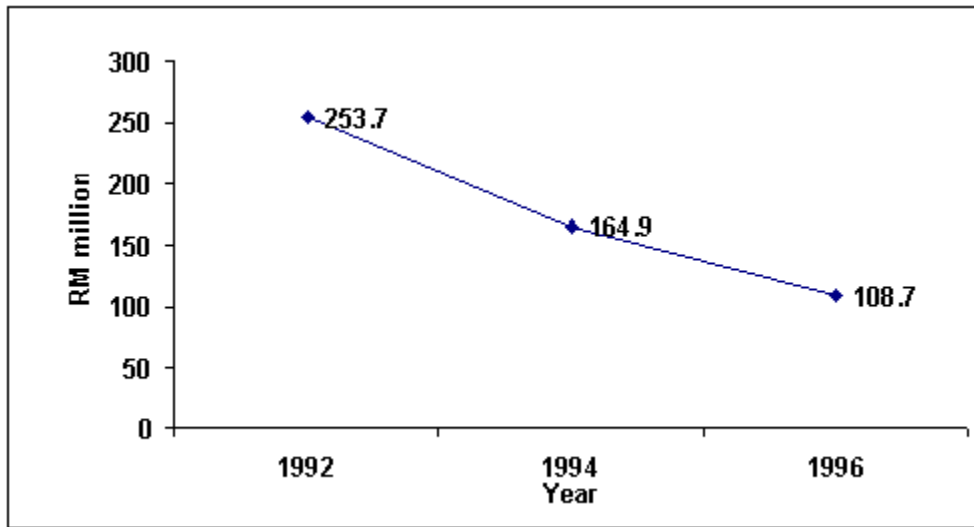


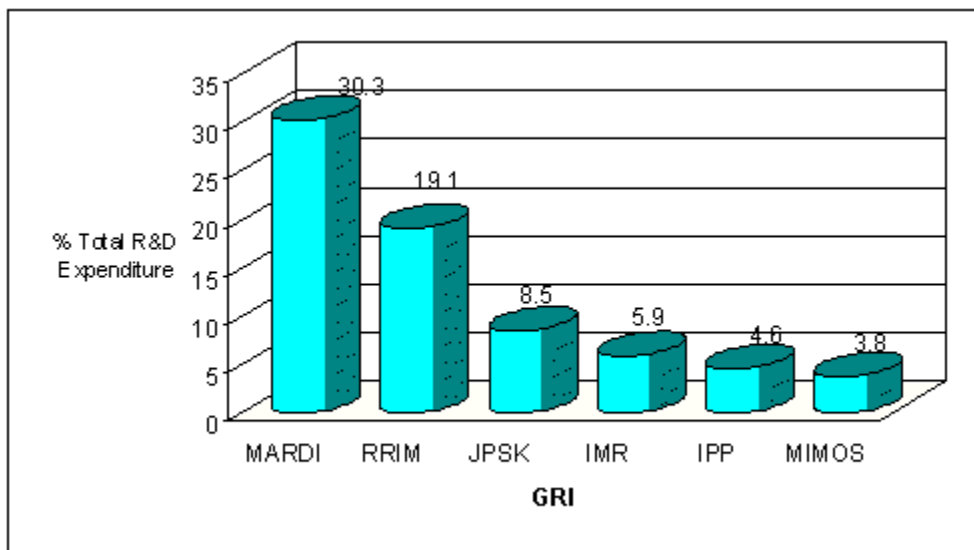
## Chapter 5 - GOVERNMENT AGENCIES AND RESEARCH INSTITUTS

### 5.1 Expenditures on R&D

There were 28 government research institutions (GRIs) carrying out R&D activities in 1996 [see Table 5.1]. The total expenditure on R&D by the GRIs was RM108.7 million. This represents a fairly significant reduction of 34% from RM164.9 spent in 1994 [see Fig. 5.1]. About 57.8% of the R&D expenditure in 1996 were due to labour cost.



(Source : Table 4.1)  
Fig. 5.1 Total R&D Expenditures (1992-1996)



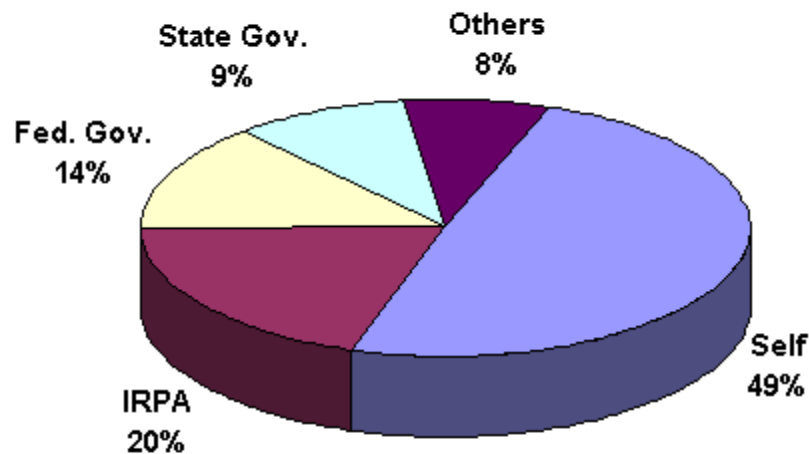
(Source : Table 5.1)  
Fig. 5.2 : The R&D expenditures by selected GRIs

4.1)

5.1)

In 1996, the two largest spenders on R&D were MARDI and RRIM. Together they contributed about 49% of the total expenditure [see Fig. 5.2]. The most notable agency outside the primary sector which spent less than half of the expenditure reported in 1994 was MIMOS. In 1996 MIMOS spent only RM4 million for its R&D activities. In view of the tremendously high cost of research in the field of microelectronics, the amount was actually very small. For comparison, Singapore spent S\$217.34 million for R&D in Computer and related areas in 1995.

About 49% of the R&D funds came from the agencies themselves where a large portion of it was actually R&D labour cost [see Fig. 5.3].

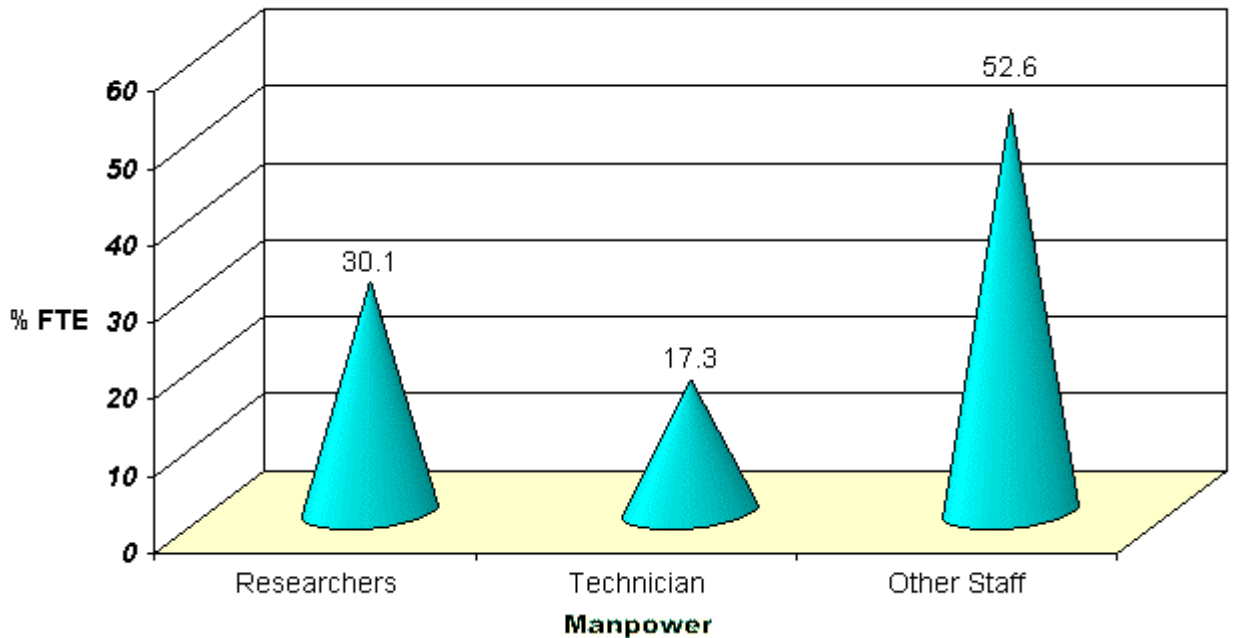


(Source Fig. 5.3 : Sources of Fund Table 5.7) (%)

## 5.2 Manpower for R&D

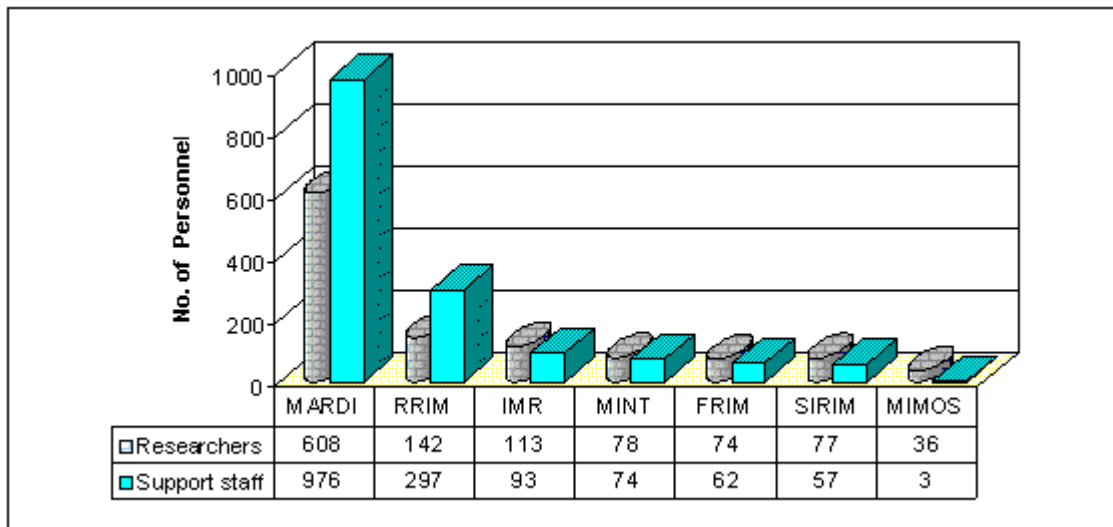
There were 528 research groups from 28 agencies reported employing R&D personnel in 1996. A total research effort (FTE) of 1,567.1 was reported with a total of 4,231 personnel (headcount) in 1996. This contributed to a reduction of 38.2% compared to the number of R&D personnel in 1994.

Fig. 5.4 illustrates the breakdown of 1,567.1 FTE contributed by the government sector, which was made up of 1,524 researchers, 687 technicians and 2,020 other support staff.



(Source : Table 5.3)  
 Fig. 5.4 Percentage of breakdown of FTE among R&D personnel

MARDI has the highest number of R&D personnel. This is followed by RRIM, IMR, MINT, FRIM, and SIRIM. MIMOS has only 36 researchers. Fig.5.4 illustrates the number of researchers and support staff for the selected agencies. The primary industry agencies as a group have higher ratio of support staff to researchers. As an example, the ratio of the support staff to researchers was 1.6:1 as in the case of MARDI but only 1:12 in the case of MIMOS.



(Source : Table 5.2)

Fig. 5.5 : The number (headcount) of researchers and supporting staff for selected GRIs

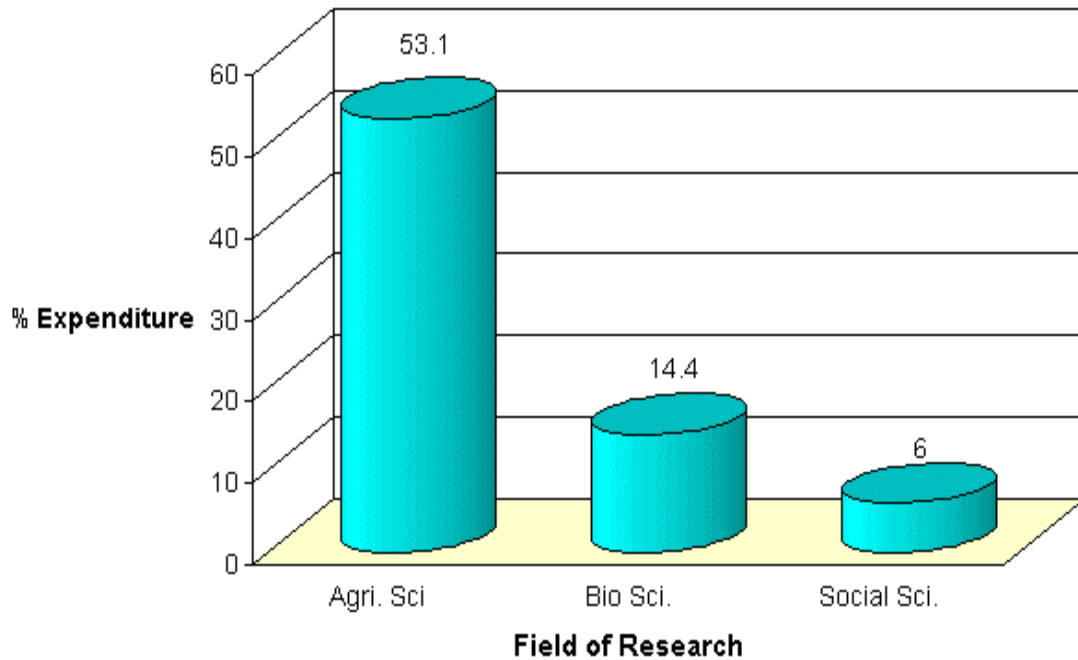
Focussing on the R&D researchers (FTE) only, about 31% of their efforts were actually focused into performing R&D activities. The government sector does not seem to be employing many foreign researchers in their R&D agencies. (i.e., only 0.7% of the total researchers in 1996).

The majority (about 65%) of the government researchers held degree qualifications or above. PhD holders constituted 2% of the total. The largest number PhD holders were from MARDI.

There were only 324 female government researchers in Malaysia in 1996, an increase of 27% compared to that in 1994. This constitutes 30% of the total government researchers. The largest group of female researchers worked in MARDI as did the largest group of male researchers.

### **5.3 R&D (FOR) Priorities**

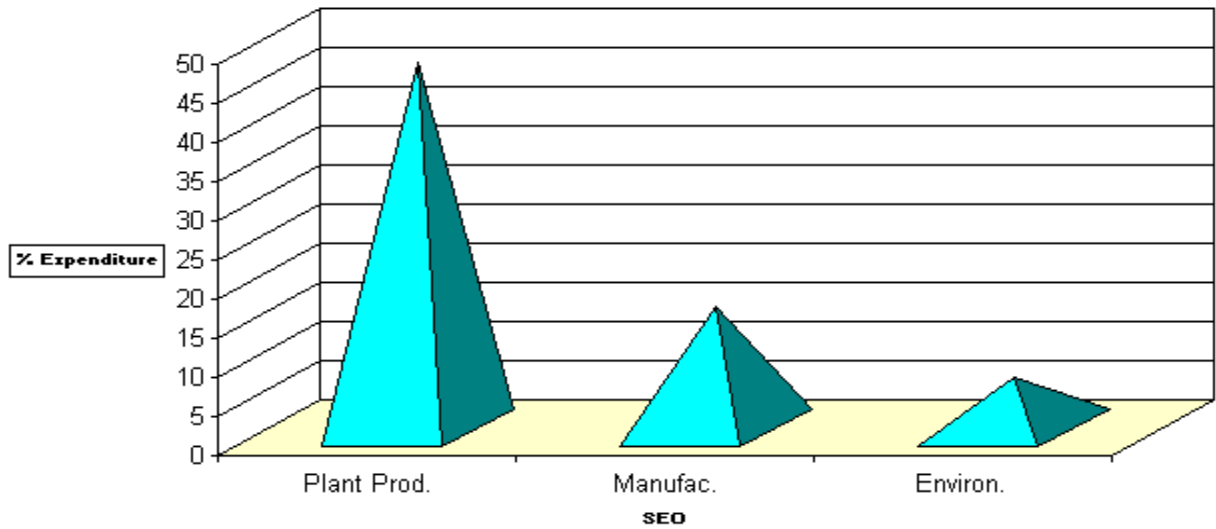
The GRIs research areas were overwhelmingly concentrated (53.2%) in agricultural Sciences. The second largest research area was Biological Sciences (14.4%) and followed by Social Sciences (6.1%) [see Fig. 5.5]. What is more interesting to note is that only 4.6% of GRIs research focus was in the field of Information, Computer and Communication Technologies despite the government's pronouncements of the sector's importance. The government's recent efforts to upgrade this research field did not result in a significant rise in the number of researchers in this field in the last two years.



(Source: *Table 5.4*)  
 Fig. 5.6 : Percentage expenditure for selected field of research (FOR)

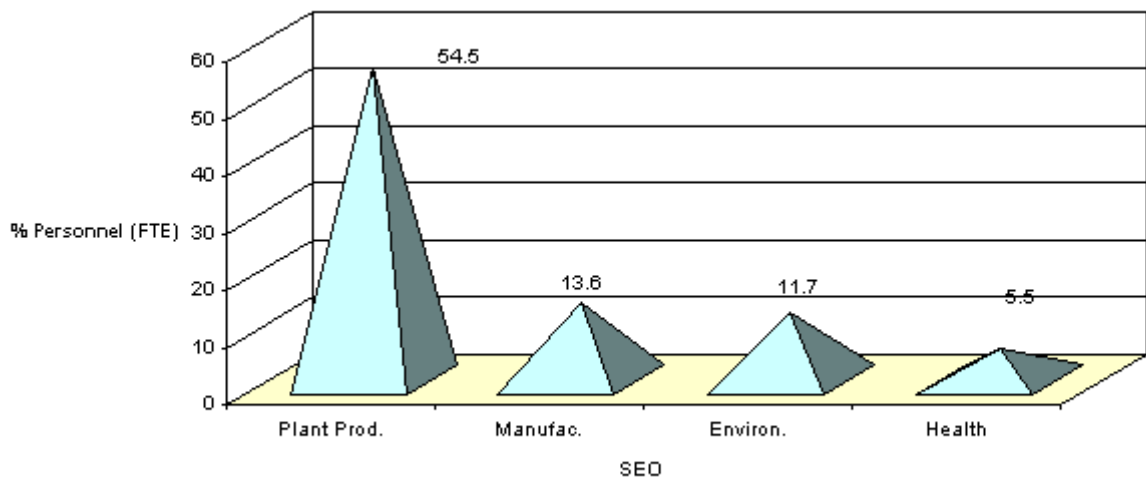
#### 5.4 Socio-Economic Objectives (SEO) of R&D

Plant Production and Plant Primary Products emerged as the top SEO of R&D in GRIs, contributing 46.7% of all expenditures [see Fig. 5.7]. Manufacturing was second (15.2%). Together they accounted for approximately 61.2% of total GRIs expenditures. Environmental Knowledge and Development (combined) contributed only 6.4%.



(Source : Table 5.6)  
 Fig. 5.7: Percentage of Expenditure for selected SEO

An almost similar pattern of SEO distribution can be seen in terms R&D personnel as illustrated in Fig. 5.8.



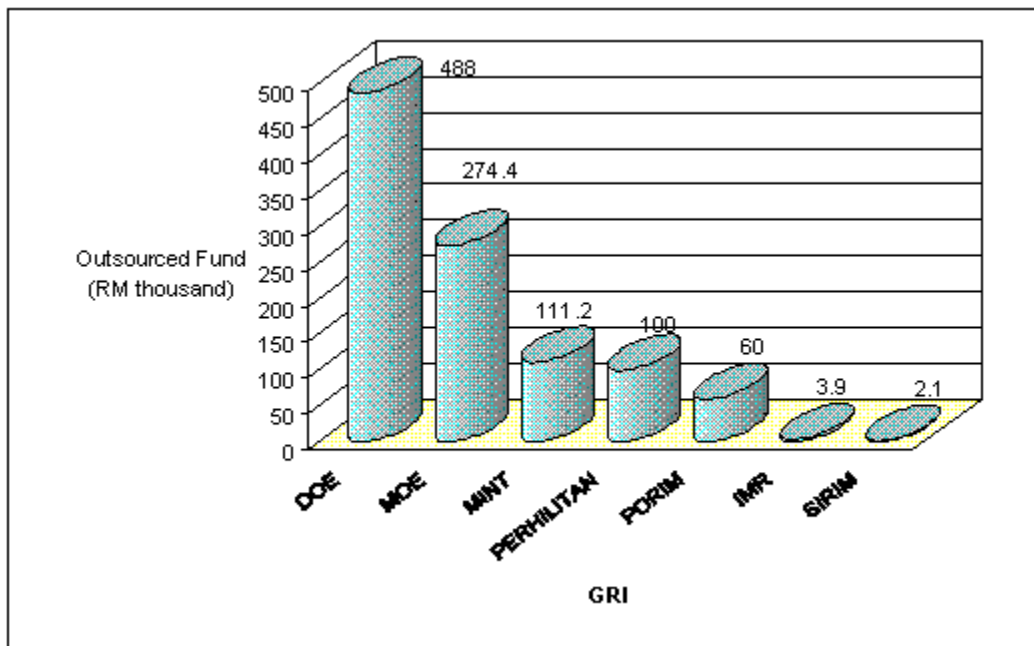
(Source : Table 5.6)  
 Fig. 5.8: Percentage of Research Personnel for selected SEO

### 5.5 R&D Labour Cost

In general, the GRIs spent around RM14,874 per research personnel in 1996. There was an increase of 19% compared to the cost per research personnel in 1994 [see Table 5.2]. The highest was RM51,609 per researcher at MIMOS Bhd. in the field of microelectronics (a field in which R&D activities are known to be costly).

### 5.6 R&D Outsourcing

There were nine GRIs which contracted out their funds to other institutions [see Fig. 5.9]. The total amount of contracted out funds was RM1.1 million. The Department of Environment (DOE) contributed the largest outsource fund amounting to RM488,000. This constituted a fairly significant reduction in fund outsourcing by the GRIs compared to the amount of RM10.4 million being contracted out in 1994.



(Source : Table 5.5)  
 Fig. 5.9: Amount of Funds Contracted Out by the GRIs

### 5.7 Factors limiting R&D Activities

Overall, 'delays in making decisions' was considered as the major factor that limited R&D activities internally in the GRIs. This is followed by two other factors which are ranked accordingly as follows:

Ranking	Internal Factor
---------	-----------------

1	Delays in making decisions
2	Current organisation structure
3	Lack of R&D management know-how

The external factors which were identified as the ones that limited R&D activities in the GRIs are ranked as follows:

<b>Ranking</b>	<b>External Factor</b>
1	Increasing capital cost
2	Lack of government incentives
3	Poor physical infrastructure support.