	2	10	479	12	2493	3367

TABLE 4.3

Rates for different categories of Labour from 1-7-1976

Sl. No.	Description	Unit	Trivandrum, Quilon, Trichur, Palghat and Malappuram Districts (Rs.)	Alleppey, Idukki Ernakulam Cannanore and Kozhikode Districts (Rs.)
(1)	(2)	(3)	(4)	(5)
1.	Blacksmith	Each per day	11.00	12.00
2.	Quarry man	"	8.50	9.00
3.	Carpenter	"	11.50	12.50
4.	Lorry Driver	"	11.00	11.00
5.	Pile Driver	"	12.00	12.00
6.	Pump Driver	"	10.00	10.00
7.	Fitter	"	10.00	11.00
8.	Hammer man (for helping blasters)	"	8.00	8.50
9.	Mason-Brick or Laterite Mason	"	11.50	12.50
10.	Mason—Rubble Mason	"	11.50	12.50
11.	Mason—Stone Mason or Stone cutter	"	11.50	12.50
12.	Mazdoor—Man Mazdoor	"	7.50	8.50
13.	Mazdoor—Special Mazdoor for white washing	"	8.00	9.00
14.	Mazdoor—Woman Mazdoor	"	5.75	6.25
15.	Mazdoor—Boy Mazdoor	"	4.50	5.00
16.	Painter	"	10.00	11.00
17.	Sawyer	"	10.00	11.00
18.	Welder	"	12.00	12.00
19.	Wood cutter	"	11.00	11.00

Note: For Hilly Areas a 15% increase in the rates may be allowed.

Source: Public Works Department—Schedule of Rates—1976.

TABLE 4.4

Labour input cost ratio of selected schemes

Sl.No.	Name of Scheme	Total expenditure	Estimated labour cost	Estimated Labour Input cost ratio (%)
(1)		(2)	(3)	(4)
1.	Maintenance of National Highway within Quilon Municipal limits providing 20mm premixed chipping carpet from KM 494/700 to 496/000	84,032	27,379	32.58
2.	Providing sand seal coat from KM 468/0 to 469/0 in Oachira section	19,888	6,111	30.72
3.	Rain damages—urgent protective works to Kothamangalam—Thrippunithura Road at KM 26/100	24,681	12,623	51.14
4.	Construction of a new building to Girls' High School, Mulanthuruthy	1,41,602	42,837	30.25
5.	Flood control works for upper reaches of Mamom river	99,684	42,335	43.8
6.	Periyar valley Irrigation Project—Forming branch canal from ch.780 m. to 960 m.	1,12,783	84,062	74.53
7.	Flood control works—Constructing retaining walls in the Neyyar river to protect the banks near Trippalanur temple	76,438	48,590	63.6

Chapter V

Estimation of manpower utilised by the activities of the P.W.D. Kerala—in 1976-77

The Manpower utilised by the four wings of the Public works Department during 1976-77 by their activities is estimated and furnished in Table V-I.

In this connection along with the technique of Investigation and limitation of the study as furnished in chapter-II, the following points may also be considered.

1. With regard to schemes under Buildings and Roads and National Highways the number of skilled workers as estimated include 'Special Mazdoors' engaged in such schemes.

2. In the field, unskilled labourer constitute men, women and in some cases boys. In this estimate unskilled labour is completely assumed of men only due to lack of sufficient data to estimate separate figures for men, women and boys.

3. Labour utilised is furnished in 1000 mandays.

4. 'Skilled Labourers' constitute masons, carpenters, drivers, painters, special mazdoors etc., who are trained for specific items of work.

5. The National Highway wing has incurred an expenditure of Rs. 15,83,415 during the year for land acquisition. The Manpower utilised for land acquisition has not been estimated for want of sufficient data.

6. In each case the man power utilised is estimated as follows.

Consider item No. 20 under 'Roads and Buildings' and items 21 to 32 in table No. 5.1. With regard to construction of pucca buildings, the material cost has been estimated to be 67%and the labour cost 33%—the cost of skilled labour 17% and the cost of unskilled labour 16%. The average labour charge of one skilled labourer per day have been assumed to be Rs. 11 and that of an unskilled labourer Rs. 8 (Please see Table 4-3 for rates for different categories of labour from 1-7-1976.)

For item (21), the labour cost works out to be $\frac{179750 \times 33}{100}$ =Rs. 59317

The cost of skilled labourer is $\frac{179750 \times 17}{100}$ =Rs. 30557 and the cost of unskilled labourer is $\frac{179750 \times 16}{100}$ =Rs. 28760.

The estimated number of skilled worker is $\frac{30557}{11}$ =2778 = 2.8 thousands and unskilled worker is $\frac{28760}{8}$ =3595 = 3.6 thousands.

7. With regard to most of the items, labour cost estimated have been found to be within the range 30-40 percent. The break-up of this percentage into cost of skilled labour and cost of unskilled labour various from schemes to scheme according to the activity involved in the implementation of the scheme. For example consider item 19 under 'Roads and Buildings'. The labour cost is estimated to be 40% of the works expenditure. The cost of skilled labour is estimated to be 18% and that of unskilled workers 22%. Labour Court and content of unskilled labour is high in this case, since the work involves new road formation also.

8. Refer to item No. 29 under 'Irrigation and projects'. Minor Irrigation works under I.P.D. (Intensive Paddy Development) involves repair to tanks, deepening of wells, construction of wells, improvements to 'chiras'. The labour cost estimated is 50% Most of the labourer required in this case is unskilled. The total number of labourers is estimated by assuming the average daily wage of a labourer to be Rs. 10. 90% of the labourer are estimated to be unskilled and the rest skilled.

9. In the case of Minor Irrigation works—Class II, Government expenditure forms only 50% of the total cost. Please refer to Chapter IV. Minor Irrigation. While 50% of each project is met by Government, 25% is provided by C.A.R.E. in the form of wheat and the remaining 25% being the contribution by the beneficiaries. Hence the labour content is estimated taking into consideration these facts also. It works out to be 50%.

10. Refer to item 56 under 'Irrigation and Projects'. The item of work taken up mainly consists of reclamation of marshy area. Labour cost estimated is 40%.

11. Refer to item 58 under 'Irrigation and Projects'. The works mainly consists of desilting shallow portions, side protection, etc., including petty improvements. The labour cost is estimated to be 40%.

12. With regard to item 3 under 'National Highways' the works consist of labour intensive programmes such as road formation. The labour cost is estimated to be 40%. Cost of skilled labour is assumed to be 18% and that

of unskilled laobur 22%. Since skilled labour in this item of work mainly consists of special mazdoors, the average daily wage of a skilled worker is assumed to be Rs. 10 per day.

13. The estimates of manpower utilised for the activities under each wing is furnished below:

	Skilled labour ('000 *mandays*)	*Unskilled labour* ('000 *mandays*)
1. Buildings and roads wing	3370.2	3861.0
2. Irrigation and Project wings	775.2	6779.3
3. National Highway wing	555.6	797.8
Total	4701.0	11438.1

The total labour utilised comes to 47.01 lakhs mandays of skilled labour and 114.38 lakhs mandays of unskilled labour.

TABLE 5.1

Estimates on manpower Utilised by the Activities of the Public Works Department During the Year 1976-77

Sl. No.	*Item*	*Works expenditure (Rs.)*	*Estimated labour input cost Ratio (%)*	*Estimated labour cost (Rs.)*	*Manpower utilised (estimated)*	
					Skilled (1000 mandays)	*Unskilled*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Buildings and Roads Wing					
1.	259 P.W. (Non-Plan) c. construction	31,04,149	33	10,24,368	47.9	62.1
2.	Do. d. Maintenance and Repairs	1,12,62,332	35	39,41,816	184.3	239.3
3.	Do.(g) Govt. Engineering workshops, operations	27,09,472	See (1) footnote			
4.	337 (d) Roads of Interstate Importance (Non Plan)	24,47,769	33	8,07,764	41.6	48.9
5.	337 (f) State Highways	3,38,970	33	1,11,860	5.8	6.8
6.	„ (g) District and other roads	27,36,414	35	9,57,745	46.5	61.6
7.	„ (h) Railway safety works	8,53,909	30	2,56,172	12.8	16.0
8.	„ (m1) Repairs and Renewals to communication	8,81,60,313	35	3,08,56,109	1586.9	1623.4
9.	„ (m3) Flood Damage works	12,94,346	40	5,17,738	23.3	35.6
10.	(m4) Ferry service grant in aid	21,325	See (1) foot note.			
11.	(m5) Erection and maintenance of Traffic sign Boards	79,709	30	23,913	1.3	1.0
12.	459 (c) Construction (voted)	1,42,77,330	33	47,11,519	220.7	285.6
13.	Do. (Charged)	1,01,865	33	33,615	1.6	2.0
14.	„ (f) (i) Sainik school works (Voted)	97,670	33	32,231	1.5	1.9
15.	537 (c) Roads of Interstate Importance	5,97,286	35	2,09,050	10.8	12.7
16.	„ (e) State Highways	70,35,001	35	24,62,250	126.6	149.5
17.	„ (f) District and other roads	2,96,45,227	35	1,03,75,829	533.6	630.0

18.	„ (i)-1 Roads intended for Development of fisheries	10,34,770	40	4,13,908	18.6	28.5
19.	„ (i)-2 Roads in sugar factory area	12,792	40	5,116	0.2	0.3
20.	283-c-Government Residential Buildings (b) construction	1,79,750	33	59,317	2.8	3.6
21.	Do. Maintenance and Repairs	23,29,010	35	8,15,153	38.1	49.5
22.	483-Government Residential Buildings (b) construction	82,36,008	33	27,17,882	127.2	164.7
23.	277-Education-Construction (Plan)	16,39,343	33	5,40,983	25.3	32.8
24.	Do. (Non Plan)	4,73,726	33	1,56,329	7.3	9.5
25.	477-Education Plan	1,17,71,605	33	38,84,634	181.9	235.4
26.	278-Art and culture (Non Plan)	60,568	33	19,987	0.9	1.2
27.	280-Medical-Construction (Plan)	2,26,699	33	74,810	3.5	4.5
28.	Do. (Non Plan)	2,91,649	33	96,244	4.5	5.8
29.	281 Family Planning (Plan)	1,31,151	33	43,280	2.0	2.6
30.	480-Medical-Construction-Plan	48,88,311	33	16,13,142	75.5	97.8
31.	481-Family Planning-Construction -Plan	5,34,343	33	1,76,333	8.3	10.7
32.	305-Agriculture - Construction - Plan	22,129	33	7,302	0.3	0.4
33.	505- Do.	429	..	..	..	..
34.	310-Animal Husbandry-Plan	68,424	33	22,580	1.1	1.4
35.	310- Do. Non Plan	3,469	33	1,144	0.1	0.1
36.	510-Animal Husbandry-Construction-Plan	2,53,926	33	83,795	3.9	5.1
37.	511-Dairy Development-Construction-Plan	7,63,173	33	2,51,847	11.8	15.4
38.	312-Fisheries Construction-Plan	7,518	..	..	..	..
39.	512- Do. Plan	4,65,800	33	1,53,714	7.2	9.3
40.	339-Tourism-Construction-Non Plan	1,93,629	33	63,896	3.0	3.9
41.	544-Transport and Communication-Construction-Plan	40,883	33	13,491	0.6	0.8
42.	„ Social security and welfare	62,928	33	20,766	0.9	1.3
	Sub Total	..	..	..	3370.2	3861.0

5.1 *Contd.*

(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Irrigation and Project Wings				
1.	306 (b)-1-3 Deepening of wells and tanks	19,176	x			
2.	506 (a)-2 Lift Irrigation works	47,11,129	x			
3.	506 (a)-1 Minor Irrigation class I	39,57,576	x		73.0	657.0
4.	506 (a)3 do. Class II	41,64,627	x			
5.	306 (d)-5 Repairs caused to M.I. Structures	2,35,143	x			
6.	306 (d)-1 M.I. works in yelah programmes	50,97,998	x			
7.	533 B (h) Thanneermukkom	10,58,774	x	..	1.5	13.5
8.	533 B (r) Kattampally	1,37,625	40	55,050	1.0	4.3
9.	333 B (d)-8-(ii) Investigation and Research M. I. works	7,49,108	33.3	2,49,703	2.5	22.5
10.	533 B (d) Development of K.E.R.I. Peechi II stage	32,672	33.3	10,890	0.5	1.1
11.	533 B-4 Moolathara R. B. C.	15,13,980	40	6,05,592	6.1	56.5
12.	533 B (r) Moovattupuzha	39,69,778	40	15,87,911	1.6	14.2
13.	533 A (i) P.V.I. schemes	2,65,80,404	x		130.1	1170.9
14.	533 B (j) Pamba	3,81,81,513	x		58.9	530.1
15.	533 B (i) Kallada	2,67,46,940	x		117.7	1058.9
16.	533 B (p) Kuttiadi	3,55,81,008	x		85.5	769.5
17.	533 B (m) Chitturpuzha	91,84,936	x		22.3	200.7
18.	533 B (o) Kanhirapuzha	1,25,86,845	x		8.0	71.9
19.	533 B (q) Pazhassi	2,90,63,509	x		65.0	596.0
20.	533 B (s) Karapuzha	4,23,426	x		3.6	32.4
21.	533 B (n) Attappady	18,08,776	x		4.5	40.5
22.	533 B (t) Edamalayar	30,900	See (2) footnote			
23.	533 B (v) Chenoni	16,39,077	x		9.0	81.0
24.	533 A (y)(h)(j) Completed projects	7,85,059	33.3	2,61,686	2.6	23.6
25.	533 B (y)(k) do.	12,92,744	33.3	4,30,915	4.3	38.8
26.	533 G (d)(ii) Flood control works	35,88,494				
27.	533 G (d)(iv) Investigation of A.S.E. and F.C. works	5,936	x		54.7	492.1
28.	533 G (d) (i) Anti-sea Erosion works	2,19,88,265				

29.	533 D (d) (ii) Inland water transport State sector schemes	7,13,169	Included in I.W.T. central sector scheme			
30.	306 M.I. (d) (vi) M. I. works under I. P. D. spill over works	17,14,936	50	8,57,468	8.6	77.2
31.	do. (vii) M.I. Class II do.	16,25,581	50	8,12,790	8.1	73.2
32.	do. (ix) do. New works	1,69,423	50	84,712	0.9	8.5
33.	533 D (d) (i) Inland water Transport-Central sector schemes.	44,06,468	x		20.9	187.9
34.	512 C (i) Fishing harbour and Landing facilities	2,71,668	33	89,650	4.1	5.6
35.	333 A (e) Peechi scheme-works	4,62,758	35	1,61,965	2.5	16.8
36.	do. Maintenance	6,57,235	33	2,16,887	3.3	22.6
37.	do. (f) Chalakudy River Diversion scheme-works	5,85,549	35	2,04,942	3.1	21.4
38.	do. Maintenance	4,44,327	33	1,46,627	2.2	15.3
39.	do. (h) Cheerakkuzhi scheme-works	74,942	35	26,229	0.4	2.7
40.	do. Maintenance	1,12,883	33	37,251	0.6	3.9
41.	do. (i) Malampuzha Project-Works	2,07,083	35	72,479	1.1	7.6
42.	do. Maintenance	9,45,859	33	3,12,133	4.7	32.5
43.	do. (j) Mangalam Project-works	47,914	35	16,769	0.3	1.7
44.	do. Maintenance	1,62,065	33	53,481	0.8	5.6
45.	do. (k) Walayar Project-works	2,78,900	35	97,615	1.2	8.5
46.	do. Maintenance	1,22,843	33	40,538	0.6	4.2
47.	333 A (1) Meenkara Project - Works	19,501	35	6,825	0.1	0.7
48.	do. Maintenance	2,64,037	33	87,132	1.3	9.1
49.	do. (j) P.V.I. Project - Maintenance	2,99,468	35	1,04,813	1.6	10.9
50.	333 B (d) vii Maintenance and Repairs to other Irrigation works	7,09,829	35	2,48,440	3.8	25.9
51.	333 B (e) Neyyar dam	4,25,905	35	1,49,066	2.6	17.6
52.	333 B (f) Kuttanad Development Scheme	61,439	35	21,503	0.3	2.2
53.	„ (g) Wadakkancherry scheme works	1,22,869	33	40,546	0.6	4.2
54.	do. Maintenance	1,56,318	35	54,711	0.8	5.7
55.	do. (k) Kattampally scheme	22,180	40	8,872	0.1	0.9
56.	do. (i) Pothundi scheme	2,85,280	35	99,848	1.5	10.4

(1)	(2)	(3)	(4)	(5)	(6)	(7)
57.	333 D (d) Navigation projects	12,58,170	40	5,03,268	7.6	52.4
58.	333 G (d) (ii) Maintenance of Anti-sea Erosion and flood control works	33,34,523	33	11,00,392	16.7	114.6
59.	do. (iii) Repairs due to flood damages	42,24,368	35	14,78,528	22.4	154.0
	Sub Total				775.2	6779.3
	National Highway Wing					
1.	337 (R.B.) C (3) Maintenance within Municipal limits	12,09,793	33	3,99,225	20.6	24.2
2.	337 (R&B) D.C.R.F. works	24,47,770	35	8,56,719	41.6	55.1
3.	337 N. H. original works	2,18,21,486	40	87,28,594	392.8	600.1
4.	337 N. H. Maintenance	59,19,204	33	19,53,337	100.6	118.4
	Sub Total				555.6	797.8
	Grand Total	..	..	..	4701.0 thousands 47.01 lakhs	11438.1 thousands 114.38 lakhs

Note:—1. Manpower utilised not estimated for want of sufficient data.
2. Work done by Kerala State Electricity Board.
3. With Regard to Plan Schemes implemented by Irrigation and Project wings, the details of labour have been collected from the concerned Division. Hence labour input cost Ratio of such schemes have not been calculated.

APPENDIX I

Details of Engineering personnel working in the P. W. D. as on 1-4-1976

Sl. No.	*Designation*	*Total*	*Post-Graduate*	*Graduate*	*Diploma holders*	*Certificate holders*	*Others*
1.	Chief Engineers and the Arbitrator	5	..	5	..	..	..
2.	Superintending Engineers	20	1	19	..	..	..
3.	Executive Engineers	97	31	62	4	..	..
4.	Assistant Engineers	420	41	262	108	9	..
5.	Arch. Assistants	10	..	3	5	2	..
6.	Junior Engineers	1358	14	711	436	197	..
7.	First Grade Draftsman	903	..	3	478	420	2
8.	Second Grade Draftsman	822	..	2	336	465	19
9.	Others	1881	..	1	24	754	1102

APPENDIX II

Kerala State Taluk-wise Length of P. W. D. Roads as on 30-6-1977

(*Length in Km.*)

Sl. No.	*Name of District and Taluk*	*State Highways*	*Major roads*	*Other district roads*	*Village roads*	*Total*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	TOTAL	2028.266	5323.821	6666.128	1236.937	15255.152
I.	TRIVANDRUM DISTRICT	116.200	213.000	1031.000	..	1360.200
1.	Neyyattinkara	18.000	50.000	233.000	..	301.000
2.	Trivandrum	13.000	68.000	317.000	..	398.000
3.	Nedumangad	74.000	38.000	284.000	..	396.000
4.	Chirayankil	11.200	57.000	197.000	..	265.200
II.	QUILON DISTRICT:	269.000	644.000	1371.00	..	2284·000
5.	Quilon	15.000	65.000	273.000	..	353.000
6.	Karunagappally	..	45.000	158.000	..	203.000
7.	Kottarakkara	69.000	74.000	241.000	..	384.000
8.	Pathanapuram	84.000	139.000	143.000	..	366.000
9.	Kunnathur	44.000	66.000	245.000	..	355.000
10.	Pathanamthitta	57.000	255.000	311.000	..	623.000
III.	ALLEPPEY DISTRICT	186.430	208.203	697.474	..	1092.107
11.	Karthikappally	5.800	9.600	97.350	..	112.750

12. Mavelikara	45.400	42.600	139.700	..	227.700
13. Chengannur	43.660	48.230	100.550	..	192.440
14. Thiruvalla	59.270	86.753	188.811	..	334.834
15. Ambalapuzha 16. Kuttanad	32.300	10.670	67.539	..	110.509
17. Sherthalai	..	10.350	103.524	..	113.874
IV. KOTTAYAM DISTRICT	269.504	635.639	691.444	..	1596.587
18. Changanasserry	47.361	106.540	148.711	..	302.612
19. Kanjirappally	52.244	41.135	135.475	..	228.854
20. Kottayam	59.544	194.088	134.622	..	388.254
21. Meenachil	76.655	193.050	175.675	..	445.380
22. Vaikom	33.700	100.826	96.961	..	231.487
V. ERNAKULAM DISTRICT	185.495	810.067	758.861	..	1754.423
23. Cochin	..	51.353	28.252	..	79.605
24. Kanayannur	24.482	105.985	55.246	..	185.713
25. Parur	..	76.615	75.930	..	152.545
26. Alwaye	15.000	69.320	146.948	..	231.268
27. Kunnathunadu	55.713	172.884	195.355	..	423.952
28. Muvattupuzha	55.400	229.810	179.590	..	464.800
29. Kothamangalam	34.900	104.100	77.540	..	216.540

(1) (2)	(3)	(4)	(5)	(6)	(7)
VI. Idukki District	329.144	380.909	472.909	..	1182.962
30. Peermade	63.708	57.000	78.430	..	199.138
31. Thodupuzha	14.600	100.299	131.565	..	246.464
32. Udumbanchola	87.276	115.125	134.566	..	336.967
33. Devikulam	163.560	108.485	128.348	..	400.393
VII. Trichur District	185.804	434.802	604.564	70.892	1296.062
34. Kodungallur	14.496	27.300	172.653	13.553	228.002
35. Mukundapuram	95.665	59.549	153.735	39.615	348.564
36. Chavakkad	..	37.206	58.363	..	95.569
37. Trichur	35.413	102.732	144.142	12.374	294.661
38. Thalappally	40.230	208.015	75.671	5.350	329.266
VIII. Palghat District	142.807	669.715	200.039	93.240	1105.801
39. Chittur	51.074	154.446	44.637	9.400	259.557
40. Alathur	..	108.310	41.400	27.100	176.810
41. Palghat	27.133	117.695	4.280	6.000	155.108
42. Ottappalam	27.600	211.670	53.572	32.440	325.282
43. Mannarghat	37.000	77.594	56.150	18.300	189.044
IX. Malappuram District	160.428	383.015	225.713	219.220	988.376
44. Ponnani	18.248	24.654	29.010	10.102	82.014

45. Tirur	..	65.699	109.243	56.380	231.322
46. Perinthalmanna	40.980	89.399	16.760	28.965	176.104
47. Ernad	101.200	203.263	70.700	123.773	498.936
X. Kozhikode District	99.254	494.171	111.824	310.885	1016.134
48. Kozhikode	47.185	112.516	33.594	133.747	327.042
49. Quilandi	..	137.621	39.084	31.939	208.644
50. Badagara	..	81.658	38.246	64.349	184.253
51. South Wynad	52.069	162.376	0.900	80–850	296.195
XI. Cannanore District	84.200	450.300	501.300	542.700	1578.500
52. Tellicherry	55.100	71.300	120.600	86.300	333.300
53. North Wynad	..	139.700	..	81.100	220.800
54. Cannanore	..	63.500	37.800	51.300	152.600
55. Thaliparamba	..	92.500	115.800	164.400	372.700
56. Hosdurg	..	44.200	115.800	82.800	242.800
57. Kasargod	29.100	39.100	111.300	76.800	256.300

Note.—The details given in column 5 in respect of Trivandrum, Quilon, Alleppey, Kottayam and Idukki District are the totals for other District Roads and Village Roads together.

APPENDIX III

District-wise Length of Roads under the Irrigation and Project Wings in the Kerala State (Upto March 1975)

(*Km.*)

	District	*Total*	*Surfaced*	*Non-surfaced*		*Remarks*
				Motorable	*Non-motorable*	
1.	Trivandrum	11.250	11.089	0.161	..	
2.	Quilon	19.095	15.165	..	3.930	
3.	Alleppey	0.625	0.625	..	...	
4.	Kottayam	2.245	0.500	1.745	...	
5.	Idukki	..	..	..	...	
6.	Ernakulam	148.235	100.225	48.010	..	
7.	Trichur	47.232	28.910	18.322	..	
8.	Malappuram	1.175	1.175	..	..	
9.	Palghat	55.000	38.710	16.290	..	
10.	Kozhikode	19.925	18.933	0.457	0.535	
11.	Cannanore	32.938	17.148	15.790	..	
		337.720	232.480	100.775	4.465	

6

MIGRATION OF ENGINEERING GRADUATES

A CASE STUDY

MIGRATION OF ENGINEERING GRADUATES

A Case Study

Introduction:

Availability of technically trained personnel in the required number at the proper time is one of the essential prerequisites for economic development and proper planning. To ensure the supply in the required number, is an important factor for the achievement of the goal. Any shortage of skilled and technical manpower will impede seriously the execution of plan programme, while any surplus in the supply will lead to unemployment. Unless, timely action is taken to restrict the supply and correlate the same with the demand in a foreseeable future, it will ultimately lead to wastage of precious manpower. With a view to achieve quick economic development, the administrators and planners had given an impetus to the growth of the inddustrial sector from the 2nd Five Year Plan onwards. Consequent on this, during the last three decades, the country has witnessed phenomenal development in the field of technical and higher education.

In Kerala, the demand for qualified engineers could not be fully met with the single engineering college started in the year 1939 at Trivandrum. Five more engineering colleges were started during the first two decades since independence in the district of Quilon, Ernakulam, Trichur, Palghat and Kozhikode. In all these, engineering colleges, there are degree courses in Civil, Mechanical and Electrical branches. In addition to the regular courses, there are part time courses in Civil, Mechanical and Electrical Engineering. The Engineering Colleges at Trivandrum and Trichur are under the control of the State Government. The Engineering College at Calicut is under the control of Central Government. The remaining 3 colleges are under private managements. 50% of the seats in the Regional Engineering College at Calicut is reserved for the students from outside the State. At present courses in Telecommunication and Architectural engineering are also being conducted in the Engineering College at Trivandrum and in Chemical Engineering at Trichur. In addition to this, there are facilities for Post-graduate courses in Civil, Mechanical and Electrical Engineering at Trivandrum, Trichur and Calicut. Post-graduate courses in Micro wave Engineering and Chemical Engineering have been started in the Engineering Colleges at Trivandrum and Trichur respectively. The intake capacities in the colleges had been increased gradually and as a result, the out-turn of Engineering graduates increased from 785 during the year 1966-67 to 1553 during the year 1960-79. There were 50 post-graduate students during the year 1966-67. During the year 1968-69, the actual intake was only 28 against the sanctioned strength of 50. The actual intake increased to 114 during the year 1974-75.

Gradually, the supply of engineering personnel out stripped the demand due to lack of avenues of employment resultinng in considerable unemployment among engineering graduates.

Various measures were taken to regulate the supply and the total intake of the year 1971-72 was brought down to 642. Later on, it was raised to 854 during the year 1974-75.

In spite of the various steps taken to regulate the out-turn of Engineering graduates the growth of unemployment among the Engineers could not be arrested. According to the live register of employment exchanges, the total number of Engineering graduates registered as job seekers as on 31-1-1976 was 1752. It may not be correct to assume that all these persons are totally unemployed, since some of the employed persons might have registered themselves for better jobs. Due to the persisting unemployment in the State, many of the qualified technical persons are leaving the state to other states and to other countries.

Objectives of the Study:

At present, reliable data on the migration of Engineers are not available. This study is intended to assess the magnitude of migration of engineering graduates and to assess the extent of unemployment under the various branches of Engineering.

Coverage:—

The details of students passed out from the six engineering colleges in the State for three years from 1970-71 to 1972-73 (Table 1 in the appendix) were collected and a 20 % sample was selected from each college for the purpose of the study. A period of 5 years after passing out the examination will give an idea of the intensity of unemployment and the period of waiting required to get a suitable job.

Methodology and Collection of data:

The twenty per cent sample was drawn out of the list of Engineering students passed out from each of the six Engineering colleges in the State by simple random method. The selected persons were personally contacted by the field staff of the Bureau of Economics and Statistics and the required details were collected in a schedule designed for the purpose. A specimen copy of the schedule is given in the appendix.

Response:

All the selected persons could not be located and contacted due to the change in their addresses. In spite of all possible efforts, details from 31[illegible] persons could only be collected out of 401 persons selected for the study. The percentage of response works out to 77.8%. The main reasons for the non

response are incorrect addresses and shifting of residence. Further, it was found that 42 persons out of 118 persons selected for the study from the Regional Engineering College Kozhikode belong to other States. The required details from these persons could not be collected.

Result of the Study:

Out of 312 graduates engineers interviewed, 306 were males and 6 were females. Among the 6 females, two persons each have their degrees in Civil Engineering and Tele-communications Engineering while one each has secured their degree in Mechanical and Architectural Engineering.

The distribution of the graduate engineers passed out during the period of 3 years under different branches is given below:

Sl.No.	*Branch*	*Sex*		*Total*	%
		Male	*Female*		
(1)	(2)	(3)	(4)	(5)	(6)
1.	Civil	45	2	47	15.1
2.	Mechanical	123	1	124	39.7
3.	Electrical	99	..	99	31.7
4.	Chemical	14	..	14	4.5
5.	Others (Tele-communication and Architecture)	25	3	28	9.0
	Total	306	6	312	100.0

The above table reveals that 39.7% of the graduates have their degrees Mechanical Engineering and 31.7% in Electrical Engineering. Only 5% have taken the degree in Chemical Engineering. The details of gineers passed out under different branches in the selected sample during year 1970-71, 1971-72 and 1972-73 are given in table 2 in the appendix.

Out of 312 Engineering graduates selected, information regarding the atus of employment could be gathered only from 311 persons (306 males and 5 females) sine one female engineer expired within an year of passing the

examination. The distribution of employed and unemployed Engineering graduates in the different age groups is given in the following table.

Age	*Employed*			*Unemployed*		
	M	*F*	*Total*	*M*	*F*	*Total*
20—22	1	..	1	..	..	..
23—25	54	..	54	9	..	9
26—28	159	1	160	24	3	27
29—31	47	1	48	7	..	7
32—34	5	..	5	..	..	..
Total	266	2	268	40	3	43

The above table reveals that 43 persons out of 311 persons are still unemployed. The percentage of unemployed persons works out to 13.8. Among the unemployed, about 62.8% persons are in the age group 26—28 and about 16.3% in the age group 29—31. 14 persons passed out during the year 1970-71 and 13 persons passed out during the year 1971-72 could get any employment so far. The distribution of persons selected for the study according to their present employment status is given in table No. 3 in Appendix.

Among the 43 unemployed persons, the maximum number are under the electrical branch closely followed by mechanical branch. The distribution of unemployed engineering graduates under different branches is given below:

Sl. No.	*Branches*	*No. of persons*	*Percentage*
1	Civil	4	9.3
2	Mechanical	15	34
3	Electrical	18	41
4	Chemical	2	4.
5	Others	4	9.
	Total	43	100

It could be seen from the above table, that the levels of unemployr among the Electrical and Mechanical engineers are much higher wh compared to other branches. The distribution of engineers under differ branches with their activity status is given in table 4. An effort has been mad

in this study to assess the period of waiting of these 43 unemployed graduate engineers. The following table shows the duration of unemployment of these persons along with their branches of study.

Duration of unemployment of the graduate engineers under different branches

Branch	*Duration of unemployment*		
	6 years	*5 years*	*4 years*
Civil	..	2	2
Mechanical	6	5	4
Electrical	5	3	8
Chemical	..	2	..
Others	1	1	4
Total	12 27.9%	13 30.2%	18 41.9%

According to the above table, 27.9% of the unemployed graduate engineers are seeking jobs for the last 6 years and 30.2% for the last 5 years. Among the various branches, Mechanical engineers and Electrical engineers find it difficult to get suitable employment compared to other branches. Special efforts will have to be taken to facilitate location of suitable jobs to the Mechanical and Electrical Engineers.

The main objective of the study is to estimate the magnitude of migration among the graduate engineers. An effort has also been made to study the migration of Engineers under different branches. The following table shows the percentage distribution of employed engineers passed out during the years 1971, 1972 and 1973 under different branches and the location of their employment.

No.	*Branch*	*Percentage of Engineers Employed*			
		With in the State	*Outside State within the country*	*Outside the country*	*Total*
1	Civil	44.2	44.2	11.6	100.0
2	Mechanical	29.6	56.5	13.9	100.0
3	Electrical	45.7	35.8	18.5	100.0
4	Chemical	25.0	66.7	8.3	100.0
5	Others	66.7	20.8	12.5	100.0
	Total	39.9	45.5	14.6	100.0

It is rather pathetic to note that a vast majority extending up to 60 per cent of the persons who passed out of the Engineering Colleges in the State from 1970-71 to 1972-73 had to leave their native State for securing a suitable job. Nearly 70% of the Mechanical Engineers and 75% of the Chemical Engineers secured their jobs outside Kerala. Gulf countries are attracting qualified technical persons by providing handsome salaries and other per-quisites. Even though, the country is obtaining valuable foreign exchange through the saving of these engineers, the State is not getting the desired benefit after spending huge amounts from the State finance for education of these engineers.

The following table showing the distribution of Engineers employed according to their year of passing and location of their employment will give an idea about the intensity of migration.

Year of Passing	*No. of Engineers employed*	*Location of employment*		
		Within State	*Outside the state but within the country*	*Outside the country*
1971	102	45.1%	41.2%	13.7%
1972	82	41.5%	50.0%	8.5%
1973	84	32.2%	46.4%	21.4%

The above table shows that the percentage of employment within the State is declining while the percentage of migration to other States and to the countries is increasing. During the year 1973, the rate of migration to other countries is much greater than the previous two years. This ma be attributed to the increased demand of engineers outside and lack of aven of employment within the State.

An attempt has been made to study the status of employment and location of employment of the Engineers already employed.

Out of the 268 employed engineers, only 7 of them (2.6%) are found be self employed. The break-up of these engineers are Electrical Engineer 2, Civil Engineering - 2, Mechanical Engineering - 1 and others 2. The r maining 261 (97.4%) are working as employees in the various sectors. one was seen as an employer starting his own industry and providing emplo ment to others. All the chemical engineers are found to be employees.

The distribution of the Engineers working as employees is given in the following tables.

Sl. No.	Branches	Total	1	2	3	4	5	6	N.S.
1	Civil	41	8	11	5	3	4	9	1
2	Mechanical	107	28	5	12	6	2	49	5
3	Electrical	79	10	12	6	2	9	36	4
4	Chemical	12	4	2	..	..	..	6	..
5	Others	22	6	4	1	..	4	7	..
	Total	261	56	34	24	11	19	107	10

The percentage break-up of these engineers is given in the following table

Sl. No.	Branch	1	2	3	4	5	6	N.S
1	Civil	19.5	26.8	12.2	7.3	9.8	22.0	2.4
2	Mechanical	26.2	4.7	11.2	5.6	1.9	45.8	4.6
3	Electrical	12.7	15.2	7.6	2.5	11.4	45.6	5.0
4	Chemical	33.3	16.7	..	..	..	50.0	..
5	Others	27.3	18.2	4.6	..	18.1	31.8	..
	Total	21.5	13.0	9.2	4.2	7.3	41.0	3.8

Note:—

1. Employed in Central Government
2. Employed in State Government
3. Employed in Central Government undertaking
4. Employed in State Government undertaking
5. Employed in Quasi-Government
6. Employed in private

N.S. Not specified.

The above table reveals that nearly 34.5% of the engineers are employed Government Service while 41.0% are in private service. The next biggest ıployer is the central government undertakings. State Government under-ıkings provide employment only to 4.2%. It also reveals that 50% of the

chemical engineers secured their jobs in Government service and the remaining 50% in private service. None of the chemical engineers could get employment in Central and State Government undertakings. The percentage of electrical engineers in Government Service works out to 27.9. Another important factor the table reveals is that the quasi-government sector is a poor employer as far as engineers are concerned. Quasi-Government institutions provide employment opportunities to Civil, Mechanical and Electrical engineers only.

As mentioned earlier, the main objective of the study is to assess to the magnitude of migration of graduate engineers passed out from the various Engineering Colleges in the State. The percentage of migration of the engineers passed out from the various colleges during the period 1970-71 to 1972-73 is given in the following table.

Percentage distribution of the engineers migrated in relation to the number passed during the 1971-73.

Year of passing	*Number of persons passed*	*Migrated to other State*	*Other countries*
1970-71	116	36.2	12.1
1971-72	95	43.2	7.4
1972-73	101	38.6	17.8
Total	312	39.1	12.5

The above table gives an idea of migration of engineers to other States and to the other countries. It can be seen that 12.5% of the engineers passed out during the period 1970-71 to 1972-73 left the country in search of jobs and 39.1% are now working in the other States in the country. Th percentage of migration to countries outside India have increased consider during the year 1972-73. This may be due to less employment opportun within the State and country and better facilities and other perquisites obta outside especially in the gulf countries.

The migration of engineers is definitely causing a drain of highly tec cally qualified persons from our country. However, it is gratifying to that we receive back valuable foreign exchange out of the savings of engin The incoming money could be very well invested for development purpo which will open further avenues of employment to technically qualified perso like engineers and other technicians.

MAN POWER DIVISION

Bureau of economics and Statistics, Trivandrum
study of migration of engineering personnel

Name of District ..

Name of the person selected ..

Address ..

Sex ..

Age in completed years ..

Qualification	*Examination passed (specify branch also)*	*year of passing*	*Name of Institution*

Specify additional qualification, if any

Employment;

State whether employed/unemployed

If employed, state whether self employed/employer/employee

If employees, state whether in Central Government/State Government/Central Government Undertakings/State Government Undertakings/Quasi-Government/Private

ocation of employment within the state/outside the te/outside the country

utside the state specify the name of state/country

ate

Signature of the Investigator

APPENDIX

TABLE I

Out-turn of Engineering Graduates Branch-wise 1970-71 to 1972-73

Sl. No.	Branch	1970-71		1971-72		1972-73		Total	
		No.	%	No.	%	No.	%	No.	%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Civil	175	18.9	80	14.5	67	12.7	322	16.1
2	Mechanical	327	35.3	234	42.4	230	43.6	791	39.5
3	Electrical	302	32.7	162	29.4	180	34.2	644	32.1
4	Chemical	30	3.2	29	5.2	20	3.8	79	3.9
5	Architecture	34	3.7	18	3.3	8	1.5	60	3.0
6	Telecommunications	57	6.2	29	5.2	22	4.2	108	5.4
	Total	925	100.0	552	100.0	527	100.0	2004	100.0

There is a fall in the out-turn of Engineering graduates from 1971-72. The five year Engineering Courses started during the year 1962-63 was discontinued from the year 1966-67 and the three year Engineering Degree course was also discontinued from the year 1968-69.

TABLE II

Distribution of Engineering Graduates in the selected sample (Branch-wise) with year of passing

Sl. No.	Branch	1970-71			1971-72			1972-73			Total			%
		M	F	Total	M	F	Total	M	F	Total	M	F	Total	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1	Civil	17	1	18	10	1	11	18	..	18	45	2	47	15.1
2	Mechanical	45	..	45	38	..	38	40	1	41	123	1	124	39.7
3	Electrical	33	..	33	34	..	34	32	..	32	99	..	99	31.7
4	Chemical	3	..	3	10	..	10	1	..	1	14	..	14	4.5
5	Others	16	1	17	1	1	2	8	1	9	25	3	28	9.0
	Total	114	2	116	93	2	95	99	2	101	306	6	312@	100.0

@Excluding residents of other States and persons not located due to incorrect addresses.

TABLE III

Age-war distribution of Engineers and their activity status

Age group	1971				1972				1973				*Total*		
	Employed		*Un-employed*		*Employed*		*Un-employed*		*Eemployed*	*Un-employed*			*Employed*	*Un-employed*	*Total*
	M	*F*	*M*	*F*	*M*	*F*	*M*	*F*	*M*	*F*	*M*		*F*		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		(13)	(14) (15)	(16)
20—22	..	..	..	..	..	..	..	..	1	..	..		..	1 (0.4) ..	1
23—25	8	..	1	..	16	..	3	..	30	..	5		..	54 (20.1) 9 (20.9)	63
26—28	60	1	9	..	53	..	6	2	46	..	9		1	160 (59.7) 27 (62.8)	187
29—31	28	1	4	..	13	..	2	..	6	..	1		..	48 (17.9) 7 (16.3)	55
32—34	4	..	..	..	..	..	..	..	1	..	..		..	5 (1.9) ..	5
Total	100	2	14	..	82	..	11	2	84	..	15		1	268 (100.0) 43 (100.0)	311*

(Figures in brackets show %)

*One female Engineer expired.

TABLE IV

Distribution of Engineers under different branches with their activity status

Sl. No.	Branch	1970-71		1971-72		1972-73		Total		Total
		Employed	Un-employed	Employed	Un-employed	Employed	Un-employed	Employed	Un-employed	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Civil	18	..	9	2	16	2	43 (91.5)	4 (8.5)	47 (100.0)
2	Mechanical	39	6	33	5	36	4	108 (87.8)	15 (12.2)	123 (100.0)
3	Electrical	27	6	31	3	23	9	81 (81.8)	18 (18.2)	99 (100.0)
4	Chemical	3	..	8	2	1	..	12 (85.7)	2 (14.3)	14 (100.0)
5	Others	15	2	1	1	8	1	24 (85.7)	4 (14.3)	28 (100.0)
	Total	102	14	82	13	84	16	268 (86.2)	43 (13.8)	311 (100.0)

TABLE V

Distribution of Engineers with location of Employment

Sl. No.	Branch	No. of Engineers Employed			Total
		Within the state	Outside the state	Outside the country	
(1)	(2)	(3)	(4)	(5)	(6)
1	Civil	19 (44.2)	19 (44.2)	5 (11.6)	43 (100.0)
2	Mechanical	32 (29.6)	61 (56.5)	15 (13.9)	108 (100.0)
3	Electrical	37 (45.7)	29 (35.8)	15 (18.5)	81 (100.0)
4	Chemical	3 (25.0)	8 (66.7)	1 (8.3)	12 (100.0)
5	Others	16 (66.7)	5 (20.8)	3 (12.5)	24 (100.0)
	Total	107 (39.9)	122 (45.5)	39 (14.6)	268 (100.0)

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