CHAPTER VI

FINDINGS AND CONCLUSION

The analysis in the foregoing chapter has revealed a number of fruitful findings in the area of research productivity of faculty members of the Science Departments in the University of Kerala. The major findings that have evolved from the discussion in chapter V are summed up here under various heads.

6.0 Major forms of literature

A total number of 2500 items are identified under five categories of forms of publication by faculty members. Of this journal articles are the main vehicle of information transfer of faculty members, which accounts 1542 (61.68 %), followed by conference papers 788 (31.52 %). Chapter in books are in the third position with 122 (4.88 %) items. Reports are 40(1.6 %) in number and text books are only 8(0.32 %).

6.1. Department-wise distribution of research productivity

a. conference papers

In the case of conference papers Department Percent)of Zoology is in the first place by contributing a total of 158 (20.05 %) items. Out of which 29 (21.97 %) papers are presented in International conferences. The second position goes to Department of Botany by producing 94 (11.93
papers. Out of which 12 (9.09 %) papers are presented in International Conferences. The third position goes to Department of Statistics contributing 92 (11.04 %) papers out of which 12 (9.09 %) papers are presented in International Conferences.

b. Journal articles

In the contribution of journal articles, first position goes to Faculty members in the physics Department by producing 306 (19.94 %) articles. Second place goes to Biochemistry Department by producing 288 (18.68 %) articles out of which 275 (20.93 %) articles are published in International Journals. Third position goes to Aquatic Biology by producing 258 (16.73 %) articles out of which 190 (14.46 %) articles are published in international journals. It is seen that lab-oriented departments have more publications, whereas non lab-oriented Departments such as Statistics, Demography, Mathematics and Geology have less number of publications.

c. Reports

In the contribution of reports, Demography Department is placed in the first position by producing 29 (72.50 %) reports. Geology Department produced 4 (10 %) reports and Botany and Aquatic Biology produced 3 reports each during the period under study.

d. Text Book

Department of Aquatic Biology produced 3 text books (37.5 %), Demography produced 2 (25 %) books and Biochemistry, Botany and Zoology contributed 1 (12.5 %) book each.
e. Chapter in books

In the contribution of chapter in books Zoology is in the first place by producing 24 (19.57 %) items. Aquatic Biology is in the second position by producing 23 (18.85 %) items and Physics is in the third position by producing 22 (18.03 %) items.

6.2 Year-wise distribution of research productivity

The year 1989 has the highest number of conference papers, ie 65 papers (8.25 %). In the case of Journal article 1981 recorded the highest number -138 (8.95 %). Reports are high in the year 1998. The year 1986 and 1990 share the top position in the category of text books. Contribution to chapter in books is in the top during the year 1990 and 98 (12).

A uniform growth or decline is not seen in the publication pattern of faculty members during the period under study.

6.3 Authorship pattern

Majority of the contribution is made by two authors ie 55.77 percent. It is followed by three authors contribution ie 22.89 percent. Single author contribution is only 12.26 percent.

It seems that collaboration research is common in science. The reason for having more publication with two authored papers may be due to the fact that it may be an ideal combination in preparing the paper by the researcher and the supervisor.
6.3.1 Department-wise analysis of authorship pattern

Department-wise analysis of authorship pattern shows that two-authored papers are more in most of the departments. But, in the Department of Statistics 71.93 percent of articles are contributed by single authors.

6.4 Gender-wise distribution of publication

In the case of Journal article, significant difference is seen only in 1981, 1982, 1983, 1984 and 1994 (5 years). In the case of contribution in regional journal there is no difference is seen between Male and Female. In the case of conference papers, difference is seen only in the case of National Seminar. Significance difference is not seen in the cases of Chapter in Books. Since the number of Research Reports and Text Books are less in number significance level is not tested.

6.5 Country-wise distribution of source journal

Out of 1542 articles, 964 (62.52 %) are published in 169 Indian journals. The second position with 182 (11.80 %) articles are published in 79 journals of US origin. The third position goes to UK with 153 (9.92 %) articles published in 54 journals.

6.6 Preference of journals for research reporting

Out of 408 journals, proceeding of Indian Academy of Science has got top position with 73 (4.73 %) articles Indian journal of chemistry scored the second position with 65 (4.21 %) articles and Indian
Journal of Biochemistry and Biophysics scored the third position with 61 (3.95%) articles each.

The Department preference shows that each Department has their own preference and there is no uniformity in selecting the journals for research reporting.

6.7 Faculty affiliation in publication

It is seen that only 171 (11.09%) articles have faculty affiliation in producing the paper. And also seen that the Department of Aquatic Biology is in the top in the case of faculty co-operation. Department of Demography, Statistics and Mathematics have not produced even a single paper in this category.

6.8 Individual productivity

Dr. V.K. Vaidyan (Physics) is the most productive faculty member with 1488 overall score. (He has produced 80 articles under the category of International papers). It is followed by Dr. N. Balakrishnan Nair (Aquatic Biology) with 1331 score points and Dr. Achutha Kurup. P (Biochemistry) with 1060 points scored the second and third positions respectively.

6.9 Ranking of faculty members

Dr. N. Balakrishnan Nair (Aquatic Biology) is in the first position with 221.8 points. The second and third positions are scored by Dr. Achutha Kurup. P. and Dr. Ittiyachan M.A. It is seen that those who found in the top of the list are senior professors.
6.10. Single authorship

Under the category of single-authored articles, Dr. Krishnan Moothathu T.S (Department of Statistics) is the most productive single author by producing 18 articles (AA-12, AB-3, AC-3). The second and third positions goes to Dr. O.V. Oomman (Zoology) and Dr. Prabhakaran Nair S.R. (Physics).

6.10.1 Gender-wise analysis of single authored items.

Out of 189 single authored articles 167 (88.36 %) articles are contributed by male members and 22 (11.64 %) articles are contributed by female members.

6.10.2 Department-wise analysis of single authorship

Department-wise analysis of single authored articles shows that Department of Statistics is in the first position with 41 (21.69 %) articles. Second and third positions goes to Zoology and Physics with 32 (16.93 %) and 29 (15.34 %) articles respectively. Single authored items are very few in the Department of Biochemistry (5) Chemistry (10) and Mathematics (11).

6.11 Principal authorship

Out of 1542 Journal articles contributed by faculty members are found as principal authors only in 432 (28 %) items. From among this Dr. N. Balakrishnan Nair (Aquatic Biology) is in the first place by appearing the Principal position of author field in 24 articles. The second position goes
to Dr. Krishnan Moothathu (20) and third position is with John C.P. (15). Department of Aquatic Biology is in the top position by producing 67 (15.51 %) articles in this category. The second position goes to the Department of Botany by producing 59 (13.66 %) articles and the third position goes to the Department of Physics with 57 (13.19 %) articles.

Professors contributed 194 (44.91 %) articles as principal authorship while Readers and Lectures contributed 137 (31.71 %) and 101 (23.38 %) articles respectively. 377 (87.26 %) articles are contributed by male faculty members and 55 (12.73 %) articles are contributed by female members.

6.12. Productivity and time interval

Out of 1710 authorship, Professors found 973 (56.90 %) Readers found 467 (27.31 %) and Lecturers found 270 (15.79 %).

6.12.1 Time Interval by position

Mean year taken to bring out one article by a Lecturer is 0.915, Reader is 0.906 and Professor is 0.471.

A Professor may have more publications because, probably he will be in the author field in all publications published by the scholar under his guidance. More over, the experience and knowledge gained by a professor may help to publish more.
6.12.2 Gender – wise analysis of time interval

The time taken by a male member for the publication of an article is 0.607 mean year where as a female member need 0.944 mean year. The t tests shows that there is a significant difference at 1 percentage level between a male faculty member and female faculty member.

In the category of Lectures the difference is, Male - 0.688 and female 1.631 mean years.

In the category of Readers the difference is, male - 0.831 and female 1.369 time. In the category of Professors time taken for the publication of an article is male - 0.480, female 0.416.

Except in the category of Professors, there is a significant difference between the time taken by male and female faculty members to bring out a publication.

6.12.3 Time taken for the first publication

A Lecturer need 2.222 mean years, A Reader need only 1.771 mean years and a Professor need only 0.708 mean year to bring out the first publication after joining the service. The t-test shows that there is a significant variation between these three categories. Professor is entirely different from the other categories of teachers who need only little time for the publication of the first article. This may be because of the experience he/she earned through the service and research guidance.
6.12.4 Gender-wise analysis for the first publication after joining the University service.

A male Lecturer working in the Science Department need 1.793 mean years for the publication of the first article whereas a female lecturer need 3.00 years for the publication of the first article.

A male Reader need 1.750 mean years and a female Reader need 2.000 mean years to bring out the first publication.

6.12.5 Time Interval for Publication Vs Department

Mathematics, Demography and Geology need 3.045, 3.143 and 1.911 mean years respectively, whereas Physics and Biochemistry Departments need only 0.430 and 0.443 mean years respectively. Aquatic Biology need only 0.561 mean year for the publication of an article.

There is a significant variation at 1 percentage level and it is seen that the lab oriented Departments such as Physics, Biochemistry, Aquatic Biology and Chemistry need less time for the publication than non lab oriented Departments such as Demography, Mathematics and Geology.

The Departments where theoretical nature of work is more, naturally produce less number of papers than experimental nature of work like Departments of Physics, Chemistry, Botany, Biochemistry and Zoology.

The position-wise analysis of publication shows that those who are working in a higher position need lesser time to bring out an article than
lower level. However F test indicates that significant variation is seen only in the department of Botany, Biochemistry, Aquatic Biology and Physics. The mean interval in the publication between two articles are much higher in the case of the department of Demography and Mathematics.

It is also seen that female members need more time than male members.

6.13 Age and productivity

The age group of faculty members up to 40 is the most productive group. This age group has an average productivity of 7.95 articles. The age group of 51 - 55 is in the second position with an average of 7.87 articles. The age group of 46-50 is the least productive group. i.e. an average of 5.17 articles. It seems that the initial enthusiasm in research productivity is not seen in the later years. Up to 40 may be the period of research work carried out by the faculty member leading to Ph.D. Early 50s may be a period of higher post with a supervisory capacity can produce more. After late 50s a senior professor may not able to concentrate on his research work due to administrative responsibilities.

6.14. Factors of productivity

The impact of variable such as Sex, Age, Service and position to productivity was analysed. It is seen that the above variables have only 4.6 Percent of influence in productivity. The selected variables have more influence on the publication pattern of non lab oriented departments such as Geology, Demography and Mathematics. In lab oriented departments
the influencing factor for research productivity may be the infrastructural facilities of the laboratory, library and funding etc.

6.15. Objectives and the hypotheses

The study was started with the following hypotheses.

1. Lab-oriented departments have more publication than non-lab oriented departments.

2. Female faculty members need more time to bring out research publication than male faculty members.

3. Multiple authorship is a common nature in scientific research.

The above findings and discussions are fruitful in substantiating the objectives of the study. The findings have also tested and substantiated the validity of the hypotheses formulated in the study.

6.16. Suggestions

The findings of the study may be useful to the University administrators and service level academician to formulate appropriate policies and strategies to improve research activities so as to achieve the objectives of the University. A few suggestions are given here which would be helpful to improve the mitigating research activities in the university system.

1. To formulate a research policy at the University level.
2. Specific steps to be taken for the enhancement of the research productivity of female faculty members, as a social measure since they need more time to bring out publication.

3. Facilities to be enhanced to undertake major projects and to avoid unwanted administrative delays.

4. The tested variables such as age, sex, service, designation have only 4.6 percentage of influence in productivity, especially in the lab orientated departments. The major influence to productivity may be laboratory and library facilities for research publication. Hence it is necessary to enhance the laboratory and library facilities to improve research productivity.

5. The productivity rate is much higher in experimental research areas of the university Departments. New areas of such division to be identified and more facilities to be provided to such areas to promote research activities. The inter disciplinary research is a common nature of present day research. Hence a separate division is needed to formulate policies and strategies of research allocation at University level.

6. It is seen that there is no follow up after the publication of research findings. Hence a separate division of technology transfer is needed to co-ordinate further steps and develop liaison with industrial and commercial organisation, so that it will encourage the faculty members to concentrate more in research activities.
6.17 Related areas for further research

1. The impact of laboratory and library in research productivity.

2. Relation between funding and research productivity

3. Finance, Research projects and productivity : A correlation study

4. Impact of I.T. on productivity of Faculty members in Science Departments.

6.18 Conclusion

The study related to University faculty members reveal the research productivity and its characteristics in detail during the period under study. The strength and weakness of research areas, method of research reporting and its growth pattern etc. are given. The study may give an insight to take judicial steps to formulate research policy and planning at University level for a productive and meaningful research activity in the University.