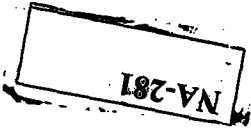


Summary Report



**Tracer Study of S & T Graduates who
passed out from universities
in Sri Lanka (1998/1999)**

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June 2002



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passed out from universities
in Sri Lanka (1998/1999)**



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Foreword

The Tracer Study of graduates who had passed out in the years 1998 and 1999 was carried out with a view to getting an in-depth understanding of the graduate labour market and forecasting the future demand of graduates in different disciplines of study. We feel that the study has produced useful findings for planners and other interested groups to understand the current trends in graduate employment in the country. As it is planned to publish these findings as a journal article with a more detailed analysis, only a limited analysis is provided in this report.

Several shortcomings have been identified while conducting this study. However, some of them could not be avoided due to a limitation of resources

The next attempt is planned at conducting a sample survey and generating more qualitative analysis.

Your comments and suggestions on this study are most welcome.

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Executive Summary

This study was carried out to collect and analyse career information of Science & Technology (S&T) graduates, taking into account graduates who passed out from all the universities in Sri Lanka, excluding Jaffna and South Eastern Universities, during the years 1998/1999.

The overall objective of this study was to gain an in-depth understanding of the labour market of recently passed out graduates and to forecast the requirement / demand of graduates in the different academic streams in the field of Science & Technology namely in the stream of Science, Engineering and Agriculture.

Data was collected from the graduates who passed out in 1998 and 1999. Contact information of graduates was obtained from the relevant faculties of the universities. A structured questionnaire accompanied by a self addressed stamped envelope was posted to each and every graduate.

The questionnaire dealt with the current employment status, sector of employment, management level, salary structure, waiting time for first paid employment, source of information for jobs and views of graduates regarding the problems faced in finding suitable employment. A total number of 1261 responses (response rate of 36%) were taken as the sample for analysis.

The following are the major findings of the study:

- 78% from the sample were employed while 14.6% were unemployed
- Among the graduates pursuing higher studies full-time, and those not seeking jobs and unemployed, more than 2/3^{rds} of them were female .

- The highest percentage (more than 95%) of graduates in the academic stream of engineering were employed.
- More than (24%) of B.Sc. (Bio Science) graduates were unemployed.
- Absorption to the private sector was highest in engineering graduates (more than 55%). In contrast, absorption to the public sector was highest in B.Sc. (Bio Science) graduates.
- The average monthly income of employed graduates fell between Rs. 5000/= to Rs. 10,000/= .
- More than half of the graduates who were employed in the private sector received a monthly income of Rs. 15,000/=.
- 60% of the engineering graduates earned a monthly income of more than Rs .15,000/-
- 80% of the B.Sc.(Special) and 75% of engineering graduates secured employment within 6 months of graduation, while less than 50% of other graduates secured employment within that period.
- A higher proportion of B.Sc. (Special) graduates were engaged in Research and Development activities (around 35%). Teaching was the most common form of occupation among BSc (General) graduates.
- Temporarily employed and unemployed graduates have quoted discrimination as the major factor for not receiving permanent employment.
- Newspaper advertisements were the most prevalent source of job opportunities for graduates.

- Many of the obstacles faced by graduates in finding suitable employment could be removed by making appropriate curriculum changes.

In addition, an attempt was made to project the demand of S&T graduates for the years 2002, 2003 and 2004. The absorption rate and the out turn/intake ratio were used as key factors/variables for the projections.

The study introduces an unemployment index, an indicator that can be used to explain the trends in unemployment.

Furthermore, considering the many limitations in the currently used methods of forecasting, the present study suggests two new methods. The first is the use of common absorption rates for the available graduate labour force for each year. The advantage of this method is its applicability to all the economic situations of a country, However, in situations where the economy is growing at an unpredictable rate and where graduates from a particular academic stream are fully absorbed within one year, this method cannot be used. In such a situation, where full absorption occurs, the use of growth rates of fresh graduates in the labour market to project the demand of S&T graduates is more applicable.

1. Introduction

In view of the rapidly changing social, economic, political and technological climates, manpower requirements are also rapidly changing these giving rise to the need for constant monitoring of manpower requirements in the country.

The Tracer study of graduates can be used as a useful tool to examine the current level of Science & Technology (S& T) manpower requirements in the labour market and forecast the demand for the coming years, which in turn facilitates the policy changes in relation to the effective utilization of S& T manpower.

There were very few attempts during the last decade to forecast manpower requirements and related issues. Two of those studies are highlighted below.

1.1 Study on manpower requirements based on economic growth.

There was an attempt to forecast manpower requirements based on the growth rate of professionals & the growth rate of the Gross Domestic Product (GDP). These two growth rates were used under two scenarios: Baseline and High growth scenario. In the Baseline scenario, professional growth rates were calculated for different years. The annual growth rate of recent years were used for projections. The high growth scenario was based on the concept that the professional growth rates are growing at a faster rate than overall employment when the GDP is growing. In this case, professional growth rates were calculated using the average GDP growth rate of the recent past. In both methods, additional requirements of professionals were projected using the professional growth rate and existing stock of S&T professionals.

This method may be used in a situation where the economy shows a steady growth rate. In a situation where the GDP growth fluctuates within a wide range, the validity of this method is doubtful. Moreover, this method needs vast amounts of data sets in relation to the different sectors in order to make an accurate forecast. A forecast made in 1995 is given in annex 1.

1.2 Tracer study of University S& T graduates -1997

This study has been conducted by the Science and Technology Personnel Development Project with the aim of collecting information to describe the first destination, employment status, and income levels of graduates. The study was confined to graduates who passed out in 1997 from S & T faculties of the Sri Lankan Universities.

The names and addresses of graduates, who passed out in 1997, had been obtained from the relevant faculties of the universities. A structured questionnaire was posted to these graduates with a covering letter and a self addressed stamped envelope. A 5% random sample was selected from the non -respondents to send reminders.

Major findings of the above study are given in annex 3

1.3 Current Study

The present follow up study focused on graduates who passed out in 1998 and 1999. The aim of this survey was to collect career information to analyze the labour market and forecast the demand for recently passed out graduates in the field of Science & Technology, which will be useful in the policy making process.

The analysis is mainly focused on gaining insights into the current employment status of graduates, their demand in different sectors, income levels and the rates of absorption into the labour market etc

In addition, an attempt was made to forecast manpower requirements/demand of fresh S & T graduates in different disciplines using some of the data obtained from this study. However, this approach also has certain limitations which are discussed later.

2. Objectives

The overall objective of this study was to gain an in-depth understanding regarding the labour market of the recently passed out graduates and to forecast manpower demand in different disciplines in the field of Science & Technology.

2.1 Specific Objectives

1. Analyze current employment status, sectors of employment, and salary structure of the S & T graduates in different disciplines.
2. Analyze the pattern of the absorption rate of graduates in the field of Science & Technology into the labour market
3. Analyze the obstacles faced by graduates in the process of absorption into the labour market.
4. Forecast the demand for S& T graduates in each discipline

3. Scope of the study

In the year 2000, the Manpower Information System (MIS) unit at the National Science Foundation (NSF) conducted this study covering Science, Engineering and Agriculture Faculties of all the Sri Lankan Universities, excluding the Jaffna and South Eastern University.

4. Methodology

The list of names and addresses of graduates who passed out from the Science, Engineering and Agriculture faculties in the years 1998 and 1999 were obtained from the relevant faculties in printed form, electronic media and copying down from university records.

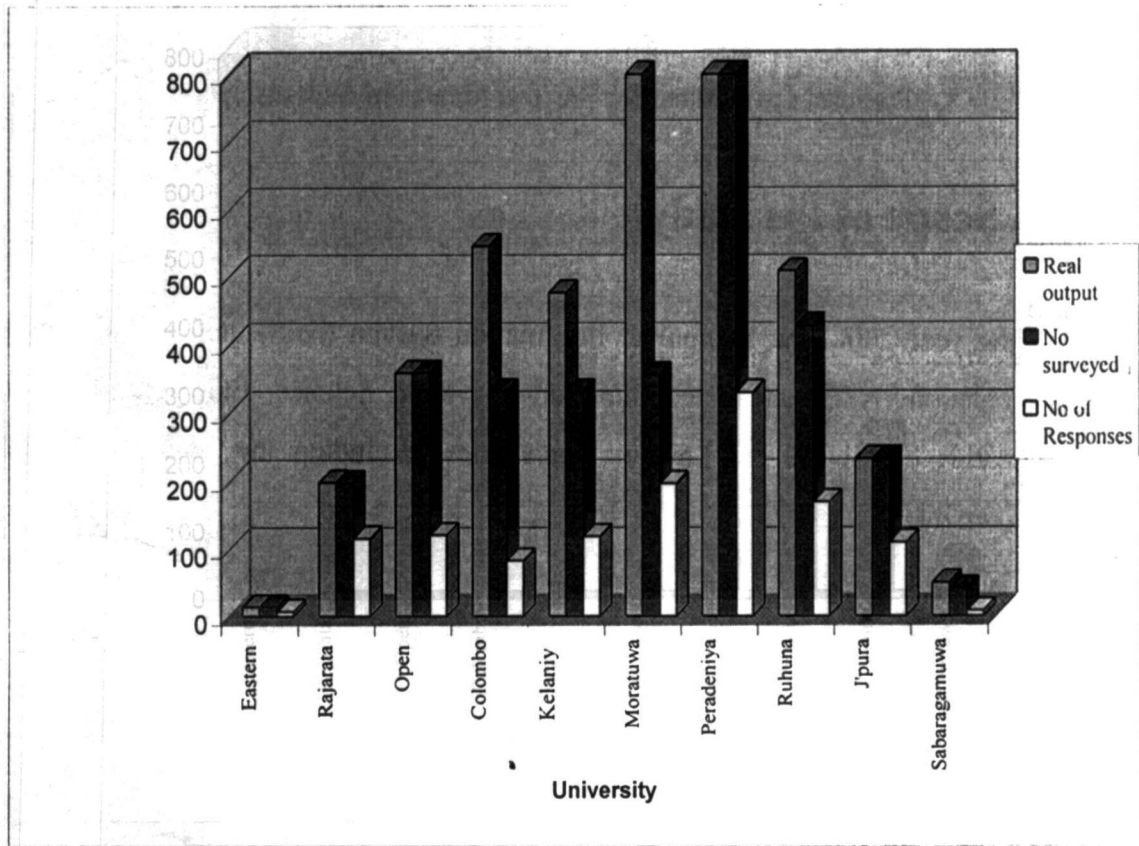
A pre-tested structured questionnaire (Annex 2) was posted to each and every graduate who was listed in the above list. The questionnaire was accompanied with a stamped envelope to enable the respondents to return the filled questionnaire to NSF.

A program was developed in Visual Basic to facilitate data entry. It was implemented in an Access database.

Data was analyzed using the statistical software package for Social Sciences (SPSS).

Status of Responses

Figure 4 shows the number of graduates who passed out from the science, agriculture and engineering faculties of different universities Sri Lanka in the years of 1998 and 1999 (actual out turn), number surveyed and the number of responses received from graduates who passed out from those particular faculties of the universities.



*Actual output of graduates was taken from a report on "Sri Lanka University Statistics 2000", University Grant Commission.

Fig.4 : Actual Out turn of S&T graduates (1998 & 1999) number surveyed and the no of graduates who responded.

The number of valid responses from graduates who passed out from each faculty is given in Table 4.

| University | Faculty | Number Surveyed | No of Responses | Response Rate(%) |
|---------------------|-----------------------|-----------------|-----------------|------------------|
| Eastern | Agriculture | 19 | 7 | 37 |
| Rajarata | Agricultural Sciences | 75 | 41 | 55 |
| -do- | Applied Sciences I | 101 | 59 | 58 |
| -do- | Applied Sciences II | 81 | 16 | 20 |
| Sabaragamuwa | Applied Sciences | 41 | 8 | 20 |
| Open | Eng. Technology | 27 | 3 | 11 |
| -do- | Natural Sciences | 332 | 118 | 36 |
| Colombo | Science | 332 | 83 | 25 |
| Kelaniya | Science | 331 | 119 | 36 |
| Moratuwa | Engineering | 356 | 197 | 55 |
| Peradeniya | Agriculture | 330 | 112 | 34 |
| -do- | Engineering | 440 | 106 | 24 |
| -do- | Science | 406 | 112 | 28 |
| Ruhuna | Agriculture | 117 | 52 | 44 |
| -do- | Science | 310 | 118 | 38 |
| Sri Jayawardanapura | Applied Sciences | 233 | 110 | 47 |
| Total | | 3531 | 1261 | 36 |

Table. 4: Status of responses

5. Assumptions

1. The list of graduates who passed out in 1998 and 1999 and their home addresses provided by the universities are accurate.
2. The aim was to collect information from all the graduates belonging to the group as mentioned above. Only 36% of the total has responded (1261). Therefore, the number of responses was taken as the sample assuming that the sample adequately represents the total population of S & T graduates who passed out in 1998 and 1999.

6. Limitations

There was a need to conduct a non-respondent survey in order to test whether the respondent sample was biased towards unemployment. The MIS unit was not in a position to carry out a non-respondent survey due to the limitations of manpower and financial resources.

In this study, attention has not been given to issues such as the employment pattern of graduates, frictional unemployment, under employment and job satisfaction of graduates.

7. Summary of the findings

7.1 Basic characteristics of responded graduates

Among 1261 of the graduates who responded, 57.5% were males. The respondent graduates were distributed among all districts (Fig 9.1). Colombo district reported the highest percentage of responses (17.5%) followed by Kurunegala (9.8%), Gampaha (9.2%), Galle (8.6%), Kandy (8.4%) and other districts (46.5%).

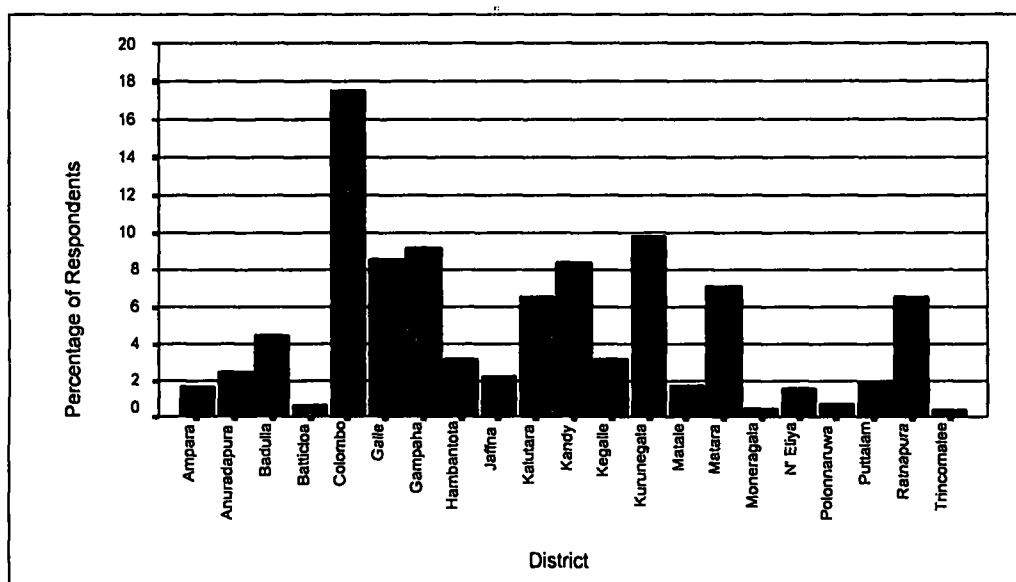


Fig.7.1: Distribution of Respondents among Districts.

Distribution of graduates by degree course

The sample consisted of 29.7% B.Sc. General (Bio Science), 24.2% B.Sc (Engineering) graduates, 21.7% B. Sc. General (Physical Science) graduates, 16.8% B.Sc. (Agriculture) graduates and 5.6% B. Sc. (Special) graduates.

7.2 Current Employment Status

In this study, the current employment status of graduates is described using five main categories.

The employed graduates are the graduates who are permanently or temporarily engaged in full time work in formal employment sectors such as government, semi-government, private and other (NGOs, Foreign funded projects) sectors.

Those who are all involved fulltime in pursuing postgraduate studies are considered as **graduates pursuing further studies**. The graduates who are all engaged in their own or family business are considered **self-employed**.

Unemployed graduates are those without work and seeking employment.

Graduates without work and **not seeking employment** are not considered for further analysis, as they are not available for work

7.2.1 Employed graduates :The percentage employed among the graduates who responded was 78%. 70% of them were permanently employed while the others were temporarily employed.

7.2.2 Unemployed graduates :The percentage unemployed was 14.6% (only 0.5% graduates were not seeking jobs)

7.2.3 Graduates pursuing further studies : Only 3% were engaged in full time postgraduate studies.

7.2.4 Self employed graduates :The percentage of self-employed among graduates was very low (1%).

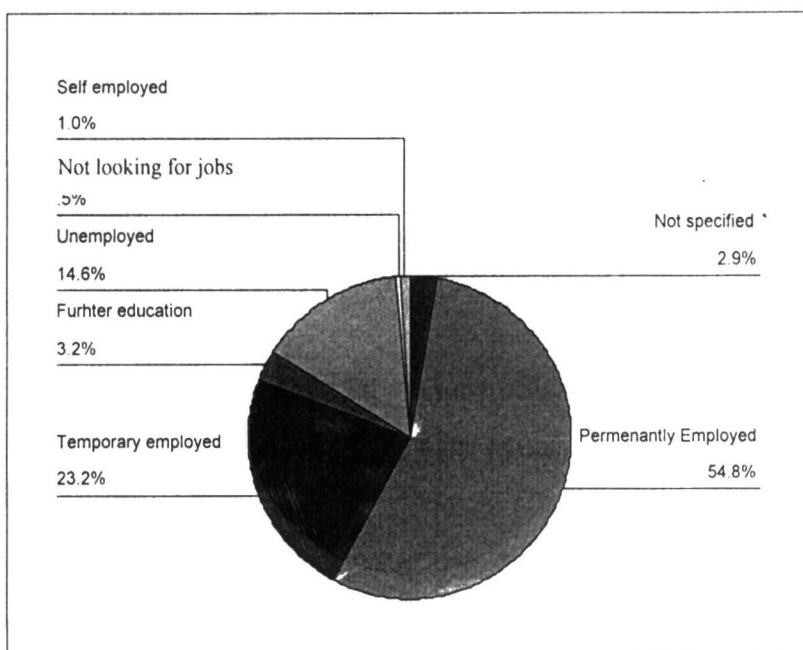


Fig.7.2: Current employment status of graduates

7.2.5 Current employment status and gender

It was revealed that 85 % of male graduates in the sample were employed while only 68.5% of females were employed (a). Only 63% of employed graduates were males (b). Fig 7.2.5.1

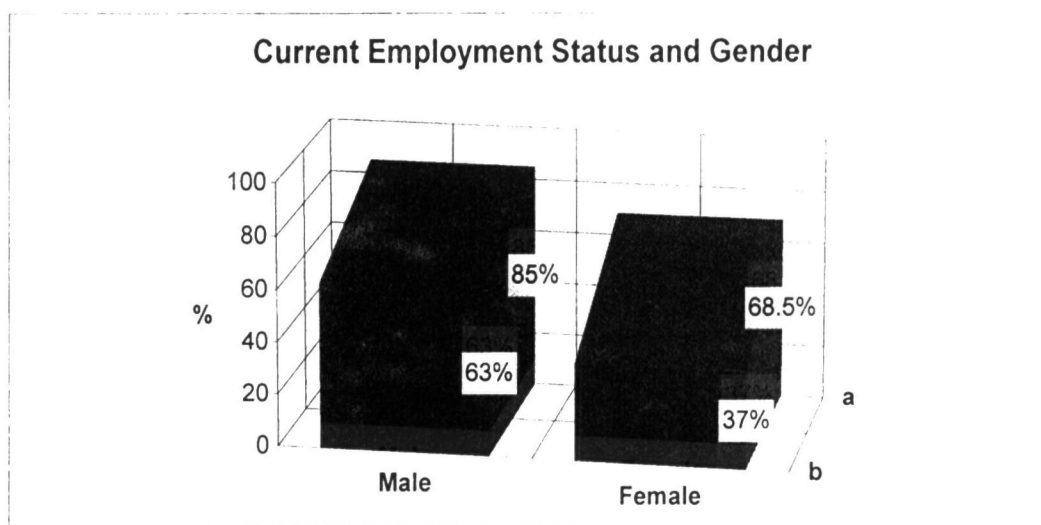


Fig.7.2.5.1: Employed graduates according to gender

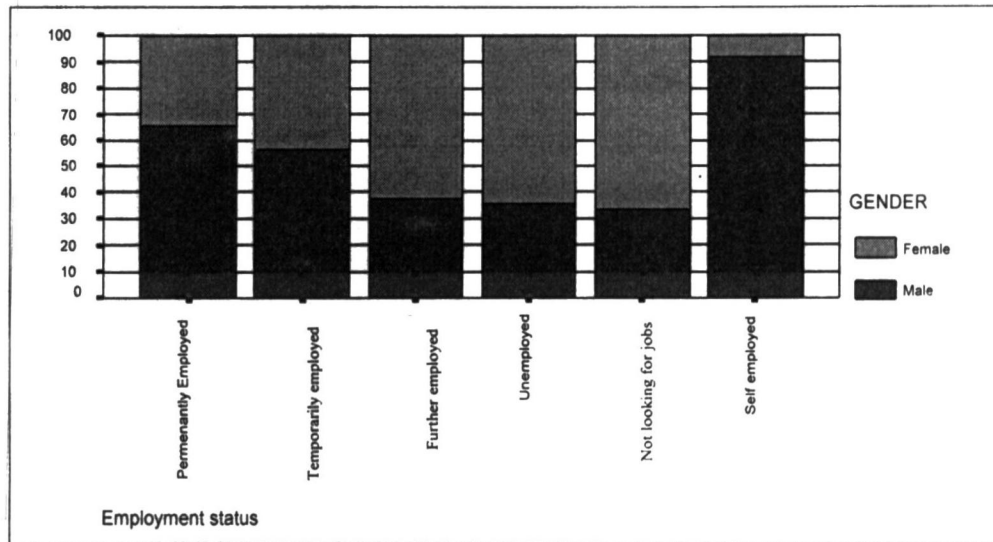


Fig 7.2.5.2: Current employment status according to gender

The proportion of females was higher among the graduates engaged in further studies (62.5%). The situation was the same for the unemployed (64.1%) and those who were not seeking jobs (66.7%). Moreover, the percentage of females among self-employed graduates was remarkably less (8.3%).

7.2.6 Achievement at the final examination and current employment status

A particular pattern can be observed in the employment status according to the level of achievement at the final examination. The percentage of graduates enjoying “employed” status changed according to the level of achievement at the final examination. For example, 88.1% of graduates with first classes, 83.6% of graduates with second upper passes, 83.3% of graduates with second lower passes and 74.1% of graduates with ordinary passes were employed. In contrast among the unemployed graduates, the percentage increased with the level of achievement (2.4%, 9.2%, 9.6% and 18.6%) respectively.

7.2.7 Current employment status and degree course

The highest proportion of employed graduates belonged to B. Sc. (Engineering) (96.1%), followed by B.Sc. Special (89.5%), B. Sc. General (Physical Science) (76.3%), B.Sc. (Agriculture) (75.5 %) and B.Sc. General (Bio Science) (64.8%). Unemployment was highest among Bio Science graduates (24.1%), followed by Physical Science (18.6 %), Agriculture (15.1%) and B. Sc. Special (3%). Unemployment was the lowest among Engineering graduates (0.7 %).

7.3 Currently Employed Graduates

The percentage of graduates in the sample who were categorized as employed was 78%. Employed graduates were divided into two main categories namely “Permanently employed” (70 %) and “Temporarily employed” (30%).

Career information of employed graduates can be analyzed according to degree course, gender, income level, management level, sector of employment, main functions of employment and time spent (waiting time) for getting the first employment.

7.3.1 Management Level

Graduates were asked to mention the management level of their current occupation. According to the data, the highest proportion of graduates belonged to the Junior Management level (32.1%) followed by the Non Executive level (30.6%), Middle Management (18%) and Senior Management (1.9%). Fig 7.6

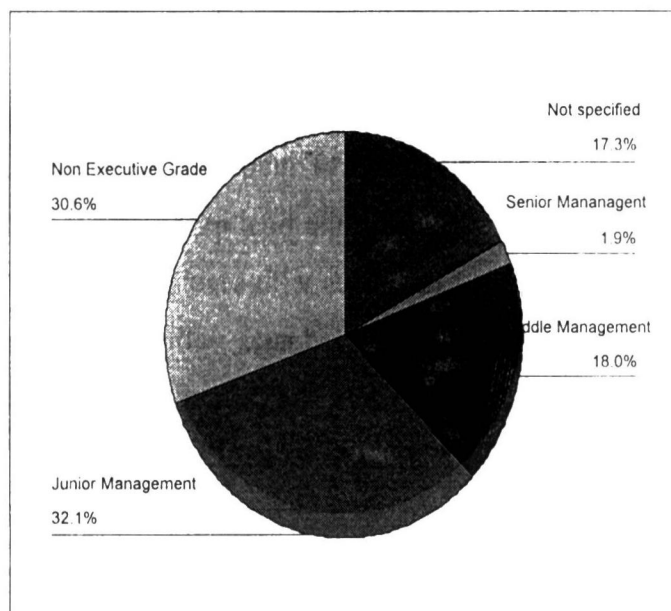


Fig 7.3.1.: Management level of currently employed graduates

7.3.1.1 Management Level and Income

An attempt was made to compare the management level of graduates with their monthly income from employment. According to the data, the management level had no real relation with the income level.

Among the graduates working as senior managers, the lowest income level was Rs 5000-10,000/-. However, 2.9% of middle level managers received an income below Rs 5,000/- Moreover, 5% of the junior managers earned an income of less than Rs 5,000/-. The respective percentage of graduates who are non-executives was 36.2%.

The most common income level irrespective of the management levels was Rs.5, 000/- to Rs. 10, 000/=

7.3.2 Sector of employment

Employment of graduates in the different sectors of the economy of the country was analyzed to identify the current trends in the graduate labour market. The highest proportion (54.6%) of graduates was absorbed into the public sector, which consisted of Government (56%) and Semi government (44%), compared with the absorption in to the Private sector (37.8%). Non Government Organizations and foreign funded projects were combined to represent other sectors and the employment of graduates in this sector was around 2.5%.

7.3.2.1 Sector of employment and degree course

Absorption of graduates into different sectors was analyzed in relation to the degree course followed. Engineering graduates showed the highest percentage of absorption into the private sector (56.7 %) followed by graduates in B.Sc. Special (43.5%), B.Sc. Physical Science (39.2%), B.Sc. Agriculture (23.8 %) and B.Sc. Bio Science (23%).

In contrast, 69.6 % of B.Sc. (Bio Science) graduates were absorbed into the public sector and only around 40% of Engineering graduates were employed in the above sector

| Degree Course | Sector Employed (%) | | | |
|---------------|---------------------|------------|---------|-------|
| | Government | Semi-Govt. | Private | Other |

| | | | | |
|---------------------|------|------|------|-----|
| B.Sc. General (Phy) | 39.2 | 14.4 | 39.2 | .5 |
| B.Sc. General (Bio) | 44.9 | 24.7 | 23.0 | 1.2 |
| B. Sc. Special | 24.2 | 24.2 | 43.5 | 4.8 |
| B. Sc. Agriculture | 33.1 | 27.5 | 23.8 | 8.8 |
| B. Sc. Engineering | 12.3 | 27.6 | 56.7 | 1.0 |
| Not specified | 56.3 | 18.8 | 18.8 | 6.3 |
| Total | 30.9 | 23.7 | 37.8 | 2.5 |

* 5% of the sample had not specified the sector of employment

Table 7.3.2.1: Graduate employment-Sector of employment by degree course

7.3.2.2 Sector of employment and income

The sector of employment of graduates was analyzed with their income levels to see whether any relationship could be seen between these two factors. With regard to the graduates employed in the private sector, 10.5% are belonged to the highest income level (more than Rs.30,000). In the semi government sector, the respective percentage was 5.2. In the government sector, only 0.3% of the graduates earned more than Rs. 30,000/=.

More than half of the graduates in the private sector (53.8%) earned an income of more than Rs. 15,000. In all sectors, most of the graduates received a monthly income between Rs. 5000/= and Rs.10,000/= ,

| Sector | Percentage |
|-----------------|------------|
| Government | 53.9% |
| Semi government | 56.7 % |
| Other sectors | 52%. |

| Income Group | Sector of Employment(%) | | | |
|--------------|-------------------------|------|---------|-------|
| | Government | Semi | Private | Other |
| | | | | |

| | | Government | | |
|------------------|-------|------------|-------|-------|
| Rs. 3000 or less | 9.5 | .4 | 1.1 | |
| Rs. 3001- 5000 | 27.3 | 5.6 | 9.4 | 16.0 |
| Rs. 5001-10000 | 53.9 | 56.7 | 21.8 | 52.0 |
| Rs. 10001-15000 | | 1.7 | 13.2 | 8.0 |
| Rs. 15001-20000 | 7.9 | 24.9 | 25.3 | 12.0 |
| Rs. 20001-30001 | .7 | 4.7 | 18.0 | 12.0 |
| Rs. 30001 & over | .3 | 5.2 | 10.5 | |
| Not specified | .3 | .9 | .8 | |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

* 5% of the sample has not specified the sector of employment

Table 7.3.2.2: Graduate employment-Sector of employment by income group

7.3.3 Income levels

Among all respondent graduates, nearly 40% of them received a monthly income in the range of Rs. 5,000/= and Rs.10, 000/= while 18.2 % of graduates earned more than Rs. 15,000/= per month. Only 13.7% of graduates earned more than Rs. 20,000 /= per month.

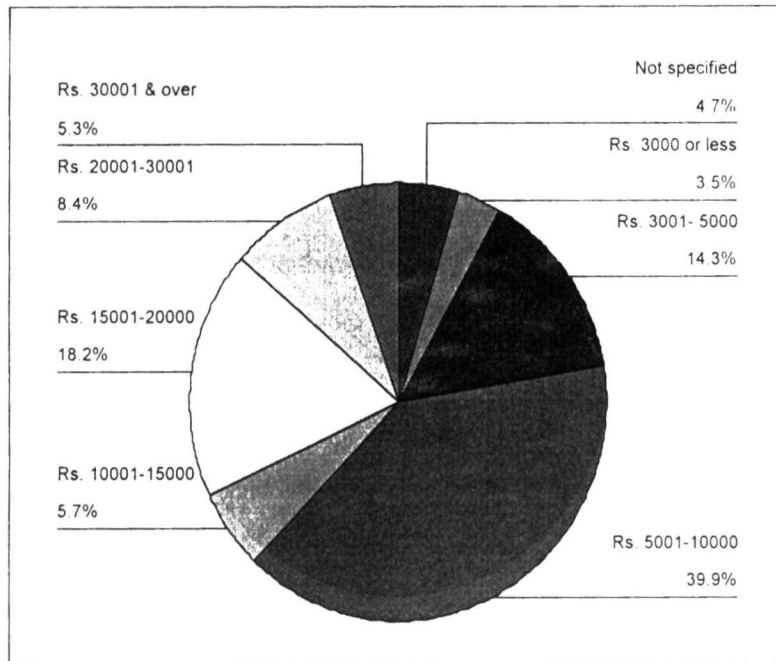


Fig 7.3.3: Income levels of employed graduates

7.3.3.1 Income level and gender

A considerable difference in the income levels of male and female graduates has been observed. 74.6% of females earned an income of less than Rs. 10,000/=. The respective percentage for males was only 47.6%.

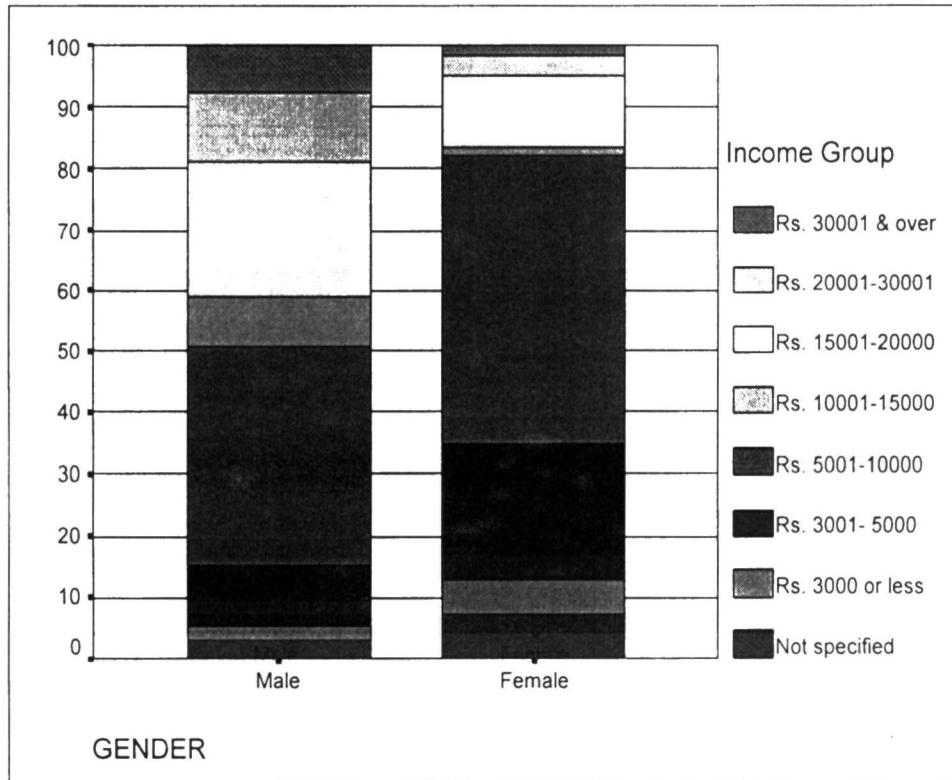


Fig 7.3.3.1: Income levels of employed graduates by gender

7.3.3.2 Income level and Degree course

According to the data, 13.7% of B.Sc. (Engineering) graduates earned an income of more than Rs. 30,000/=. Relevant percentages of B.Sc. (Special), B.Sc. (Physical Science), B.Sc.(Agriculture) graduates were 9.7, 2.4 and 0.6 respectively.

The higher percentage of Engineering graduates (29.4 %) earned an income of Rs. 15,000/= to Rs.20,000/=. However, among the other graduates the higher proportion earned an income of Rs. 5000/= - Rs. 10,000/=.

Furthermore, 60.8% of Engineering graduates earned an income of more than Rs15,000/=. In contrast, only 8.3% of graduates in B.Sc. (Bio Science) earned more than Rs.15, 000/=.

| Income Group | Degree Course (%) | | | | | Total (%) |
|------------------|---------------------|---------------------|----------------|--------------|------------|-----------|
| | B.Sc. General (Phy) | B.Sc. General (Bio) | B. Sc. Special | B. Sc. Agri. | B. Sc. Eng | |
| Rs. 3000 or less | 5.3 | 6.6 | 1.6 | 1.9 | .7 | 3.5 |
| Rs. 3001- 5000 | 26.3 | 21.8 | 4.8 | 15.6 | .3 | 14.3 |
| Rs. 5001-10000 | 38.3 | 57.6 | 37.1 | 49.4 | 20.8 | 39.9 |
| Rs. 10001-15000 | 1.9 | .8 | 9.7 | .6 | 14.7 | 5.7 |
| Rs. 15001-20000 | 13.9 | 6.2 | 24.2 | 20.0 | 29.4 | 18.2 |
| Rs. 20001-30001 | 6.2 | 2.1 | 8.1 | 5.0 | 17.7 | 8.4 |
| Rs. 30001 & over | 2.4 | | 9.7 | .6 | 13.7 | 5.3 |
| Not specified | 5.7 | 4.9 | 4.8 | 6.9 | 2.7 | 4.7 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

* 2% of the sample had not specified the degree course

Table 7.3.3.2: Graduate employment- income levels by degree course

7.3.4 Main functions of the occupation

Main functions performed by graduates in their occupations were analyzed.

| Function | Degree Course (%) | | | | | Total |
|-----------------------------------|---------------------|----------------------|----------------|------------|------------|-------|
| | B.Sc. General (Phy) | B.Sc. General (Bio.) | B. Sc. Special | B.Sc. Agri | B. Sc. Eng | |
| Administration | 3.3 | 4.0 | 2.9 | 3.3 | 4.9 | 5.1 |
| Direction & Management | 4.0 | 5.3 | 1.4 | 6.6 | 21.3 | 11.4 |
| Extension Service | 0.4 | 2.1 | 2.9 | 15.6 | 3.9 | 5.7 |
| Production & Product Development. | 6.9 | 4.0 | 4.3 | 8.5 | 16.7 | 10.9 |
| Research & Development | 4.7 | 6.6 | 35.7 | 17.9 | 10.2 | 13.5 |
| Software Development | 5.8 | 1.1 | 11.4 | - | 10.5 | 6.1 |
| Teaching | 29.6 | 21.4 | 20.0 | 16.5 | 4.6 | 23.3 |
| Testing & Quality Control | 8.5 | 4.8 | 8.6 | 5.7 | 3.6 | 7.6 |
| Trade | 0.3 | 1.3 | 1.4 | 8.5 | 2.3 | 1.9 |
| Other | 15.0 | 13.5 | 17.1 | 3.8 | 33.4 | 23.1 |

* Percentages do not add up to 100 due to multiple responses

Table 7.3.4: Main functions of the occupations of graduates

7.3.5 Waiting time

Waiting time is defined as the period from the date of graduation to the first paid employment. 25.4% of graduates had been able to get employed before their graduation or just after graduation. Waiting time for these graduates was recorded as 0 months. 65.5% of the graduates had found the first paid employment within the first 6 months of their graduation. The analysis in relation to the waiting time is given below

7.3.5.1 Degree Course and Waiting time

Waiting time and degree course were analyzed to see the rate of absorption of graduates in different categories of the degree course. B. Sc. (Special) graduates showed the highest rate of absorption into the labour market. Within the first 6 months after graduation, 85% of B. Sc. (Special), 82% of Engineering, 71 % of Agriculture, 57.7% of Physical Science, 52.1% of Bioscience graduates had got absorbed into the labour market.

In contrast, 33.1 % of graduates in Bioscience, 25.2% of Physical sciences, 13.7% of Agriculture and 3% of B.Sc. (Special) had failed to find a job even after 2 years of their graduation.

| Waiting time (Months) | Degree Course (%) | | | | | Total (%) |
|--------------------------|---------------------------|---------------------------|-------------------|----------------|----------------|--------------|
| | B.Sc. General (Phy) | B.Sc. General (Bio) | B. Sc. Special | B. Sc. Agri | B. Sc. Engi | |
| 0 | 23.0 | 21.7 | 40.3 | 11.3 | 39.0 | 25.4 |
| 0-6 | 23.0 | 18.8 | 40.3 | 30.7 | 35.7 | 26.8 |
| 6-12 | 11.7 | 11.6 | 4.5 | 29.7 | 7.2 | 13.3 |
| 12-18 | 8.8 | 5.0 | 4.5 | 7.5 | 5.6 | 6.3 |
| 18-24 | 2.9 | 2.4 | 1.5 | 2.4 | 1.6 | 2.2 |
| >24 | 25.2 | 33.1 | 3.0 | 13.7 | 1.0 | 18.8 |
| Not Specified | 5.5 | 7.4 | 6.0 | 4.7 | 9.8 | 7.2 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

*2% of the sample had not specified the degree course

Table 7.3.5.1: Waiting time of graduates according to the degree course

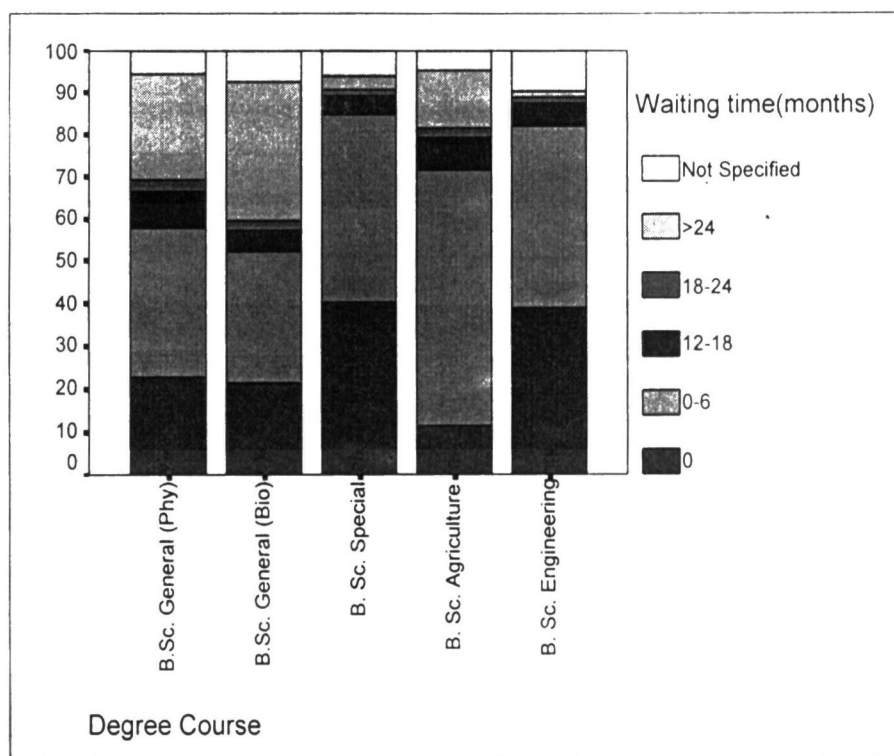


Fig. 7.3.5.1: Waiting time of graduates according to the degree course

7.3.5.2 Waiting time and achievement at the final examination

Waiting time and the level of achievement at the final examination were analyzed to see whether there was any relationship between academic performances and absorption of graduates into the labour market.

78.3 % of the graduates who had passed out with second uppers had been absorbed into the labour market within the first 6 months after graduation. Relevant percentages for graduates with first classes, second lowers and passes were 76.2%, 73.7% and 59.3% respectively.

Nearly 25% of graduates with passes had failed to find a place in the labour market even after 2 years of graduation.

| Waiting time (Months) | Achievement at the final Examination | | | | Total |
|-----------------------|--------------------------------------|--------------|--------------|-------|-------|
| | First Class | Second Upper | Second Lower | Pass | |
| 0 | 16.7 | 25.0 | 24.9 | 26.6 | 25.4 |
| 0-6 | 59.5 | 53.3 | 48.8 | 32.7 | 40.1 |
| 12-18 | 9.5 | 4.6 | 6.7 | 6.2 | 6.3 |
| 18-24 | | 2.0 | 2.3 | 2.1 | 2.2 |
| >24 | 11.9 | 10.5 | 10.2 | 24.9 | 18.8 |
| Not Specified | 2.4 | 4.6 | 7.0 | 7.5 | 7.2 |
| | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

1.2% of the sample had not specified the level of achievement at the final examination

Table 7.3.5.2: Waiting time of graduates according to the level of achievement at the final examination

7.3.6 View of temporarily employed graduates regarding their failure in obtaining permanent employment

The comments of the graduates who were able to receive temporary employment have been analyzed to see the reasons for their failure to obtain a permanent employment. Interestingly, discrimination in terms of race, caste, religion, politics and sex (37.5%) have been indicated as major reasons over the other commonly expected reasons such as low standard of English, poor performance at the tests and interviews etc.

| View | Percentage |
|--|------------|
| Discrimination by race, caste, religion & politics | 25.7 |
| Poor performance at the degree program | 15.8 |
| Low Standard of English | 15.1 |
| Poor performance at tests and interviews | 13.2 |
| Sex discrimination | 11.8 |
| Status of school attended during secondary education | 2.6 |
| Other | 38.8 |
| Not Specified | 47.95 |
| Total | * 100.00 |

* Percentages do not add up to 100 due to multiple responses

Table 7.3.6: Major reasons for the failure to obtain permanent employment.

7.4 Unemployed Graduates

The percentage of unemployed graduates in the sample was 14.6%. Among unemployed graduates, the majority of them were females (64.1%), males (35.9%).

7.4.1 Unemployed graduates by Degree Course

Unemployed graduates were classified according to the degree course followed. B.Sc. General (Bio science) graduates showed the highest proportion (49.5%) among unemployed graduates, followed by graduates in B.Sc. General (Physical Science)- (27.7 %), B. Sc. Agriculture (17.4%), B. Sc.Special (1.1%) and B. Sc. Engineering (1.1%)

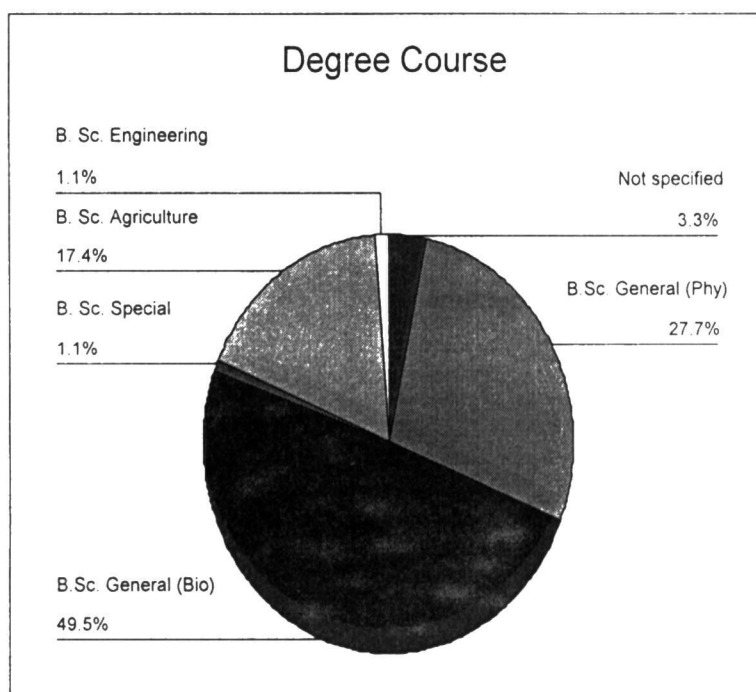


Fig.7.4.1: Unemployed graduates according to the degree course

7.4.2 Views regarding their failure in obtaining permanent employment

The comments of the unemployed graduates have been analyzed to see the reasons for their failure to obtain permanent employment. Interestingly, in this category also discrimination in terms of race, caste, religion, politics and sex had been voted as the major reason for the failure to obtain permanent employment.

| View | Percentage | |
|--|------------|--------|
| Discrimination by race, caste, religion & politics | 31.3 | 44.8 |
| Poor performance at tests and interviews | 20.3 | |
| Low standard of English | 17.2 | |
| Sex discrimination | 13.5 | 69.57 |
| Poor performance at the degree program | 10.9 | |
| Status of school attended during secondary education | 3.9 | |
| Other | 26.6 | |
| Not Specified | | 30.43 |
| Total | * | 100.00 |

* Percentages do not add up to 100 due to multiple responses

Table 7.4.2.: Views regarding their failure in obtaining permanent employment

7.5 Self Employed Graduates

The percentage of self-employed among graduates was very low (1%). Self-employment activities include computer typesetting & desktop publishing, trade, production of seeds, fruit & vegetable processing and exporting, private tuition etc.

The size of the sample of self-employed graduates was inadequate to carry out further analysis. However, it is worthwhile to note that the majority of the self-employed were B.Sc. - (Bio science) graduates. Furthermore, among the self-employed graduates, females were remarkably low (only 8%).

7.6 Main Sources of Employment Information

According to the data, the main source of information on job opportunities was considered the newspapers. 30% of graduates had found information regarding their jobs from newspapers, 15% through the university, 12.3% from the Government gazette, 9.6% from personal contacts with the employer and 6.8% through other employees.

This shows that informal mechanisms also play a considerable role in graduate employment

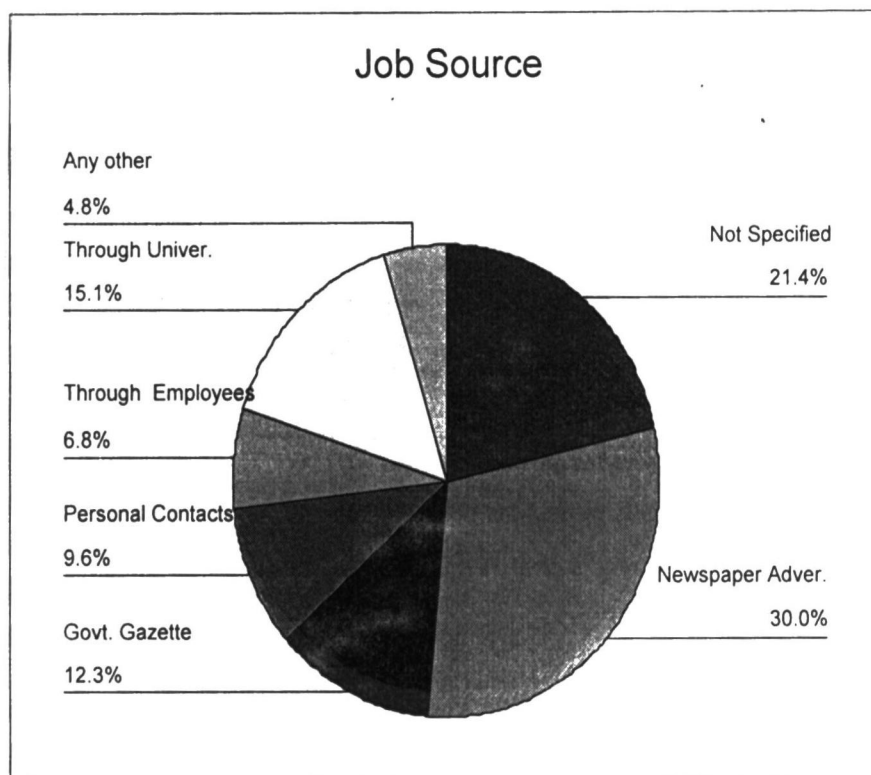


Fig 7.6: Main sources of employment information

7.7 Obstacles faced by graduates in finding suitable employment

Graduates were asked to indicate obstacles faced by them in the process of searching for suitable employment.

According to the data, the main obstacle was the absence of work experience Table 7.7. It is interesting to note that the obstacles indicated under a, d, e, f can easily be removed through necessary curriculum changes. The necessity of relevant national policy changes is shown in order to overcome the obstacles indicated under b and c

| Obstacle | Percentage |
|--|------------|
| (a) Absence of required work experience | 34.26 |
| (b) Absence of opportunities in the field of specialty | 25.22 |
| (c) Absence of opportunities in the area of interest | 15.38 |
| (d) Lack of knowledge in English | 12.85 |
| (e) Lack of knowledge in Information Technology | 9.91 |
| (f) Lack of knowledge in Management | 4.52 |
| (g) Other | 7.93 |

* 30.21% of the sample had not specified the obstacles.

*Percentages do not add up to 100 due to multiple responses

Table 7.7: Obstacles faced by graduates in finding suitable employment.

7.8 Projections of demand for S & T graduates in 2002, 2003 and 2004

An attempt was made to forecast S & T manpower requirements/demand using the absorption rate of the graduates and outturn/intake ratio as key variables.

Absorption rate is defined as the percentage of graduates absorbed into the labour market within a particular period of time. The ratio between the out turn of graduates and the corresponding intake for each academic year is considered as the out turn/intake ratio.

7.8.1 Methodology

Employed graduates were classified according to the academic stream: B.Sc. (Physical & Biological Science), B.Sc. Engineering and B.Sc. Agriculture. The total responses received from each academic stream were treated as the population of respective streams. Ten random samples of size 30 were taken (with replacement) from the defined population. The cumulative absorption rate was plotted against the waiting time. Different time periods were observed by different samples to absorb fully (100% absorption) into the labour market. Absorption rates were calculated for each academic stream for the 1st year (P_1), 2nd year (P_2) and estimated upto the time taken for 100% absorption (P_n) after graduation.

The calculated and estimated absorption rates of each sample for the different years were used to estimate absorption rates of population and confidence interval for the population absorption rates.

The intake of students and out turn of graduates from the relevant faculties of the universities for the corresponding years were taken from the UGC reports. The out turn/intake ratio was calculated for each academic year and academic stream. This ratio was plotted against the time (years). An extraordinary pattern was observed in the intake/out turn ratio for different disciplines at different time periods. It was suspected that some external factors such as political, economical and institutional environments had contributed to this behavior of the intake/out turn ratio. An attempt was not made to measure/estimate these effects individually (separately) because of the limitation of data for these categories. But this effects were considered together as seasonal (for years)/ cyclic components and estimated.

Among several models, the moving average model was selected as it was well fitted with data. Using this model, ratios were projected for the next few years. Deciding on the projection periods depended on the data availability of intake. The amount of intake and projected ratio were used to estimate the out turn (supply) of graduates from different academic streams for each academic year.

Existing (A_1, B_1, C_1), estimated out turn (D_1, E_1, F_1) and estimated absorption rates ($P_1 \dots P_4$) for different years were used to estimate the demand/requirements of graduates in different disciplines for different years.

| Year | Out turn | Amount absorbed | | | | | |
|-----------|----------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| | | 1998/1999 | 1999/2000 | 2000/2001 | 2001/2002 | 2002/2003 | 2003/2004 |
| 1998/1999 | A ₁ | A ₁ *P ₁ | A ₂ *P ₂ | A ₃ *P ₃ | A ₄ *P ₄ | | |
| 1999/2000 | B ₁ | | B ₁ *P ₁ | B ₂ *P ₂ | B ₃ *P ₃ | B ₄ *P ₄ | |
| 2000/2001 | C ₁ | | | C ₁ *P ₁ | C ₂ *P ₂ | C ₃ *P ₃ | C ₄ *P ₄ |
| 2001/2002 | D ₁ | | | | D ₁ *P ₁ | D ₂ *P ₂ | D ₃ *P ₃ |
| 2002/2003 | E ₁ | | | | | E ₁ *P ₁ | E ₂ *P ₂ |
| 2003/2004 | F ₁ | | | | | | F ₁ *P ₁ |

The demand in 2001/2002 can be estimated by adding the amount absorbed from the different batches in the same year. This technique was used for different disciplines.

7.8.2. Analysis

7.8.2.1 Estimated absorption rates.

Population absorption rates and 95 % confidence intervals were calculated using the sample absorption rates. The following tables show the sample absorption rates, population absorption rates and confidence interval for the absorption rates.

| Sample No. | P ₁ | | P ₂ | | P ₃ | | P ₄ | |
|------------|----------------|------|----------------|------|----------------|------|----------------|-----|
| | Agr | Eng | Agr | Eng | Agr | Eng | Agr | Eng |
| 1 | 63.6 | 87.9 | 16.8 | 12.1 | 12.6 | 0 | 0 | 6.9 |
| 2 | 66.7 | 79 | 19.7 | 11.7 | 13.6 | 7.1 | 2.1 | 0.0 |
| 3 | 73.1 | 75.9 | 20.5 | 10.3 | 6.4 | 11.0 | 2.7 | 0.0 |
| 4 | 68.8 | 90.3 | 17.1 | 9.7 | 13.4 | 0 | 0 | 0.7 |
| 5 | 69.6 | 80.0 | 14.5 | 15 | 13.5 | 5 | 0 | 2.5 |
| 6 | 77.4 | 90.6 | 17.2 | 9.4 | 5.4 | 0 | 0 | 0.0 |
| 7 | 86.2 | 83.6 | 13.8 | 8.7 | 0.0 | 6.1 | 1.5 | 0.0 |
| 8 | 67.9 | 81.6 | 18.9 | 9.7 | 13.1 | 8.7 | 0 | 0.0 |
| 9 | 78.3 | 82.9 | 17.1 | 2.8 | 4.6 | 14.3 | 0 | 0.0 |
| 10 | 60.9 | 86.7 | 19.0 | 13.3 | 11.9 | 0 | 0 | 8.1 |

Estimated population absorption rates and confidence intervals were as follows:

| Discipline | Absorption Rate | Mean | Confidence interval | |
|------------|-----------------|-------|---------------------|-------------|
| | | | Upper limit | Lower limit |
| Eng | P ₁ | 83.85 | 85.78 | 81.91 |
| | P ₂ | 10.27 | 11.55 | 8.99 |
| | P ₃ | 5.23 | 7.264 | 3.199 |
| | P ₄ | 0.64 | 1.07 | 0.22 |
| Agr | P ₁ | 71.25 | 74.23 | 68.26 |
| | P ₂ | 17.47 | 18.32 | 16.63 |
| | P ₃ | 9.454 | 11.38 | 7.52 |
| | P ₄ | 1.81 | 3.04 | 0.59 |

7.8.2.2 Estimated Out turn/intake ratio

Out turn / intake ratios for the next few years were projected with the use of the time series model as explained in the methodology section.

| Academic year | Ratio | |
|---------------|------------|-----------|
| | Agr | Eng |
| 1988 | 0.693277 | 0.760456 |
| 1989 | 0.636364 | 0.790941 |
| 1990 | 0.643791 | 0.685328 |
| 1991 | 0.591195 | 0.720532 |
| 1992 | 0.616246 | 0.574436 |
| 1993 | 0.39666 | 0.909344 |
| 1994 | 0.570707 | 0.621438 |
| 1995 | 0.584615 | 0.605594 |
| 1997 | 0.6 | 0.661333 |
| 1998 | 0.758043** | 0.817819 |
| 1999 | 0.718072 | 0.834656 |
| 2000 | 0.591935* | 0.797671 |
| 2001 | 0.724125* | 0.671369* |
| 2002 | 0.660432* | 0.928099* |
| 2003 | 0.606019* | 0.723024* |
| 2004 | 0.741219* | 0.742655* |

* Projected values

** Estimated value

7.8.2.3 Projected Out turn.

Out turn the for years 2002, 2003 and 2004 was projected using the estimated ratios and available data on intake

| Academic Stream | Year | Projected Out turn |
|-----------------|------|--------------------|
| Agr | 2002 | 443 |
| | 2003 | 393 |
| | 2004 | 535 |
| Eng | 2002 | 685 |
| | 2003 | 633 |
| | 2004 | 688 |

7.8.2.4. Estimate of Annual Demand.

Annual demand for the next few years was projected using the estimated absorption rates and projected out turn

| Academic Stream | Year | Projected out turn | Projected Demand | | |
|-----------------|------|--------------------|------------------|------|-------------|
| | | | Lower limit | Mean | Upper limit |
| Agr | 2002 | 443 | 417 | 440 | 474 |
| | 2003 | 393 | 382 | 412 | 441 |
| | 2004 | 535 | 467 | 501 | 535 |
| Eng | 2002 | 685 | 623 | 655 | 676 |
| | 2003 | 633 | 596 | 629 | 642 |
| | 2004 | 688 | 643 | 681 | 714 |

7.8.3 Limitations.

7.8.3.1 Lack of availability of key information

Estimating the out turn and demand

Data on out turn of graduates corresponding to the particular intake was not available in tabulated form. Therefore, the data was recorded by counting the number of years for a particular degree course from the year of intake and getting the out turn of the corresponding year.

Estimate of Absorption rates

Absorption rates (P_1 , P_2 , P_3 & P_4) were calculated and estimated using data gathered from the Tracer study survey. The survey was done only for 2 years. For each academic year the same absorption rates ($P_1 \dots P_4$) were used, owing to limitation in data availability though in reality these rates are changing with the economic, social, political and other conditions.

Data on B.Sc. (Physical & Bio Science) academic stream

Absorption rates for B.Sc. Physical and Bio Science graduates were also calculated separately. It was observed that the behavior of absorption rates was not common for both groups. (P_1 for Physical Science was higher than P_1 for Bio Science). But the separate data on intake and out turn of both groups were not available in the way needed for this analysis. Therefore, the analysis of these two groups couldn't be carried out.

7.8.3.2 Lack of consistency of the data

Value for total out turn of graduates from the universities for a particular year was different in reports published by the UGC for different years.

7.8.3.3 Institutional formalities

Graduates in particular academic streams were from different faculties of different universities. The time (month of the year) of passing out /conducting of final exams was different in different faculties of different universities for a particular academic year. Therefore, even graduates from one academic stream have different entering times to the labour market, which will render this analysis more complicated.

Reputation of the University / faculty, facilities available and the quality of graduates also affect the rate of absorption, though these were not considered in this analysis.

Analysis according to the sub disciplines/specialized areas within each academic stream will be done outside of this report

7.8.4 Assumptions

Graduates from particular academic streams and belonging to a particular academic year are absorbed fully (100% absorption) within the first four years of their graduation.

Absorption rates are the same for each academic year for the graduates in particular academic streams (time independent).

7.8.5 Findings

84% of the fresh engineering graduates were absorbed into the labor market within the first year of graduation and the respective rate for the following year was 10%.

In the case of fresh agriculture graduates, 71% were absorbed in the first year and in the following year it was 17%.

The study confirms that engineering graduates have a higher demand compared with the agriculture graduates.

Estimated out turn/intake ratio will be higher in year 2002 for the engineering academic stream and lower in 2003. The academic stream of agriculture will have a lower ratio in 2003 and a higher ratio in 2004. Fluctuation of this ratio is observed in both academic streams, due is mainly to external factors.

Projected out turn of graduates for engineering for the years 2002, 2003 and 2004 are 685,633 and 688. The respective values for agriculture graduates are 443,393 and 535.

Considering the demand of fresh engineering graduates, the projected values (average) for 2002,2003 and 2004 are 655,629 and 681. In the case of fresh agriculture graduates, the respective values are 440, 412 and 501.

At any point of time (year), the index of unemployment (current unemployment as a percentage of previous year unemployment) of graduates belonging to a particular academic stream can be estimated. This index would be more meaningful than the size of unemployment.

8. Discussion

8.1 Projections of demand

With regard to the projections of demand of graduates (section 7.8 of this report) the absorption rates (P_1, P_2, P_3, P_4) were assumed to be constant for the next few years. These rates may vary from year to year due to socio-economic and some other related factors. In order to get more reliable and appropriate estimates for absorption rates for each year of out

turn, a similar Tracer study can be continued for several years. Consequently, P_1, P_2, P_3, P_4 can be recorded for each year of out turn. This recorded data can be used to project different absorption rates for different years of out turn. Furthermore, P_1, P_2, P_3, P_4 can be tabulated with corresponding GDP values of the country to investigate whether there is a relationship between them.

In the case of unemployment of graduates in a particular academic stream, we propose to use the index of unemployment rather than the size of unemployment. The Index of unemployment is current year unemployment as a percentage of previous year unemployment. This index may have values less or greater than 100 but it will be definitely greater than or equal to zero. This can be used as one of the indicators with the fixed base year. Moreover, plotting the index of unemployment vs. time (years) can be used to observe a pattern, which may lead to further investigation on external factors, which would have affected the unemployment index.

For the estimation of demand we considered only fresh graduates and the key factor was the absorption rate to estimate/project the demand. Further, 100 % absorption within the defined time interval (4 years) was considered, which may vary for different academic streams. Therefore, in the future, we can consider only P , which means the absorption rate for each year. It can be calculated by adding how much was absorbed from the total out turn and rest of the absorbed from the previous years. This P can also be plotted with corresponding GDP to observe a relationship between these variables, which can be used to suggest/predict more reliable values for P .

In this study, the demand of graduates in each academic stream was projected with the use of absorption rates. In a case where the absorption rate of the first year (P_1) is 100%, there is a possibility of underestimating the demand. Therefore, this method is not suitable when P_1 is 100%. In reality, there are a few engineering disciplines where the absorption rate is almost 100% at the time of graduation.

If the index of unemployment is zero, then too this method cannot be used to project demand, as it will lead to an underestimation of the demand. In this kind of situation, as a remedy, the following method can be used to estimate the demand.

Growth rate of fresh graduates who are employed can be calculated using the no. of fresh employees in each year. The rate of growth of employed fresh graduates and GDP can be tabulated to investigate the relationship between them. If a relationship exists, then we can suggest/ predict growth rates of employment of fresh graduates against the GDP. Once the growth rate of employment of fresh graduates for a particular year is projected, the demand for fresh graduates can also be projected for the corresponding year. This projected demand can be compared with the projected out turn of the corresponding year.

8.2 Data collection

In this study, the method of data collection needed more manpower, time and other relevant resources compared to the resources available at MIS. The questionnaires were sent to all S&T graduates in the target group. But the response rate was 36 %. Therefore, we are planning to conduct a future Tracer study using suitable sampling techniques in the next years.

The values for the demand of fresh graduates in the near future were projected considering the absorption rate as a constant. In order to increase the reliability and precision of these projections, it is required to perform, backward validation for a reliable set of data for a few years. Therefore, this study should be continued, in order to obtain more precise projections.

Use of census data will provide more accurate projected values than sampling. It also eliminates the time spent for sampling, sampling errors, human errors etc. However, the present circumstances and limited resources do not allow census of graduates every year.

We suggest the following mechanism to collect reliable and accurate data from the graduates. This mechanism may need an approach, which is beneficial to both graduates and managers. Once the system is established, reliable data can be made available not only for this study but also for many other purposes.

Graduates can be given a relevant form to fill and submit to the university just after their final examination. Having released the final results, universities can provide a reference number for each graduate who passed the final examination. Collected forms can be sent to

a central authority by the universities. Once a graduate is recruited, he/she should submit this reference number to the employer. The employer is expected to send it to the central authority with the relevant information of employment of the candidate.

This mechanism can be implemented as a web based or document based exercise depending on the facilities available in the universities, institutions and industries.

9. Annex – 1

TABLE 9.1

REQUIREMENT OF SCIENCE AND TECHNICAL PROFESSIONALS, 1994-2000 BASE LINE SCENARIO

| TOTAL REQUIREMENT OF PROFESSIONALS | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| PHYSICISTS & CHEMISTS | 10601 | 10790 | 10981 | 11179 | 11380 | 11587 | 11797 |
| MATHEMATICIANS & STATISTICIANS | 4743 | 4829 | 4918 | 5009 | 5102 | 5197 | 5294 |
| BIO – SCIENTISTS | 7811 | 7955 | 8101 | 8252 | 8406 | 8563 | 8725 |
| COMPUTING PROFESSIONALS | 1618 | 1683 | 1750 | 1820 | 1893 | 1969 | 2045 |
| CIVIL ENGINEERS | 4659 | 4845 | 5039 | 5241 | 5450 | 5668 | 5895 |
| ELECTRICAL ENGINEERS | 1325 | 1378 | 1434 | 1490 | 1550 | 1612 | 1676 |
| ELECTRONICS & TELECOM. ENGINEERS | 1325 | 1378 | 1434 | 1491 | 1551 | 1612 | 1671 |
| MECHANICAL ENGINEERS | 864 | 899 | 935 | 973 | 1012 | 1052 | 1094 |

TABLE 9.2

ADDITIONAL REQUIREMENT AFTER 1994 : BASE-LINE SCENARIO

| ADDITIONAL REQUIREMENT OF PROFESSIONALS | 1995 | | | 1996 | | | 1997 | | | 1998 | | | 1999 | | | 2000 | | |
|---|------|-----|-----|------|-----|-----|------|-----|-----|------|-----|------|------|-----|------|------|-----|------|
| | A | B | T | A | B | T | A | B | T | A | B | T | A | B | T | A | B | T |
| PHYSICISTS & CHEMISTS | 189 | 212 | 401 | 380 | 216 | 596 | 578 | 220 | 798 | 779 | 224 | 1003 | 986 | 228 | 1214 | 1195 | 232 | 1428 |
| MATHEMATICIANS & STATISTICIANS | 86 | 95 | 181 | 175 | 97 | 272 | 266 | 98 | 364 | 359 | 100 | 459 | 454 | 102 | 556 | 551 | 104 | 655 |
| BIO-SCIENTISTS | 144 | 156 | 300 | 290 | 159 | 449 | 441 | 162 | 603 | 595 | 165 | 760 | 752 | 168 | 920 | 914 | 171 | 1085 |
| COMPUTING PROFESSIONALS | 65 | 32 | 97 | 132 | 34 | 166 | 202 | 35 | 237 | 275 | 36 | 311 | 351 | 38 | 389 | 429 | 39 | 468 |
| CIVIL ENGINEERS | 186 | 93 | 279 | 380 | 97 | 477 | 582 | 101 | 683 | 791 | 105 | 896 | 1009 | 110 | 1119 | 1236 | 113 | 1349 |
| ELECTRICAL ENGINEERS | 53 | 27 | 80 | 109 | 28 | 137 | 165 | 29 | 194 | 225 | 30 | 255 | 287 | 31 | 318 | 351 | 32 | 383 |
| ELECTRONICS & TELECOM. ENGINEERS | 53 | 27 | 80 | 109 | 28 | 137 | 165 | 29 | 194 | 225 | 30 | 255 | 287 | 31 | 318 | 351 | 32 | 383 |
| MECHANICAL ENGINEERS | 35 | 17 | 52 | 71 | 18 | 89 | 109 | 19 | 128 | 148 | 19 | 167 | 188 | 20 | 208 | 230 | 21 | 251 |

A: Additional requirement after 1994

B: Additional requirement due to attrition, at the rate of 2%

T: Total

TABLE 9.3**REQUIREMENT OF SCIENTIFIC AND TECHNICAL PROFESSIONALS, 1994-2000 HIGH GROWTH SCENARIO**

| TOTAL REQUIREMENT OF PROFESSIONALS | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| PHYSICISTS & CHEMISTS | 10601 | 10856 | 11120 | 11390 | 11670 | 11958 | 12255 |
| MATHEMATICIANS & STATISTICIANS | 4743 | 486 | 4981 | 5107 | 5235 | 5368 | 5506 |
| BIO - SCIENTISTS | 7811 | 8006 | 8207 | 8413 | 8626 | 8848 | 9075 |
| COMPUTING PROFESSIONALS | 1618 | 1705 | 1798 | 1895 | 1997 | 2105 | 2218 |
| CIVIL ENGINEERS | 4659 | 4911 | 5176 | 5455 | 5750 | 6060 | 6388 |
| ELECTRICAL ENGINEERS | 1325 | 1396 | 1472 | 1552 | 1635 | 1724 | 1817 |
| ELECTRONICS & TELECOM. ENGINEERS | 1325 | 1397 | 1472 | 1552 | 1635 | 1723 | 1817 |
| MECHANICAL ENGINEERS | 864 | 912 | 961 | 1013 | 1067 | 1125 | 1186 |

TABLE 9.4

ADDITIONAL REQUIREMENT AFTER 1994 : HIGH GROWTH SCENARIO

| ADDITIONAL REQUIREMENT OF PROFESSIONALS | 1995 | | | 1996 | | | 1997 | | | 1998 | | | 1999 | | | 2000 | | |
|---|------|-----|-----|------|-----|-----|------|-----|------|------|-----|------|------|-----|------|------|-----|------|
| | A | B | T | A | B | T | A | B | T | A | B | T | A | B | T | A | B | T |
| PHYSICISTS & CHEMISTS | 255 | 212 | 467 | 519 | 217 | 736 | 789 | 222 | 1011 | 1069 | 228 | 1297 | 1357 | 233 | 1590 | 1654 | 239 | 1893 |
| MATHEMATICIANS & STATISTICIANS | 117 | 95 | 212 | 238 | 97 | 335 | 364 | 100 | 464 | 492 | 102 | 594 | 625 | 105 | 798 | 763 | 107 | 870 |
| BIO-SCIENTISTS | 195 | 156 | 354 | 396 | 160 | 550 | 602 | 164 | 766 | 815 | 168 | 983 | 1037 | 173 | 1210 | 1264 | 177 | 1441 |
| COMPUTING PROFESSIONALS | 87 | 32 | 119 | 180 | 34 | 214 | 277 | 36 | 313 | 379 | 38 | 417 | 487 | 40 | 527 | 600 | 42 | 642 |
| CIVIL ENGINEERS | 252 | 93 | 345 | 517 | 98 | 610 | 796 | 104 | 900 | 1091 | 109 | 1200 | 1401 | 115 | 1516 | 1729 | 121 | 1850 |
| ELECTRICAL ENGINEERS | 72 | 26 | 98 | 147 | 28 | 175 | 228 | 30 | 258 | 311 | 31 | 342 | 399 | 32 | 431 | 492 | 35 | 527 |
| ELECTRONICS & TELECOM. ENGINEERS | 72 | 26 | 98 | 147 | 28 | 175 | 228 | 30 | 258 | 311 | 31 | 342 | 399 | 32 | 431 | 192 | 35 | 527 |
| MECHANICAL ENGINEERS | 48 | 17 | 65 | 97 | 18 | 115 | 149 | 19 | 168 | 203 | 20 | 223 | 261 | 21 | 282 | 322 | 23 | 345 |

A: Additional requirement after 1994

B: Additional requirement due to attrition, at the rate of 2%

T: Total

Annex - 2**Tracer Study of University Graduates- Questionnaire**

S. No :

Year :.....

(Please circle the relevant number to indicate your responses where possible answers are given)

1. Name :

2. Present Address :

..... Tel:-.....

3. Gender 1. Male 2. Female

4. District from which you entered the University :.....

5. When did you enter the University ?:
Month..... Year

6. University from which you graduated :

7. Faculty :

8. Department (if relevant) :

9. Degree Course followed :

9.1. B.Sc. General 1. Physical 2. Biological
9.2. B. Sc. Special Main Subject1. Physical
2. Biological

8.3 B.Sc. Agriculture (Specialized in

8.4 B.Sc. Engineering (Specialized in

10. Results declared in: Month Year

11. Achievement at the final examination: 1. First Class
2. Second Upper
3. Second Lower
4. Pass12. Have you undergone any training after completing your degree ? 1. Yes 2. No
if yes , please indicate the followings :Duration (months)
12.1. Apprenticeship training
12.2. Company training
12.3. Graduate training program
12.4 Other (Specify)

13. Other Qualifications obtained after graduation :

| Course title | Institution | Year commenced | Year completed |
|--------------|-------------|----------------|----------------|
| | | | |
| | | | |

For office use only

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17. Details of first paid employment after graduation
 (complete if the first paid employment is different from the current employment)

1. Date joined :

2. Designation :

3. Name of the Organization :

4. Nature of the job 1. Permanent
 2. Temporary

5. Type of the job 1. Full time
 2. Part time

6. Management level of your position
 1. Senior Management
 2. Middle Management
 3. Junior Management
 4. Non Executive Grade

7. To which of the following categories did your employer belong
 1. Government
 2. Semi Government
 3. Private
 4. Any other (specify).....

8. Main function of your occupation
 1. Research and Development
 2. Teaching
 3. Direction and Management
 4. Trade
 5. Extension Service
 6. Administration
 7. Production & Product Development
 8. Software Development
 9. Testing and Quality Control
 10. Any other(Specify).....

9. Average monthly salary : Rs.

| | |
|--|--|
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| | |
|--|--|

18. How did you get to know of your present job?

1. Newspaper advertisement
2. Govt. Gazette
3. Personal contacts with employers
4. Through other employees
5. Through the University
6. Any other (Specify).....

GO TO 20

19. If you are self-employed, provide the following information

| | |
|---|--|
| <p>1. Type or nature of self employment</p> <p>2. Initial capital investment</p> <ol style="list-style-type: none"> 1. Less than Rs.10,000 2. Rs. 10,000 - 50,000 3. Rs. 50,000 -1,000,000 4. More than Rs 1,000,000 <p>3. Major source of capital</p> <ol style="list-style-type: none"> 1. Family 2. Personal income from previous job 3. Private assets 4. Loans 5. Any other (specify) <p>4. Average Monthly Income</p> <ol style="list-style-type: none"> 1. Rs. 3000 or less 2. Rs. 3001 - 5000 3. Rs. 5001 - 10000 4. Rs. 10001-15000 5. Rs. 15001 -20000 6. Rs. 20001- 25000 7. Rs. 25001- 30000 8. Rs. 30001 & over | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|---|--|

20. If you are unemployed or engaged in a short term job, why in your view have you failed to obtain permanent employment.

1. Poor performance at the degree program
2. Poor performance at tests and interviews
3. Low standard of English
4. Sex discrimination
5. Status of school attended during secondary education
6. Discrimination in terms of race, caste, religion and politics.
7. Other (Please specify).....

| | | | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|

21. What obstacles did you face in finding a suitable employment for you?

1. Lack of knowledge of English
2. Lack of Knowledge of Information Technology
3. Lack of knowledge of Management
4. Absence of required work experience
5. Absence of employment opportunities in the field of my specialty
6. Absence of employment opportunities in the area of my interest
7. Any other (Please specify)

| | | | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|

22. Please give your comments/ suggestions regarding this survey

.....
Signature

.....
Date

Thank you very much for sparing your time to complete this questionnaire

Annex – 3

Report of a Tracer Study of University S & T Graduates

Key Indicators

The finding of the Tracer Study can be summarized in terms of a list of key indicators as presented in the Table herewith.

Table: Tracer Study of University S & T Graduates – Key Indicators

| Indicator | Both Genders | Male | Female |
|---|--|------------|------------|
| 1. Overall employment rate | 71.9% | 72.4% | 70.9% |
| 2. Overall employment rate | 5.7% | 4.7% | 7.5% |
| 3. Degree – wise lowest unemployment rate | 1.6% for B.Sc. Engineering | | |
| 4. Degree – wise highest unemployment rate | 11.8% for B.Sc. General Degree (Physical) | | |
| 5. Proportion engaged in regular wage employment | 98.1% | | |
| 6. Proportion engaged in government & semi government sectors | 1.9% | | |
| 7. Proportion engaged in government & semi government sectors | 59.6% | | |
| 8. Proportion engaged in private sector | 38.3% | | |
| 9. Degree – wise highest proportion engaged in private sector | 56.0% among B.Sc. Engineering | | |
| 10. Degree – wise lowest proportion engaged in private sector | 13.8% among B.Sc. Agriculture | | |
| 11. Average monthly income of graduates with regular income | Rs. 9,862 | Rs. 10,944 | Rs. 7,683 |
| 12. Degree – wise highest monthly income of graduates | Rs. 13,379 for B.Sc. Emgoneering | | |
| 13. Degree – wise lowest monthly income of graduates | Rs. 6161 for B.Sc. General Degree (Bioscience) | | |
| 14. Average monthly income of graduates in self – employment | Rs. 7,150 | | |
| 15. Average waiting time for employment | 6.4 months | 5.8 months | 7.9 months |
| 16. Degree – wise shortest waiting time for employment | 4.4 months for B.Sc. Engineering | | |
| 17. Degree – wise longest waiting time for employment | 9.7 months for B.Sc. Agriculture | | |

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