RESEARCH OUTPUT OF SCIENCE AND TECHNOLOGY FACULTY MEMBERS OF MIZORAM UNIVERSITY

A dissertation submitted in partial fulfillment of the requirement for the Degree of Master of Philosophy in Library and Information Science

Submitted by

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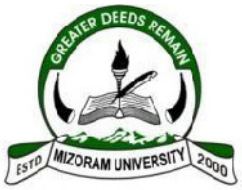

DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE

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D E C L A R A T I O N

I, **R.Lalengmawia**, hereby declare that the subject matter of this dissertation is the record of the work done by me, that the contents of this dissertation did not form the basis of the award of any previous degree to me or to do the best of my knowledge to anybody else, and that the dissertation has not been submitted by me for any research degree in any other University/ Institute.

This is being submitted to the Mizoram University for the degree of Master of Philosophy in Library and Information Science.

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C E R T I F I C A T E

This is to certify that Mr. **R. Lalengmawia** has completed the dissertation entitled "**RESEARCH OUTPUT OF SCIENCE AND TECHNOLOGY FACULTY MEMBERS OF MIZORAM UNIVERSITY**" for awarding the degree of Master of Philosophy in Library and Information Science under my supervision. This is the candidate's original work and worthy of examination.

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Place: Tanhril, Aizawl (R. LALENGMAWIA)

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ABBREVIATIONS

Term	Description
AACR2	Anglo-American Cataloguing Rules II
AACSB	Association to Advance Collegiate Schools of Business
ALA	American Library Association
ANNU	An-Najah National University
DDC	Dewey Decimal Classification
DLSU	De La Salle University
DST	Department of Science & Technology
D. Litt.	Doctor of Literature
DUT	Durban University of Technology
EE & RD	Extension Education and Rural Development
FIST	Fund for Improvement of S&T Infrastructure
HAMP	Horticulture, Aromatic and Medicinal Plants
ICT	Information & Communication Technology
ID	Identification
IF	Impact Factor
IT	Information Technology
LCSH	Library of Congress Subject Headings
M. Phil	Master of Philosophy
NRC	National Research Council
NEHU	North-Eastern Hill University
PG	Post Graduate
Ph.D.	Doctor of Philosophy
RFID	Radio Frequency Identification
SAP	Special Assistance Programme
SDR	Survey of Doctorate Recipients
SES&NRM	School of Earth Sciences & Natural Resources Management
SFAAFT	School of Fine Arts, Architecture & Fashion Technology
SET	School of Engineering and Technology
S&T	Science & Technology
SEMIS	School of Economics, Management & Information Science
SEH	School of Education & Humanities
SLS	School of Life Sciences
SPS	School of Physical Sciences
SSS	School of Social Sciences
UG	Under Graduate
UGC	University Grants Commission

CHAPTER- I

INTRODUCTION

1.1 Introduction

Research is a continue process, in which we search for truth or try to reach near the reality. Research highlights new problems, collects data or information about those problems draw conclusions and make recommendations. Researcher carefully investigates data, analyze data, explain data and verify the facts. Research corrects the mistakes, add and advance the knowledge. Knowledge gained through research is always objective and scientific. Research based knowledge is always logical, rational and based on experience. According to Rashid (2001), research is a conscious effort to collect information, to verify the information and to analyze the information. Research is an organized effort to solve the complex and teasing problems. It is generally accepted that research plays a critical role in promoting the prosperity of a nation and the well-being of its citizens in this knowledge-based era (Abbott & Doucouliagos, 2004). Creswell (2008) reported that research not only aids solving practical problems and brings about material improvements, but it also provides insight into new ideas that improve human understanding of various social, economic and cultural phenomena.

Research has always been the main approach to solving problems by all categories of professionals' right from the ancient times (Boaduo & Babitseng, 2007). According to Rashid (2001), "*research is a conscious effort to collect, verify and analyze information. Research can be understood as having two broad components, namely, knowledge creation and knowledge distribution*". Ochai & Nedosa (1998) asserted that the fruits of research are new knowledge and facts, which are communicated to the academic community through scholarly publications and seminars.

Universities across the world are considered as producers of new knowledge and considered as modern entrepreneurial engines and generators of knowledge through research. Hence, the role of university is not limited to teaching. McCabe and McCabe (2000) noted that academic staff members in any higher institution, especially universities, are provided the opportunity to focus on an area of inquiry, develop a research program and later share the knowledge with students and others in the drive to develop professional skills and impact on a field and society, as a whole. Research provides a good platform for teaching faculty members to become successful academician. This is because research develops academic knowledge and

reinforces the skills needed for effective knowledge transfer. It also inspires academics towards hard work, fills the gaps of previous researches, and creates an opportunity for future research.

In recent years, there has been increasing interest among researchers and policy makers in the notion of research output. Research output is one of the major measures of university academic performance and a core indicator for calculations of university rankings. A number of studies have tried to compare research output across countries or academic disciplines and to explore the main factors that enhance the research output of faculty members. Research plays a critical role in promoting the prosperity of a nation and the well-being of its citizens. Universities through research make important contributions to the growth and development of industries and government businesses, thereby promoting national and global development.

Research output is combination of two words "Research" and "output. "Research" means very careful, observant, and vigilant study or investigation of phenomena, particularly to search and find out new particulars, information and facts while "output" means production or output, produced in duration of time. Both the words means different to different people. With reference to higher education, research output means publications of papers in professional journals, in shape of books or presentation of research papers in conference proceedings. To work on projects, publication of monographs, development of experimental designs, production of artistic or creative works. Research output and research activity are interrelated. According to Creswell (1986), "*research output includes research publications in professional journals and in conference proceedings, writing a book or chapter, gathering and analyzing original evidence, working with post-graduate students on dissertations and class projects, obtaining research grants, carrying out editorial duties, obtaining patents and licenses, writing of monographs, developing experimental designs, producing works of an artistic or creative nature, engaging in public debates and commentaries*".

Most of the research output of academics is disseminated via publications. Research publications enable academics to earn recognition in academic circles locally and internationally. In higher education, research output often served as a major role in

attaining success in academics circles as it is related to promotion, tenure, and salary. Research output has been defined as the relationship between the outputs generated by a system and the inputs provided to create those outputs. It may also include the term 'efficiency' and more importantly 'effectiveness', which measures the total output or results of performance (Turnage, 1990). Print & Hattie (1997) define research output as 'the totality of research performed by academics in universities and related contents within a given time period' (p.454), and research efficiency has been defined as the output of research per unit of input resource (Kostoff, 1995).

In universities, recognition and advancement of individual academic staff members depend largely on the quantity and quality of their research productions, which are communicated in the form of journal articles, books, technical reports, and other types of publications. There has been no concrete definition of what research output is. Numerous studies were already conducted focused on this topic with various indicators of measurement. William, as cited by Wichian et al. (2009), noted that "*research output could be defined in terms of research product and research effort, to the extent of which a researcher produces*". Most studies measured research output by calculating a composite indicator derived by summing up the number of finished research reports, number of published research reports, and number of utilized research report. The measurement of research output could be different, depending on the weights given to each indicator. Individual research output is defined as output divided by career years. Wherein researcher's output is defined as the sum of the scores of all articles written over his or her career (Fabel, Hein & Hofmeister, 2008). In the normal count, the output of each author and institution was calculated according to how many times they appeared in the database (Huang & Hsu, 2005).

1.2 Scope of the Study

The present study is confined to Science & Technology faculty members of Mizoram University, Aizawl. The number of Science & Technology departments covered under study is given in table 1. There are 99 faculty members belongs to 17 Science & Technology departments under 5 Schools of studies under Mizoram University. Further faculty members research output will be measured for last 5 years from the year 2009-2014 academic years.

Table 1.1: Science & Technology Departments, Mizoram University

SN	Science & Technology Departments	School of Studies
1.	Botany	School of Life Sciences
2.	Zoology	
3.	Biotechnology	
4.	Physics	School of Physical Sciences
5.	Chemistry	
6.	Mathematics & Computer Sciences	
7.	Geology	School of Earth Sciences & NRM
8.	Forestry	
9.	Environmental Sciences	
10.	Geography & Resource Management	
11.	Horticulture, Aromatic & Medical Plants	
12.	Information Technology	School of Engineering & Technology
13.	Computer Engineering	
14.	Electrical Engineering	
15.	Electronic & Communication Engineering	
16.	Civil Engineering	
17.	Planning & Architecture	School of Fine Arts, Architecture & Fashion Technology

1.3 Significance of the Study

There are number of scientometric studies conducted to access the research output of various departments, institutions, universities and faculty members individually. In the case of Mizoram University, no scientometric study has been conducted so far. So, the present study is an attempt to fill up the gap. Therefore, the study is an attempt to investigate the research output of Science & Technology faculty members of Mizoram University. Information regarding factors that influence research output of academic staff in universities will be of interest to a large number of institutions that are currently dealing with ways to retain their academic status in the global university community. Although, this study concentrates upon one university for reasons of economy and scale, the investigation has been designed in such a way as to be useful to a wide range of situations, particularly where demographic and cultural factors are similar to the studied institution.

The main aim of the study is to provide information that will assist in the design, development and formulation of institutional research policies in the changing global situation, and in particular to highlight those factors that should be emphasized in order to further encourage academic staffs to increase their research output. It is

anticipated that this investigation will provide new perspectives on this issue. Such information is vital to this study for improving higher education research output. To most effectively achieve this aim, the various obstacles to increasing the output for faculty members need to be identified in their own terms. This study has been designed to address these issues, and will solicit information directly from faculty members regarding their perceptions of reasons for non-participation in research output, and to invite suggestions about the ways to overcome these obstacles. The results of this study will provide benefits to the studied departments and university. Further, present study will help to show the current trend of research output of faculty members as well as display the various forms of research output. The research output status will help the faculty members to assess themselves for further improvement upon research output.

1.4 Review of Literature

Cele et al. (2014), studied various factors contributing to the level of research output at the Durban University of Technology (DUT), and were investigated by the research and their implications to the University were also examined. Data are collected from six faculties at DUT, stratified sample of 60 respondents were used with the sample consisting of 30 experienced researchers and 30 emerging researchers selected from the academic staff. Respondents were asked to complete a 5-point Likert scale questionnaire with the help of an interviewer. Results of the study reveal that the majority of respondents indicate various factors, including individual and institutional elements, as the main barrier to participate in doing research.

Kipchirchir (2014) examined the influence of postgraduate students' personal characteristics on their research output of Kenya's Moi University specifically the Faculty of Education. Study involved 4 departments within the School of Education with 285 postgraduates out of 1148. Eight postgraduate alumni and three HODs were also included in the study. Study concludes that low research output were due to poor attitude and lack of interest in research by postgraduates. It was also observed that low research skill experience and training too significantly lowered research output. Roleda et al. (2014) conducted a survey to measure the research productivity of some academic departments at De La Salle University (DLSU) in Scopus database; and found that research productivity output includes journal publications, conference

papers, books, and monographs. Sweileh et al. (2014) assessed the scientific research productivity of the An-Najah National University, Palestine based on Scopus database. Bibliometric analysis was used to identify the pattern of publication, relative growth rate, authorship pattern, collaborative measures, author's productivity, most prolific authors, and most prolific journals. For the 791 published documents, total 4553 citations were received with an average of 5.8 citations per document. Approximately 50% published documents have foreign collaborations with 59 countries. Research output of university showed steady growth over the years and it was high in certain scientific disciplines than others.

BayJr et al. (2013) investigated the possible relationships of two factors to research productivity among faculty members of the College of Dentistry at Lyceum of the Philippines University-Batangas. The findings indicate that Dentistry faculty members have low research productivity as evidenced by its research production, with only five of them having completed a research paper as main author and only one as co-author whereas institutional support was higher than the departmental support for conducting research. Further respondents were most confident with the technical part in research writing, but least confident in writing the methodology. Organizational support towards research activities and faculty members' confidence in writing the paper were not indicators associated with research productivity.

Okiki (2013) assessed the level of research productivity of teaching faculty members in Nigerian federal universities. The findings of the study show that the research productivity of the teaching faculty members in Nigerian federal universities is high in journal publications, technical reports, conference papers, working papers, and occasional papers. Further, research productivity is higher in Northeast, and Southwest, and North Central Nigeria. Low Internet bandwidth and financial constraint are the barriers to research productivity. Aswathy & Gopikuttan (2013) analyses the publication pattern of faculty members of three universities in Kerala viz., University of Kerala, Mahatma Gandhi University and University of Calicut. The year-wise growth has been observed in number of publications as well as multi-authorship dominates among university teachers; and statistically there is no significant difference between the experience and productivity. Increase in the age and experience results more collaboration. Jung (2012) examined the research

productivity of Hong Kong academics, specifically study explored the individual and institutional factors that contribute to their productivity as well as compared determinants across academic disciplines. Study found that Hong Kong academics are highly internationalized in terms of research activities. Moreover, research productivity is influenced by a number of factors, including personal characteristics, workload, differences in research styles, and institutional characteristics. In addition, considerable variation exists regarding the determinants of research productivity across disciplinary categories.

Chen et al. (2010) surveyed 367 accounting faculty members from AACSB accredited colleges of business to examine their research productivity, and intrinsic and extrinsic motivators to conduct research. Wide differences in research productivity were observed in the faculty associated with doctoral vs. non-doctoral granting programs. There were some common motivators of research for faculty in the two sets of programs; however some interesting differences were also noted. Of the thirteen rewards studied, receiving or having tenure is the most important reward, while getting a possible administrative position was the least important. There were significant differences in the importance of these rewards between tenured-untenured and between male-female faculty members. Faculty perceives a strong link between research productivity and the attainment of the rewards of tenure and of promotion. However, in the minds of the faculty, the link between publications and salary increases is not strong. Fabel et al. (2008) had drawn a comprehensive dataset that collects the research output of business economists employed by Austrian, German and Swiss universities and computed the research rankings of departments and identified the leading departments in selected sub-disciplines. Moreover, investigated that how institutional design and individual characteristics affects research productivity and how to draw some conclusions for the training of junior scientists.

Lertputtarak (2008) investigated the factors related to research productivity in a Public University in Thailand. She observed five important factors related to research productivity that can be conveniently divided into three main groupings which had been termed the essential factors, desirable factors, and side-affect factors. Rodgers & Neri (2007) investigated why some economics departments in Australian universities are more research productive than others. They formulate the hypothesis that research

productivity depends upon the human capital of department members and the department-specific conditions under which they work. Tobit model was used to estimate the magnitude of the two effects and both were found to be important.

Young et al. (2006) examined the participation of family physician residency faculty in research, their protected time, and their research output and how these varied by program type. This was a cross-sectional survey of all family medicine residency programs in the United States. Majority of programs reported at least one family physician who participated in research, though the medical school-based programs reported a higher total number of faculties than the community-based, medical school affiliated programs and percentage of faculty. Substantially more MSB programs had at least one family physician with significant protected time for research. It has been found that only about half of the family medicine residencies produced any nationally recognized research over a 3-year period and that this represented only a small improvement over the last 10 years. Further findings suggest that more support is needed if research is to become an integral part of the culture of family medicine. Bland (2005) conducted a study on theoretical, practical, and predative model of faculty and department research productivity and found that numerous characteristics impact faculty research productivity. The study tested the ability of the Bland et al. (2002) model – based on individual, institutional and leadership variables influencing faculty research productivity, to explain individual and group (department) research productivity within the context of a large medical school.

Iqbal & Mahmood (2001) studied factors related to low research productivity at higher education level. About 232 male and female faculty members were selected for the study through the stratified sampling technique. Further concluded that extra teaching load, performance of administrative duties along with academic duties, lack of funds, non-existence of research leave, negative attitude of the faculty towards research, lack of research skills, non-availability of latest books, absence of professional journals, less number of university own journals, are the major causes of low productivity and reduced the research productivity of the university faculty members. Levin & Stephan (1991) analyzed the relationship between age and the publishing productivity of Ph.D. scientists using data from the Survey of Doctorate Recipients (National Research Council) and the Science Citation Index. The

longitudinal nature of the data allows for the identification of pure aging effects. In five of the six areas studied, a life-cycle aging effect was present. Only in particle physics, where scientists often speak of being on a "religious quest", there is indication that scientific productivity is not investment-motivated. Vintage effects were also considered. The expectation that the latest educated were the most productive was not generally supported by the data.

Banal-Estanol et al. (2009) studied university projects and research collaboration projects with industry that are supported by government grants. They found that universities focus on more basic ventures when they develop projects alone and that the collaboration with firms increases the quantity and quality of the research output only when the firms' characteristics make them valuable partners. Harzing (2005) investigated publication patterns of Australian academics in Economics & Business. Findings showed that this discipline follows the general Australian trend of declining impact, measured as citations per paper, from the mid-1990s. However, the gap in Australia's ranking of publication quantity (number of papers) and publication quality (impact) is much wider in Economics & Business than in other disciplines. The discipline combines the highest ranking in quantity with the lowest ranking in quality. Seven possible explanations for this pattern were also discussed. Williams (2010) measured the research output of newer Australian universities based on Thomson Reuters ISI and Scopus databases and found that there had been some convergence in research publications with the newer universities catching up on the traditional research-intensive universities. Abbott & Doucouliagos (2003) explored the links between research output, research income, academic and non-academic labor and some of the characteristics of Australian universities. Findings indicated that research income, academic staff and post-graduates were all positively associated with research output. Further, there were noticeable differences across different types of universities, with the newer universities lagging in research performance. Hirsch (2005) made an effort to quantify an individual's scientific research output and finally proposed *h-index*, defined as the number of papers with citation number higher or equal to *h* as a useful index to characterize the scientific output of a researcher.

1.5 Research Design

1.5.1 Statement of the Problem

Although there is clear evidence that administrators at many institutions together with academic staff realize the importance of research within the university structure, there is still an unacceptably low level of research output. Why some faculties produce research year after year while others do not conduct any research is a 'puzzle' (Creswell, 1985). The current climate in higher education threatens the university's ability to sustain the conditions that support research achievements. Increased demands on government funding, a deteriorating physical infrastructure, increased pressure on undergraduate and postgraduate programs have raised concerns about the continued capacity of universities to maintain teaching, research output and service to the state.

Higher Education needs to be taken to the next level by motivating the new generation faculty members to raise their levels of output in terms of innovation in research. In the connected world of the knowledge era, forging meaningful linkages between academics towards raising the overall quality in research was the need of the hour. This prompted to undertake as research problem to find out the research output of Science & Technology faculty members of Mizoram University.

1.5.2 Objectives of the Study

The objective of the study was to investigate the research output of Science & Technology faculty members of Mizoram University, Aizawl. The specific objectives for the study were to:

a) Find out the trend & growth of research output of faculty members of Science & Technology department under Mizoram University.
b) Find out the forms of research output of the faculty members of Science & Technology.
c) Examine the socio-demographic characteristics of faculty members of Science & Technology.
d) Find out the inhibitors to faculty members on their research activities.

1.5.3 Research Methodology

The study was designed to investigate the research output of Science & Technology faculty members of Mizoram University. The total population for the study was 99 faculty members belong to Science & Technology Departments. Therefore, the survey

and questionnaire methods of research were being found to appropriate to undertake the study.

- Survey method: Survey had been made from Mizoram University Annual Report & University Website to gather information about the research output of faculty members under study.
- Questionnaire method: Further, scholar explored the measures to obtain information through questionnaire method to know the research output and its related problems faced by the faculty members.

The data obtained were tabulated and analyzed according to their effectiveness by the use of suitable statistical package.

1.6 Chapterization

The present study has been tentatively divided into the following chapters:

Chapter 1 "Introduction" gives an introduction to the meaning and importance of research output.

Chapter 2 "Mizoram University Profile" highlights about Mizoram University; schools and departments of Mizoram University; central library, library sections, library services and facilities, and new initiatives in central library.

Chapter 3 "Research Output" gives the measurement of research output, model of faculty research output and individual, institutional and leadership characteristics that facilitate research output.

Chapter 4 "Data Analysis and Findings" highlights the tables of data and its findings through questionnaires from the Science & Technology faculty members of Mizoram University.

Chapter 5 "Conclusion and Suggestions" deals with the conclusion of the whole study and suggestions for the research output of Science & Technology faculty members of Mizoram University.

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CHAPTER- II

MIZORAM UNIVERSITY PROFILE

2.1 Introduction

North East India comprises of eight states consisting of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim; and all the states form a part of the East Himalayan region which extends from Sikkim eastwards and embraces the Darjeeling Hills of West Bengal. Mizoram is a mountainous region which is sandwiched between Myanmar in the East and the South and Bangladesh and Tripura in the West with its northern frontiers touching Assam and Manipur states. It was one of the districts of Assam until 1972 when it became a Union Territory. Mizoram University campus is located at Tanhril, which is 17 kilometers away from Aizawl city, the capital and headquarters of Mizoram.

2.2 Mizoram University: An Overview

Mizoram University was established on 2nd July, 2001 by the Mizoram University Act, 2000 which appeared in the Gazette of India (Extraordinary) on 25th April, 2000 as a Central University having His Excellency, the President of India as its Visitor. The objectives of the University, as laid down in the Act are "to disseminate and advance knowledge by providing instructional and research facilities in such branches of learning as it may deem fit, to make provisions for integrated courses in humanities, natural and physical sciences, forestry and other allied disciplines in the educational programs of the University; to take appropriate measures for promoting innovations in teaching-disciplinary studies and research; to educate and train manpower in the development of the state of Mizoram; and to pay special attention to the improvement of the social and economic conditions and welfare of the people of that State, their intellectual, academic and cultural development". Keeping these objectives in view, Mizoram University has embarked on various programs/schemes in terms of academic and administrative development.

The jurisdiction of Mizoram University extended to the whole of Mizoram, the erstwhile jurisdiction of Mizoram Campus of North Eastern Hill University, Shillong which functioned till 1st July, 2001. University at its inception inherited the following from North Eastern Hill University (NEHU) under which it had functioned as Mizoram Campus for 24 years since 1979.

- 7 Post-Graduate Departments under 4 Schools of Studies.

- 21 teaching faculty, 96 supporting staff, and a total enrollment of 398 PG students.
- 31 Affiliated Colleges including 1 Constituent College and an approximate total enrollment of 5200 students at the UG level.
- 5 Academic building blocks and a cluster of 4 others.

Mizoram University in the current scenario has changed immensely since the recent move of the main administration to its permanent campus at Tanhril. The University is now well consolidated in its main campus. The permanent campus of Mizoram University rests on a plot of land measuring 978.19 acres with its lush greenery and scenic hills, leased by the Government of Mizoram at Tanhril. At present, there are 28 UG Colleges including 1 constituent college, 2 professional institutions affiliated to the University.

2.3 Schools and Departments of Mizoram University: An Introduction

There are altogether 8 different schools of study constituting 33 various academic departments covering the streams of Humanities, Science, Social Science, and Engineering etc. The following are the list of different schools with different academic departments attached to the respective schools.

a) School of Economics, Management & Information Science (SEMIS)

There are 5 departments under the School of Economics, Management & Information Science at present. They are the Departments of Economics, Commerce, Library & Information Science, Management, and Journalism & Mass Communication. Economics Department is one of the oldest departments in the University. It was started in 1979 during the era of the then North Eastern Hill University, Mizoram Campus. The youngest Department under the School is Journalism & Mass Communication which was started from 2011 academic session.

b) School of Education & Humanities (SEH)

The School of Education & Humanities came into existence in 2001 with the establishment of Mizoram University. The School has so far consisted of 4 Academic PG Departments namely Education, English (both established in 1979), Mizo

(established in 1997), and Hindi (established in 2010). All the academic departments under the School are actively engaged in teaching, research and extension activities.

c) School of Social Sciences (SSS)

The School of Social Sciences came into being as an entity in the year 2002. The School consists of the Departments of Political Science, Public Administration, Psychology, History & Ethnography, Social Work and Sociology.

d) School of Earth Sciences & Natural Resources Management (SES&NRM)

The School which was set up by the name of "School of Forestry & Earth Sciences" in 2002 was changed to the "School of Earth Sciences & Natural Resources Management" in 2006. The School comprises of 6 academic departments such as the Departments of Forestry, Geology, Environmental Science (the then Forest Ecology, Biodiversity & Environmental Sciences), Geography & Resource Management (the then Geography, Tribal Culture & Resource Management), Horticulture Aromatic & Medicinal Plants (HAMP), and Extension Education & Rural Development (EE&RD). Mizoram University is the only University which offers M. Sc. in Forestry and M. Sc. in Horticulture Aromatic & Medicinal Plants in North-East India.

e) School of Life Sciences (SLS)

The School of Life Sciences was established in 2006 with the creation of three academic departments namely Botany, Zoology, and Biotechnology. The School of Life Sciences has been selected by Department of Science & Technology (DST) for FIST and UGC for Non-SAP programs.

f) School of Physical Sciences (SPS)

The School of Physical Sciences was established in 2006. Presently, there are 3 academic departments under the School. They are Department of Physics (established in 2003), Department of Chemistry (established in 2005), and Department of Mathematics & Computer Science (established in 2007).

g) School of Engineering & Technology (SET)

The School was set up in 2007. There are 5 academic departments under the School namely, Department of Information Technology, Department of Electronic &

Communication Engineering, Electrical Engineering, Civil engineering, and Computer Engineering. The School is in the process of setting up a Central Engineering Workshop.

h) School of Fine Arts, Architecture & Fashion Technology (SFAAFT)

This school was set up in the year 2011. The Department of Architecture was established in May 2013.

2.4 Central Library, Mizoram University

A library is an organization that promotes the use of sources of information. According to ALA Glossary of Library and Information Science, a university library is defined as "a library, or system of libraries, established, supported and administered by a university to meet the information needs of its students and faculty and support its instructional, research and service programs." Dr. Shankar Dayal Sharma, the then Vice President of India, while delivering his speech at the 8th World Book Fair in 1988 stated quite rightly that "a library is more important than a university because a library can function without a university, whereas a university cannot do without a library." University library is the heart of academic pursuits, directly as regards its research work, and indirectly as regards its teaching work, which derives its life from research work. Therefore, quality education and research is impossible without a quality library. One of the fundamental ways of improving the quality of research work is to facilitate and support the processes of creating, accessing and using information and knowledge. The world of scholarship has changed dramatically in the last decade. Information and Communication Technology (ICT) are the catalysts of this change. Electronic resources have provided the power to get information timely and manage information more effectively and also the means to dissolve barriers and offer equity of access to knowledge and information. University library is, thus an important organization maintained by a university to support and promote its teaching, research, extension and publication programs.

Mizoram University Central Library started along with its parent body, the North Eastern Hill University (NEHU) Mizoram Campus in the year 1979. Mizoram University Central Library witnessed tremendous growth after the establishment of Mizoram University. Since its inception the library supports the educational, research

and learning functions of the University and a number of services are directed to these efforts. The total collection of the library by 31st March, 2015 included with the number of 1,01,726 books, 256 Ph. D. thesis, 177 M. Phil. dissertations, 294 Master Degree dissertations/project work and 11,005 bound volumes of journals. Presently, library subscribes 226 journals, 48 general periodicals and 14 dailies (English-5, Mizo-8, and Hindi-1). The total library membership is 2,872 comprising 379 UG, 1405 PG Students, 123 M.Phil. Scholars, 526 Ph. D. Scholars, 233 Teachers, 32 Guest Lecturers, and 171 Non-teaching staff.

The library is now equipped with computers and other electronic & audio-visual equipments to provide seamless in-house and online services. Digitization of Mizoram University's own documents and publications for creating an Institutional Repository had been completed and hosted. The repository collection provides free online access to all types of institutional research outputs within the campus network (Intranet). Besides, implementation of advanced technology in the field of identification, security, tracking and automated handling of library materials using Electro-magnetic and Radio Frequency Identification (RFID) based library management system had been completed and in use since March, 2012. Apart from the print resources that Mizoram University Central Library had procured over the period of time, the University had also become the member of UGC-Infonet Digital Library Consortium through which the students, faculty and staff can access more than 8000 core and peer-reviewed journals and 10 bibliographic databases from 23 publishers and aggregators in different disciplines.

2.4.1 Library Sections

- Acquisition Section

Acquisition Section of the Central Library deals with the procurement of books, reference books, core books and multi-volume books. The section also deals with day to day operations such as receiving indents for procurement, checking duplicates, placing orders, receiving and assigning the books with accession numbers.

- Technical Section

Technical services are the 'behind the scene' activities that a library undertakes to effectively deliver library services to the public. These services include the processes

and procedures which are necessary to keep the library materials in order, like data entry, classifying, cataloguing, assigning subject headings, checking and physical processing, to get the materials ready to put on library shelves. The Library follows Dewey Decimal Classification, AACR-2 for cataloguing, and Library of Congress Subject Headings for assigning subject headings.

- Periodical Section

Periodical Section handles print subscription. The section processes journal subscriptions, renewals, orders, payment, journal receipts and bound volumes; regulates the shelf arrangement of the current journals and displays recent arrivals daily.

- Circulation Section

This is the front end of library operations providing the lending services to the library users. All the functions of this section are computerized and the transactions in this section are based on RFID technology using barcode. All the registered library users are provided with a bar-coded ID card and all the books of the library are bar-coded and further equipped with a magnetic strip and tag.

2.4.2 Library Services and Facilities

The Central Library, Mizoram University provides the following services and facilities to its members:

- Library membership facility
- Document borrowing facility
- Circulation service
- Reference service
- User guidance
- Online Public Access Catalogue
- Facility to browse reading materials in open access environment
- Use of special collections wherever they are available
- Use of theses and dissertations as per the conditions
- Information literacy programs for the benefit of the students
- Photocopying service by adhering to the copyright provisions
- Access facilities of print and electronic resources

2.4.3 New Initiatives in Central Library

- Digitization

Digitization of Ph.D. theses, M. Phil. dissertations, University's own documents and research output of the faculty members for creating an Institutional Repository had been pursued and hosted. The repository collection provides free online access to all types of institutional research outputs within the campus network (Intranet).

- Implementation of RFID

Implementation of advanced technology in the field of identification, security, tracking and automated handling of library materials using Electro-magnetic and Radio Frequency Identification (RFID) based Library Management System had been completed and in use since March 2012 which allows users to check-out books by themselves using a Self Check machine.

- Development of IT Infrastructure for Visually Handicapped

Computerized Braille System for visually handicapped students had been successfully installed and in use since December, 2011.

2.5 Conclusion

Mizoram University is one of the most important centers for higher education in the state of Mizoram since its establishment. It is necessary to emphasize that the University is still trying to develop a substantial research and educational infrastructure although it has already started attracting a number of students, research scholars and faculty members from all parts of the country. The University's teaching and research are supposed to be innovative, collaborative, enterprising and flexible, based on the intelligent use of emerging technologies. Besides, its traditional printed collection, Mizoram University provides all faculty members with free access to its electronic resources. In addition, the University provides free Internet access through campus network to all the faculty members.

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CHAPTER- III

RESEARCH OUTPUT

3.1 Introduction

In recent years, there has been increasing interest among researchers and policy makers in the notion of research output. Research output is one of the major measures of university academic performance and a core indicator for calculations of university rankings. A number of studies have tried to compare research output across countries or academic disciplines and to explore the main factors that enhance the research output of faculty members. Research plays a critical role in promoting the prosperity of a nation and the well-being of its citizens. Universities through research make important contributions to the growth and development of industries and government businesses, thereby promoting national and global development. One of the strategies for determining research output is to assess the quantity of publications which researchers communicated through primary or other sources. Research output and research activity are inter-related. Research involves collecting and analyzing data. Output results from writing, reading and publishing research reports in professional referred journals, and displaying it on the web, or to making it known to the public through any other means.

According to Creswell (1986), research output is the extent to which lecturers engage in their own research and publish scientific articles in referred journals, conference proceedings, writing a book or a chapter, gathering and analyzing original evidence, working with postgraduate students on dissertations and class projects, obtaining research grants, carrying out editorial duties, obtaining patents and licenses, writing monographs, developing experimental designs, producing works of an artistic or a creative nature, engaging in public debates and commentaries. For the purposes of this investigation, it is important that the notion of 'research output' be carefully defined, since it is a key element in the development of the research question. To begin, 'Research' means the careful study or investigation, especially in order to discover new facts or information (Oxford University, 1995). 'Output' means the total production compared with inputs or consumption over the same period of time, which serves as a measure of whether the producer's production processes are working efficiently (Witzel, 1999). However, in combining the two words as 'research output', a simple definition becomes more difficult in a research environment because different people have very different perceptions about its meaning.

Most of the methods for measuring research output involve measuring the number of journal articles published. Research output has been mentioned in several studies relating to higher education. The most pervasive issue regarding the measurement of research output is the confusion of quantity of publications with quality of publications, either in the publications themselves or in the publication outlets (Lawrence & Green, 1980). Print and Hattie (1997) highlighted the value of publications as the most direct measure of research performance. These include: articles in refereed journals, commercially published peer reviewed books, major refereed conference presentations, papers in refereed conference proceedings, articles weighed by journal citation impact, competitive peer reviewed grants, postgraduate research degrees supervised to completion, and editor/editorial board of recognized journals. Demographic variables have generally been associated with research output. Age has been studied in numerous works, with conflicting results. Many studies about output have indicated that the relationship between publication and age is not linear, although the overall rate of publication generally declines with age (Finkelstein, Seal & Schuster, 1998; Teodorescu, 2000).

According to Over (1982), research output of academics slightly decreased with age. Bland and Berquist (1997) also observed that the average output of academic members' drops with age but many senior academics remains active and that there is no significant evidence that age determines a drop in output. Research output is an outcome measurement of scholarly effort (Jacobs, Hartgraves & Beard, 1986; Kurz et al., 1989), and has two components that are (i) knowledge creation (research), and (ii) knowledge distribution (productivity) (Gaston, 1970). For the most part, the 'product' of academic lecturers' research is scholarly publication (Carnegie Foundation, 1991). The importance of this definition of research output is that it enables faculty members to share insights, demonstrate academic scholarship, gain recognition for creative thinking, and finally to develop a reputation for expertise in a specialty area (Rhodman, 2002). Taking a slightly wider view, research output can include research publication in professional journals and in conference proceedings, writing a book or chapter, gathering and analysing original evidence, working with post-graduate students on dissertations and class projects, obtaining research grants, carrying out editorial duties, obtaining patents and licenses, writing monographs, developing

experimental designs, producing works of an artistic or creative nature, engaging in public debates and commentaries (Creswell, 1986).

However, research is typically a private and self-mastered activity, and it can be difficult for university staff members to balance an effective project agenda with the demands of teaching, service and life in general. According to Boice (1987), productivity should emerge from hard work, and a fair schedule for research activity should utilize a benchmark that encourages a struggling researcher to relate to their current level of activity. For example, Boice (1987) found that a new faculty member who could find only one hour per weekday to work on their research, generally managed to submit about 1.5 manuscripts per year, which is then consistent with the expectations for a pay rise and higher tenure status. Furthermore, faculty members who adopt a regimen of brief daily periods for research projects typically experience less stress in managing their time and their lives (Boice, 1987).

3.2 Measurement of Research Output

The most pervasive issue regarding the measurement of research output is the confusion of quantity of publications with quality of publications, either in the publication itself or the publication outlet (Lawrence & Green, 1980). Indeed, it has been noted that the debate over the most appropriate measure of output revolves around these two fundamental dimensions of quantity and quality (McGuire et al., 1988). Furthermore, whilst research output can be measured at the individual level, there is also a need to develop hierarchical measures at the sub-department, department and university levels.

3.2.1 Quantity Measurement

The most frequently used measure of the quantity or amount of research output is a numerical publication count or the journal article count over a certain time period. The activities included in measuring output range from a narrow perspective of 'number of research articles published' to a broad interpretation which consists of presentations, both formal and informal, number of graduate students that a staff member is advising, publications of any type and proposals submitted for funding. Moreover, it also includes counts of the number of editorial duties, conference deliveries, licenses, patents, monographs, books, experimental designs, and works of

an artistic or creative nature, public debates and commentaries (Creswell, 1986). Rotten (1990) stated that a common approach to measuring research output was to count the number of books, articles, technical reports, bulletins, and book reviews published, as well as presentations given and grants received through reviewing curriculum vitae or other print materials.

Fielden and Gibbons (1991) pointed out that within the business faculty, many lecturers emphasize articles published in refereed journals and trivialize all other measures of output. Clement and Stevens (1989) found that management administrators put greater weight on scholarly research and less on trade and newspapers articles than their non-management business peers. Radhakrishma and Jackson (1993) reported that publishing in refereed journals was ranked as the most important factor in research output, and Radhakrishma, Yoder and Scanlon (1994, p.17) noted that 'publication (in refereed articles in journals and paper presentations at a conferences) are considered to be a very important component of faculty output." This statement was supported by Kotrlik et al. (2002) in reference to Personal Communication from William J. Cooper, former Dean of the Louisiana State University Graduate School. Kotrlik et al. (2002) quoted William Cooper as stating that 'the only magic number is zero; if you haven't published in refereed journals, then publications in research conference proceedings, books and other publications are meaningless' (p.3).

To further illustrate the complexity of this task of determining research output, faculty publication counts can either be 'straight counts' or 'weighted counts' (Collins, 1993). It has been suggested that perhaps the easiest way to gather counts is to ask respondents to self-report the number of publications produced for a particular period of time. However, counting all publications equally may be simplistic because it ignores the quality of the publication. One method of adding quality into self-reported counts is to define eligible publications carefully. Faculty members can be asked to list non-refereed publications separately from refereed journals. Single authored papers can be distinguished from multiple-authored ones. The types of publications, for example journal articles, books, monographs, or book reviews, can also be easily distinguished (Brocato, 2001). Furthermore, Creswell (1986), seriously pointed out that counts of publication need some form of weighting system, particularly, for

instance, the comparisons between journal articles and books. Books demonstrate a problem because there are several types of books that cannot be used to measure research performance, such as original scholarly books, theoretical or research monographs, edited books and textbooks. A chapter in a book for readings may also be classified as a book form. Further problems also could arise when equal weight is given to many of the peer-reviewed publications in newer journals whose review standard may be less rigorous than the longer established journals. Several weighting systems have developed to make comparisons among types of research output. Braxton and Toombs (1982) used an objective method of weight assignment by using a panel of scholars of the academic profession or of graduate education to make the assessment when weighting output. The judges were asked to rate the publications on scale of zero to ten. The median ratings obtained were then used to construct a scale of the weights. The results of this weighting procedure show that original scholarly books and monographs receive higher weights than do journal articles. Textbooks are also weighted higher than edited books, whereas edited books are weighted equally with articles published in high-quality journals but higher than articles published in journals of lower perceived quality (Creswell, 1986).

The special characteristics of the various journals also affect the weighting system. An article published in a refereed journal is assessed and certified as a contribution to knowledge because refereed journals are putatively 'prestige' journals, supervising the review of manuscript by experts in the field. Thus, articles published in refereed journals may be assessed higher than articles in non-refereed journals (Miller & Serzan, 1984). However, there are also unpublished research outcomes that are recognized as a form of productivity. For example, papers presented at professional meetings and the final reports of funded research are significant types of unpublished research. Weights for these items may also be needed because a grant from the National Science Foundation is perceived as having more value than one received from an institutional research fund. Furthermore, the prestige of professional associations also varies with their geographical location. For instance, a paper presented at the national association conference may have more prestige than the one presented at a regional meeting (Creswell, 1986). Lastly, service as a reviewer of grants proposals is another pertinent measure (Pellino, Blackburn & Boberg, 1984). The simple counting of published and unpublished research outcomes does not allow

any comment upon the quality of work. For examination of quality, peer review rating and citation analysis are emerging as relatively new tools to assess the value of the contributions of research to the discipline.

3.2.2 Quality Measurement

Peer review refers to a process whereby one or more qualified persons professionally peer review a person's work, generally for publication in a scholarly journal or book (Upali, Hebert & Nigel, 2001). External reviewers for academic journals typically do not know the names of the authors of manuscripts that they are asked to review. However, the case of assessing grant proposals may be different, because the peer review process in grant proposals has considerable interest in what are the particular characteristics of the researcher (viz. age, gender, rank, potential conflicts of interest) (Chubin, 1994). Kirkpatrick and Locke (1992) found a statistically significant positive correlation between individual peer rating and measures based on article counts and citation counts. However, peer ratings are not without their limitations, for example, it can be influenced by the personality of the scholar being judged and/or by the prestige of the institution of affiliation (Folger, Astin & Bayer, 1970). Similarly, Nelson, Buss and Katzko (1983) argued that peer review has several other limitations like: (i) the quality of the personal work is not being measured in peer reviews, (ii) journals different in scope of articles published because some journals may concentrate on contribution to knowledge while others may focus on more creative contributions, and (iii) peer rating is affected by rapid changes of editorial staff and publishing policies.

Citation measurements have been used to measure faculty research output (Braskamp & Ory, 1994; Creamer, 1998). Indeed, Centra (1981) claimed that citation data better reflects the impact of faculty work. One way of gathering citation data is by obtaining curriculum vitae from faculty and verifying listed citations via citation abstracts and databases (Brocato, 2001). Published works are cited as building blocks for ideas, concepts, findings, methods or information on instrumentation. Some are cited for negative purposes or for perfunctory reasons (Creswell, 1986). Nevertheless, in a cited article, not everything is read and found useful. A publication is property, and citing practice is a social device for coping with problems of property rights and priority claims (Kaplan, 1965). However, citation counts have some important limitations (Creswell, 1986; Brocato, 2001). First, there are substantial differences in

citation rates among various disciplines because of the rates of publication and the acceptance rates of journals. Second, significant research may not be recognized for a considerable period of time, but a scholar who has published a number of pieces in a fixed period of time might expect to generate at least a few citations. Citation rates decay substantially (Line, 1984), thus staff who work for a longer period of time generally have more publications and more opportunity to be cited. Consequently, citation counting must be a restricted compilation to a fixed span of time in both citation sources and the citation documents. Third, a scholar who is a junior author of a piece, and therefore not first named, would be missed in simple counts. Fourth, some surnames are subject to common misspelling by citing authors, and these errors are preserved in the citation indexes. Fifth, citations may be for criticisms and rejections of research rather than its merit and utility. Sixth, several critics of citation tools have noted that self-citations and citation of friends' work may distort realistic measurement. Finally, citation counts do not distinguish between positive and negative comments about the work. Furthermore, citation indices are subject to a long lag-time because of the long peer review and publication process.

It has been noted that the quality measure of research output is not as frequently used as simple counts since the cost of gathering information on citation is quite considerable (Wanner, Lewis & Gregorio, 1981). In addition, the correlation range between citation counts and publication counts are only 0.6 to 0.72 (Cole & Cole, 1967).

3.3 Model of Faculty Research Output

Numerous studies on faculty research output identify consistent set of facilitating characteristics that have an impact on faculty research output. A few authors have grouped these characteristics into clusters or models to understand the major factors that affect research output and to begin to identify a model that explains faculty research output. Bland et al. (2002) model used in the study builds on earlier models, as is illustrated by the following discussion of earlier attempts to cluster disparate characteristics into explanatory models. Finkelstein suggested that seven critical variables predict faculty publication rates: faculty researchers having a research orientation, the highest terminal degree within a field, early publication habits, previous publication activity, communication with disciplinary colleagues,

subscriptions to a large number of journals, and sufficient time allocated to research. Finkelstein's early model of research output is useful because it provides an initial picture of the attributes of a successful researcher at the individual faculty level. However, Finkelstein's model does not clearly articulate the institutional factors that affect faculty research output. Creswell's model begins to account for some institutional factors affecting faculty research output. He described successful researchers as those who tend to hold a senior professor rank, spend at least one-third of their time on research activities, publish early in their careers, receive positive feedback from peers for research efforts, and maintain regular and close contact with colleagues on and off campus who conduct research on similar topics. Creswell's model extends beyond individual characteristics by acknowledging that faculty researchers are more productive when they are employed by a major university that rewards research and assigns ample time for faculty to conduct research. Thus, Creswell's model acknowledges the importance of the institution and the research culture within that institution on an individual faculty's research output.

Dundar and Lewis proposed a model in which faculty research output is primarily associated with two attributes: individual attributes that relate to personal traits and environmental experiences and institutional and departmental attributes that entail variables related to leadership, culture, structure, and policies. Based on a study of more than 3,600 research– doctoral programs in the United States, they found that one of the most significant predictors of faculty research productivity is faculty-group size. Other features included such things as being a private rather than a public institution, having a larger number of full professors, and having a larger percentage of faculties within a department actively publishing in peer-reviewed journals. Teodorescu proposed an international model of faculty research publication output. Teodorescu's model asserted that individual achievement variables and institutional characteristic variables would predict faculty research output across national boundaries. In a test of this model across ten nations, he found that, although correlates of faculty research output varied across national boundaries, faculty involvement in disciplinary affiliations (such as membership in professional societies and attendance at professional conferences) was significantly related to research output across all countries.

A fifth model by Brocato proposed that faculty research output in the context of medical school family practice departments is related primarily to the broad factors of early research socialization, individual faculty's psychological and demographic characteristics, and the institutional and departmental research environments. He found that individual faculty's characteristics, such as motivation, professional networks, and research training, were highly correlated to research output. He also determined that institutional, departmental, and disciplinary characteristics had a much lower impact on faculty research output, especially in relation to the individual faculty's characteristics. Bland and colleagues synthesized the literature on faculty research output into a model that asserts high research output is strongly associated with eight individual characteristics, fifteen institutional characteristics, and four leadership characteristics. This model has evolved through its application in several studies, as noted earlier. In the Bland et al. (2002) model, faculty research output is highest when a faculty member has specific individual qualities, works in an institution that is highly conducive to research, and is led by someone who possesses essential leadership qualities and uses an assertive–participatory management approach.

Further, the Bland et al. (2002) model suggests a hierarchical order to these three sets of qualities i.e. the individual characteristics are essential, but they have more or less power in assuring faculty research output depending on how research-conducive the faculty member's institution is. Finally, the impact of the institution is mediated by the qualities and style of the leader. Many of the individual-level characteristics and institution-wide features that facilitate faculty research output are already present in most established research-oriented universities. For example, in such institutions research is consistently emphasized in the mission and the promotion and tenure structure. Also, most faculty in these institutions have individual characteristics, such as holding the highest terminal degree in their field, being tenured, and holding the highest rank. In addition, these faculties have most of the other individual characteristics of a productive researcher, such as being driven to do research, socialized to the research culture, and well-grounded in basic content knowledge and research skills. So, although the above cited literature is useful to institutions such as these, it is not specific enough to inform decisions about what would further facilitate the faculty's research output.

3.4 Individual, Institutional and Leadership Characteristics that Facilitate Research Output:

3.4.1 Individual Characteristics:

a) Socialization: Understands the values, norms, expectations, and sanctions affecting established faculty (e.g., beneficence, academic freedom).

b) Motivation: Driven to explore, understand, and follow one's own ideas, and to advance and contribute to society through innovation, discovery, and creative works.

c) Content knowledge: Familiar—within one's research area—with all major published works, projects being conducted, differing theories, key researchers, and predominant funding sources.

d) Basic and advanced research skills: Comfortable with statistics, study design, data collection methods, and advanced methods commonly used in one's area.

e) Simultaneous projects: Engaged in multiple, concurrent projects, so as to buffer against disillusionment if one project stalls or fails.

f) Orientation: Committed to both external activities (e.g., regional and national meetings, collaborating with colleagues) and activities within one's own organization (e.g., curriculum planning, institutional governance).

g) Autonomy and commitment: Has academic freedom, plans one's own time and sets one's own goals, but is also committed to and plays a meaningful role within the larger organization.

h) Work habits: Has established productive scholarly habits early on in one's career.

3.4.2 Institutional Characteristics:

a) Recruitment and selection: Great effort is expended to recruit and hire members who have the training, goals, commitment, and socialization that match the institution.

b) Clear coordinating goals: Visible, shared goals coordinate members' work.

c) Research emphasis: Research has greater or equal priority than other goals.

d) Culture: Members are bonded by shared, research-related values and practices, have a safe home for testing new ideas.

e) Positive group climate: The climate is characterized by high morale, a spirit of innovation, dedication to work, receptivity to new ideas, frequent interactions, high degree of cooperation, low member turnover, good leader/member relationships, and open discussion of disagreements.

f) Mentoring: Beginning and mid-level members are assisted by and collaborate with established scholars.

g) Communication with professional network: Members have a vibrant network of colleagues with whom they have frequent and substantive (not merely social) research communication, both impromptu and formal, in and outside of the institution.

h) Resources: Members have access to sufficient resources such as funding, facilities, and especially humans (e.g., local peers for support, research assistants, and technical consultants).

i) Sufficient work time: Members have significant periods of uninterrupted time to devote to scholarly activities.

j) Size/experience/expertise: Members offer different perspectives by virtue of differences in their degree levels, approaches to problems, and varying discipline backgrounds; the group is stable, and its size is at or above a "critical mass."

k) Communication: Clear and multiple forms of communication such that all members feel informed.

l) Rewards: Research is rewarded equitably and in accordance with defined benchmarks of achievement; potential rewards include money, promotion, recognition, and new responsibilities.

m) Brokered opportunities: Professional development opportunities are routinely and proactively offered to members to assure their continued growth and vitality.

n) Decentralized organization: Governance structures are flat and decentralized where participation of members is expected.

o) Assertive participative governance: Clear and common goals, assertive and participative leadership where active participation of members is expected, and effective feedback systems are utilized.

3.4.3 Leadership Characteristics:

a) Scholar: Highly regarded as a scholar; serves as a sponsor, mentor, and peer model for other group members.

b) Research oriented: Possesses a "research orientation"; has internalized the group's research-centered mission.

c) Capably fulfills all critical leadership roles:

- Manager of people and resources

- Fund-raiser
- Group advocate
- Keeps the group's mission and shared goals visible to all members
- Attends to the many individual and institutional features that facilitate research output

d) Participative leader:
   - Uses an assertive, participative style of leadership
   - Holds frequent meetings with clear objectives
   - Creates formal mechanisms and sets expectations for all members to contribute to decision making
   - Makes high-quality information readily available to the group
   - Vests ownership of projects with members and values their idea

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CHAPTER- IV

DATA ANALYSIS & FINDINGS

4.1 Introduction

The analysis of data involves critical examination of the data with the objectives in mind for determining the pattern of relationship among the variables. The term analysis refers to the computation of certain measures along with searching for patterns of relationship that exists among data groups. The type of study and the complexity of the hypotheses determine the method and depth of analysis. Data analysis and findings are crucial for a scientific study and for that, the scholar has taken relevant data obtained through the filled-in questionnaire for making an exhaustive analysis and draws the inferences. The scholar has taken due efforts as its validity depends more upon common sense, experience, background knowledge and intelligent honesty of the interpreter than upon conformity to any set rules that might be formulated.

4.2 Analysis of Data

The analysis and interpretation of data involve the objective material in the possession of the researcher and his subjective reaction and desires to derive from the data, the inherent meaning in their relation to the problem. Analysis of data is the most skilled task of all the stages of research. It is a task calling for the researcher's own judgment and skill. Proper analysis requires a familiarity with the background of the study. Keeping in view the objectives of the study in mind, a structured questionnaire was prepared and distributed among 99 faculty members of Science & Technology departments of the university (on October 2015) to obtain relevant data. Out of 99, a total number of 80 (80.8%) faculty members responded to the questionnaire. The collected data were analyzed, tabulated, interpreted to draw the inferences.

4.2.1 Number of Faculty Members in Schools and Departments

The faculties in academic institutions are one of the most important constituencies representing their parent institutions because of their knowledge production and re-use. In modern universities, the three fundamental obligations of faculty are teaching students, conducting research and consulting, and providing service related to their discipline. There were 99 faculty members representing 17 academic departments under 5 schools of studies in Mizoram University at the time of data collection. The responses of the faculty members were arranged according to school & department wise respectively shown in table 4.1.

Table 4.1: Number of Faculty in Schools and Departments

Name of the School	Name of the Department	No. of Faculty Members		Response Percentage
		Distributed	Responded	
School of Life Sciences (SLS)	Botany	7	7	100%
	Zoology	8	7	87.5%
	Biotechnology	6	4	66.67%
School of Physical Sciences (SPS)	Physics	7	6	85.71%
	Chemistry	7	6	85.71%
	Mathematics & Computer Science	5	4	80%
School of Earth Sciences & Natural Resources Management (SES&NRM)	Geology	6	5	83.33%
	Forestry	8	6	75%
	Environmental Sciences	8	4	50%
	Geography & Natural Resources Management	8	8	100%
	Horticulture, Aromatic & Medicinal Plants	6	5	83.33%
School of Engineering & Technology (SET)	Information Technology	5	4	80%
	Computer Engineering	4	2	50%
	Electrical Engineering	4	3	75%
	Electronics & Communication Engineering	5	4	80%
	Civil Engineering	3	3	100%
School of Fine Arts, Architecture & Fashion Technology (SFAAFT)	Planning & Architecture	2	2	100%
Total		99	80	80.8%

Table 4.2: School wise Response Ratio

	Name of the School				
	SLS	SPS	SES&NRM	SET	SFAAFT
Questionnaire Distributed	21	19	36	21	2
Questionnaire Responded	18	16	28	16	2
Response Ratio	85.71%	84.21%	77.78%	76.19%	100%

Table 4.1 & 4.2 reveals the department & school wise response of faculty members to the questionnaires distributed to them. 80.8% faculty members responded to the questionnaires distributed to them which become the average response rate for the questionnaires. The highest response rates (100%) came from Botany, Geography & Natural Resources Management, Civil Engineering, and Planning & Architecture departments amongst 17 Science & Technology departments of the university. The least response (50%) received from two departments namely Environmental Sciences and Computer Engineering. Amongst 5 schools of studies SFAAFT had highest

response rate (100%) followed by SLS (85.71%), SPS (84.21%), SES&NRM (77.78%), and SET (76.19%). Some faculty members were absent for longer period of time for their academic assignments during study period, so could not responded the questionnaires that made their departments' response rate down.

4.2.2 Gender & Age of Respondents

Personal detail section of the questionnaire provides information regarding gender and their age group. Age of the respondent usually has a role to play in using electronic resources, as younger generations tend to use computers more effectively. Analysis of the study by gender and age of the respondent has been discussed under Table 4.3.

Table 4.3: Gender & Age of Respondents

Gender of the respondent		Age of the respondent (Age group)				Total	Percentage
		<30	31-40	41-50	>51		
	Male	9	28	16	11	64	80%
	Female	6	10	0	0	16	20%
Total		15	38	16	11	80	100%
Percentage		18.75%	47.50%	20%	13.75%	100%	

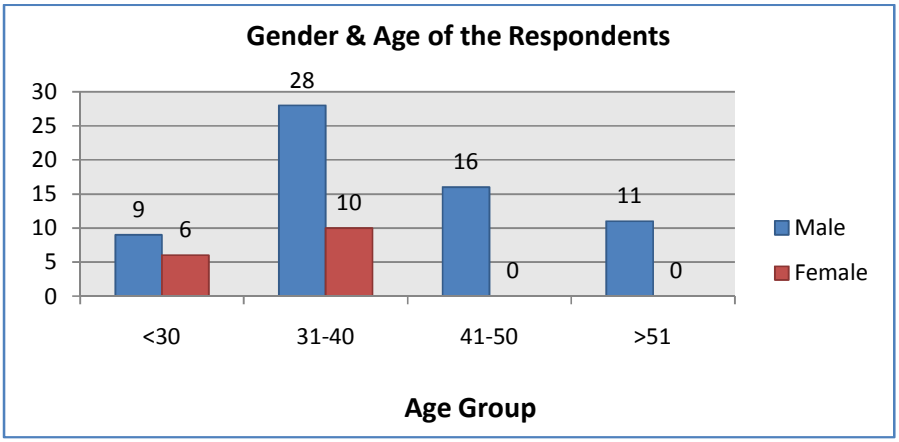

Fig 4.1: Gender and Age of Respondents

Table 4.3 and figure 4.1 represent gender and age of the respondents. From the observation of table 4.3, there were 80% male and 20% female respondents. The age group has been divided into 4 categories viz. less than 30, 31-40, 41-50, and more than 50. There were 47.5% respondents belongs to 31-40 age group while 18.75% respondents belongs to less than 30 age group. 20% respondents comes under 41-50

age group whether 13.75% respondents comes under more than 50 age group. Further, 66.25% respondents come under the age of 40 years which shows that majority of the responses received from young faculty members. In another way, we can say that majority of the faculty members of Science & Technology departments are younger in age. Interestingly, all the female faculty members are young and they all are belongs to less than 30 and 31-40 age groups only.

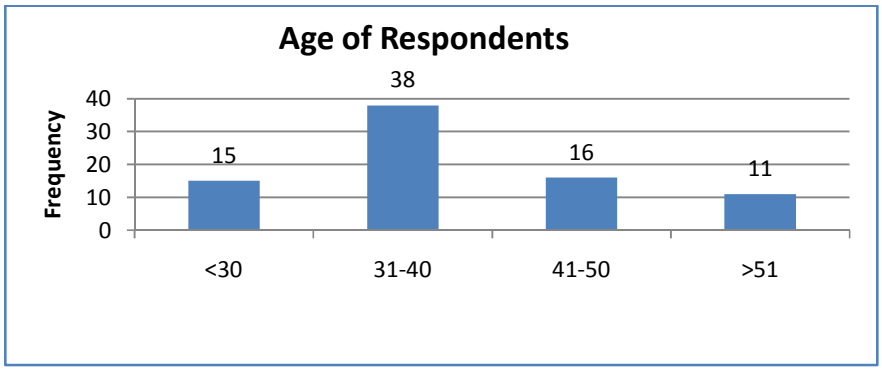

Fig 4.2: Age of Respondents

4.2.3 Academic Position & Age of Respondents

Analysis of the Academic Position and Age of Respondents of faculty members have been discussed in table 4.4 and supported by the figure 4.3 for better understanding.

Table 4.4: Academic Position & Age of Respondents

Academic Position	Age of the respondent				Total	Percentage
	<30	31-40	41-50	>51		
Assistant Professor	15	36	7	1	59	73.75%
Associate Professor	0	1	3	0	4	5%
Professor	0	1	6	10	17	21.25%
Total	15	38	16	11	80	100%
Percentage	18.75%	47.50%	20%	13.75%	100%	

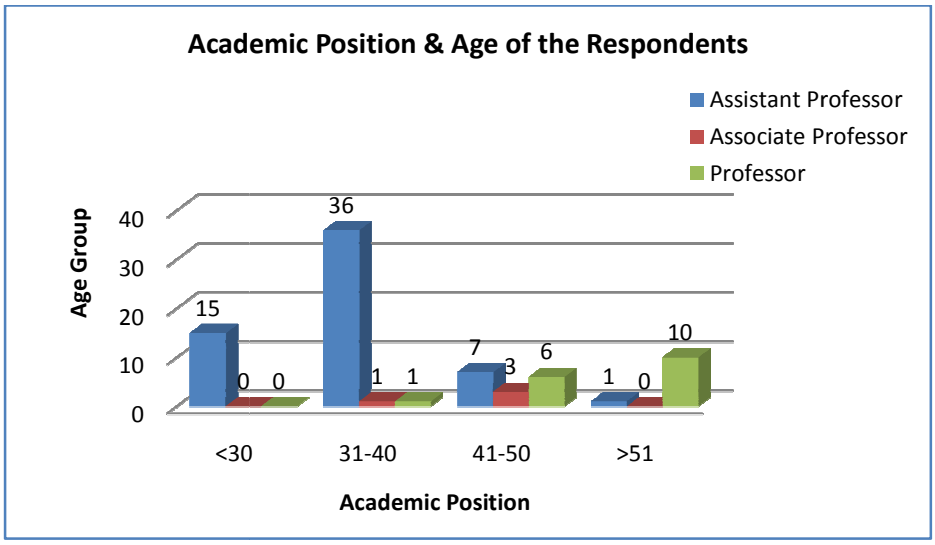

Fig 4.3: Academic Position & Age of Respondents

On the observation of table 4.4, 73.75% faculty members belong to Assistant Professor Category followed by 21.25% Professors while Associate Professors were 5% only. Further 18.75% belong to age group less than 30 which included 100% Assistant Professors; 47.5% belong to age group 31-40 which included 95% Assistant Professors only while Associate Professors and Professors were only 5%; 20% belong to 41-50 age group which included 43.75% Assistant Professors and rest were Associate Professors and Professors; 13.75% belong to more than 50 age group which included 9% Assistant Professor while 91% were Professors only. There was lack of Associate Professors at this level. Based on this analysis it is observed that upto 40 years of age group Assistant Professors were more and as age increased Professors and Associate Professors were more. Thus we can say that for reaching at higher academic position age is the decisive factor.

4.2.4 Academic Position vis-a-vis Academic Qualification

Analysis of responses by Academic Position vis-à-vis Academic Qualification of the faculty members covered under study has been discussed in table 4.5 and supported by figure 4.4.

Table 4.5: Academic Position vis-à-vis Academic Qualification

Academic Position	Academic Qualifications				Total	Percentage
	Ph. D	M. Phil	Master Degree	Others		
Assistant Professor	33	4	22	0	59	73.75%
Associate Professor	4	0	0	0	4	5%
Professor	16	0	0	1	17	21.25%
Total	53	4	22	1	80	100%
Percentage	66.25%	5%	27.5%	1.25%	100%	

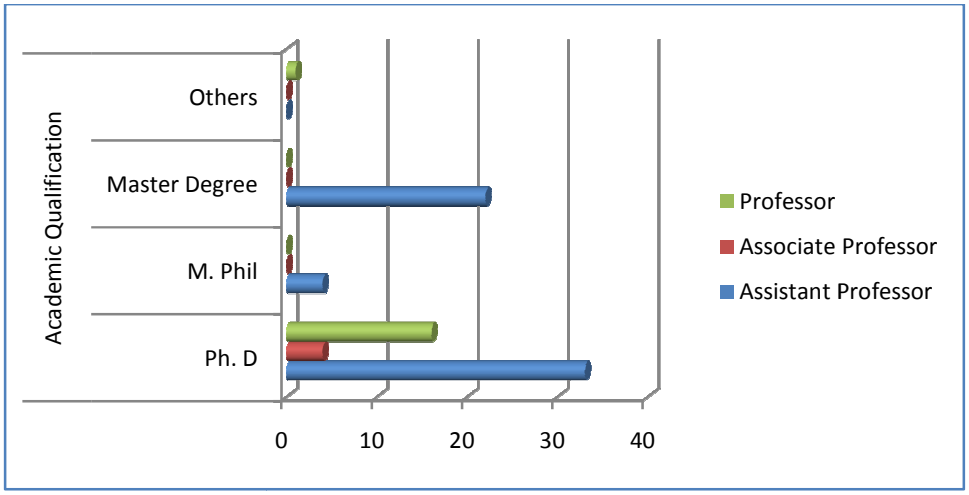

Fig 4.4: Academic Position vis-à-vis Academic Qualification

On the observation of table 4.5, 73.75% faculty members belong to Assistant Professor Category followed by 21.25% Professors while Associate Professors were only 5%. Further, 66.25% faculty members had Ph. D. degree as their highest academic qualification while 5% were M. Phil only. There were 27.5% faculty members of Science & Technology departments had Masters degree (M.Sc./M. Tech.) only as highest academic qualification while 1.25% had some other degree (D. Litt.) also. Amongst the Ph. D. degree holders, 62% belong to Assistant Professor and 30% belong to Professor while 8% belong to Associate Professors. All the M. Phil. and Masters Degree holders belong to only Assistant Professors category. Horizontally in the category of Assistant Professors, 56% had Ph. D. Degree, 37% Masters Degree and only 7% had M. Phil. Degree. Horizontally in the category of Associate Professors, all had only Ph. D. Degree while in case of Professors, 94% had Ph. D. degree and only 6% had higher (D. Litt.) than Ph. D.

4.2.5 Academic Position vis-a-vis Teaching Experience

Analysis of the Academic Position vis-à-vis Teaching Experience of faculty members has been discussed in table 4.6 and supported by figure 4.5 for better understanding.

Table 4.6: Academic Position vis-a-vis Teaching Experience

Academic Position	Teaching Experience (in years)							Total	Percentage
	1-5	6-10	11-15	16-20	21-25	26-30	>31		
Assistant Professor	33	23	3	0	0	0	0	59	73.75%
Associate Professor	0	1	2	0	1	0	0	4	5%
Professor	0	0	5	3	3	3	3	17	21.25%
Total	33	24	10	3	4	3	3	80	100%
Percentage	41.25%	30%	12.50%	3.75%	5%	3.75%	3.75%	100%	

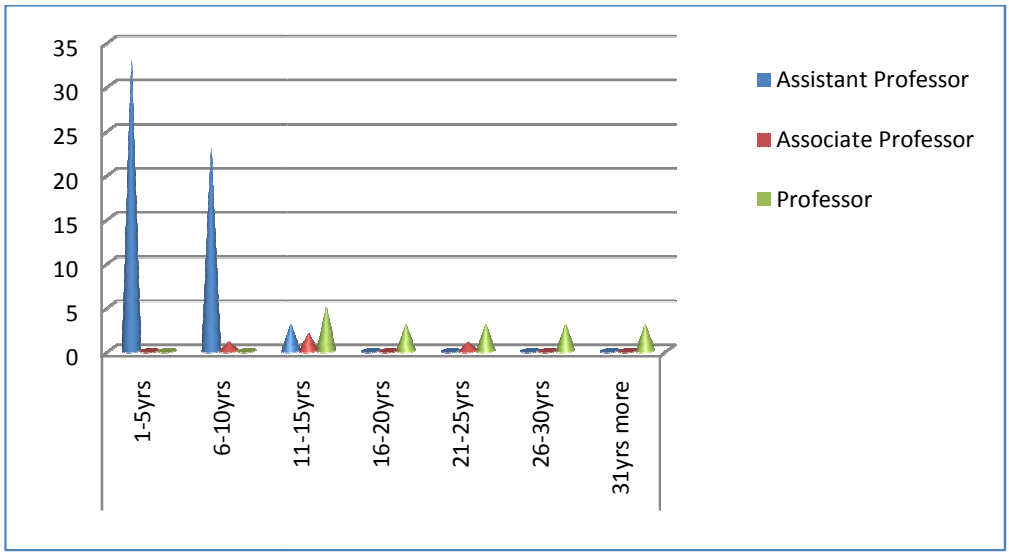

Fig 4.5: Academic Position vis-a-vis Teaching Experience

On the observation of table 4.6, 73.75% faculty members belong to Assistant Professor Category followed by 21.25% Professors while Associate Professors were only 5%. There were 41.25% faculties belong to only Assistant Professor Category had experience of 1-5 years in their career while 30% faculties belong to Assistant Professors and one Associate Professor category had the experience of 6-10 years. 12.5% faculties had experience of 11-15 years out of which 30% were Assistant Professor, 20% were Associate Professor, and 50% were Professor. 3.75% faculties

had experience of 16-20 years and belong to Professors category only. 5% faculties had 21-25 years of experience and out of them 75% were Professor and 25% were Associate Professor only. In the experience group of 26-30 years and more than 31 years, there were 3.75% faculties respectively belong to only Professor Category.

4.2.6 Academic Position versus Publications (July, 2009 – June, 2014)

The analysis of the Academic Position versus Publications of faculty members has been discussed in table 4.7 and supported by figure 4.6 for clear understanding.

Table 4.7: Academic Position versus Publications (July 2009 – June 2014)

Academic Position	Publications (in number)					Total	Percentage
	None	1-10	11-20	21-30	>30		
Assistant Professor	7	40	9	3	0	59	73.75%
Associate Professor	0	2	1	1	0	4	5%
Professor	0	3	5	6	3	17	21.25%
Total	7	45	15	10	3	80	100%
Percentage	8.75%	56.25%	18.75%	12.50%	3.75%	100%	

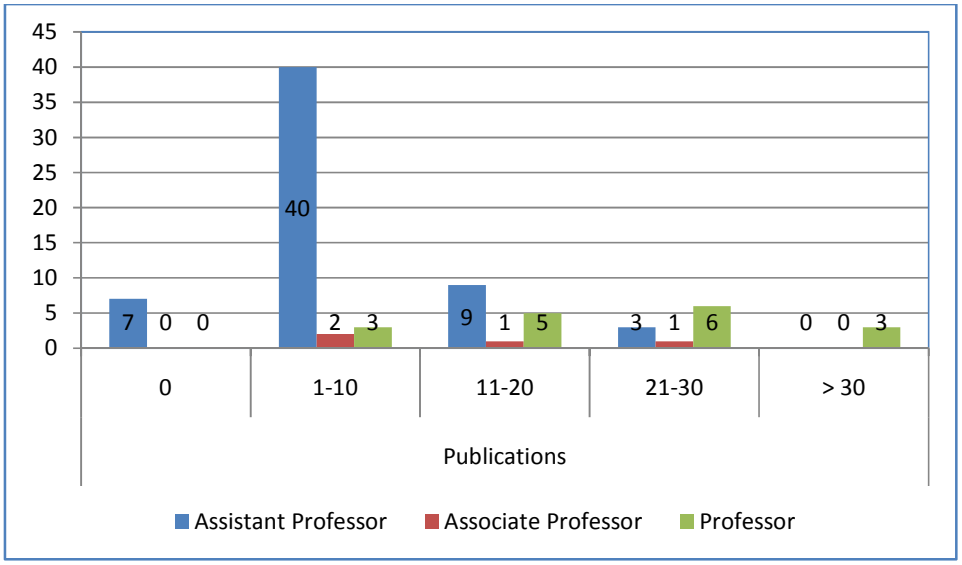

Fig 4.6: Academic Position versus Publications (July 2009 – June 2014)

Based on the observation of table 4.6, 73.75% faculty members belong to Assistant Professor followed by 21.25% Professors, and 5% Associate Professors only. Designation and experience had direct relationship with the academic growth of faculty. In this regard, study has been conducted and found that 8.75% faculties had

no publication, during five years of range taken for study, belong to entry level i.e. Assistant Professors category. There were 56.25% faculties had total publications range from 1-10 in last five academic years i.e. July 2009 – June 2014, out of which 89% belong to Assistant Professor and rest of them belong to Associate Professor and Professor. 18.75% faculties had publications range from 11-20, out of which 60% were Assistant Professor, 33% were Professor and rests were Associate Professor. 12.5% faculties had publications range from 21-30, out of which 30% were Assistant Professor, 10% were Associate Professor, and 60% were Professor. Only 3.75% faculties had publication range more than 30 belong to Professor category only. Further, 75% faculties had publication range from 1-20 in last five academic years i.e. July 2009 – June 2014 and most of them belong to Assistant Professor category. Out of total Assistant Professor Category, 68% had publication range from 1-10 in last five academic years i.e. July 2009 – June 2014 whereas in Professor category, 53% had more than 21 publications in last five academic years i.e. July 2009 – June 2014.

4.2.7 Teaching Experience versus Publications (July, 2009 – June, 2014)

Analysis of the number of publications versus teaching experience by the faculty members belong to Science & Technology departments under Mizoram University during 2009-2014 has been discussed in table 4.8.

Table 4.8: Teaching Experience versus Publications

Teaching Experience (in Years)	Publications (between July, 2009 – June, 2014)					Total	Percentage
	None	1-10	11-20	21-30	> 30		
1-5	5	24	4	0	0	33	41.25%
6-10	2	16	4	2	0	24	30%
11-15	0	3	3	4	0	10	12.50%
16-20	0	0	1	1	1	3	3.75%
21-25	0	0	1	1	2	4	5%
26-30	0	1	1	1	0	3	3.75%
>31	0	1	1	1	0	3	3.75%
Total	7	45	15	10	3	80	100%
Percentage	8.75%	56.25%	18.75%	12.50%	3.75%	100%	

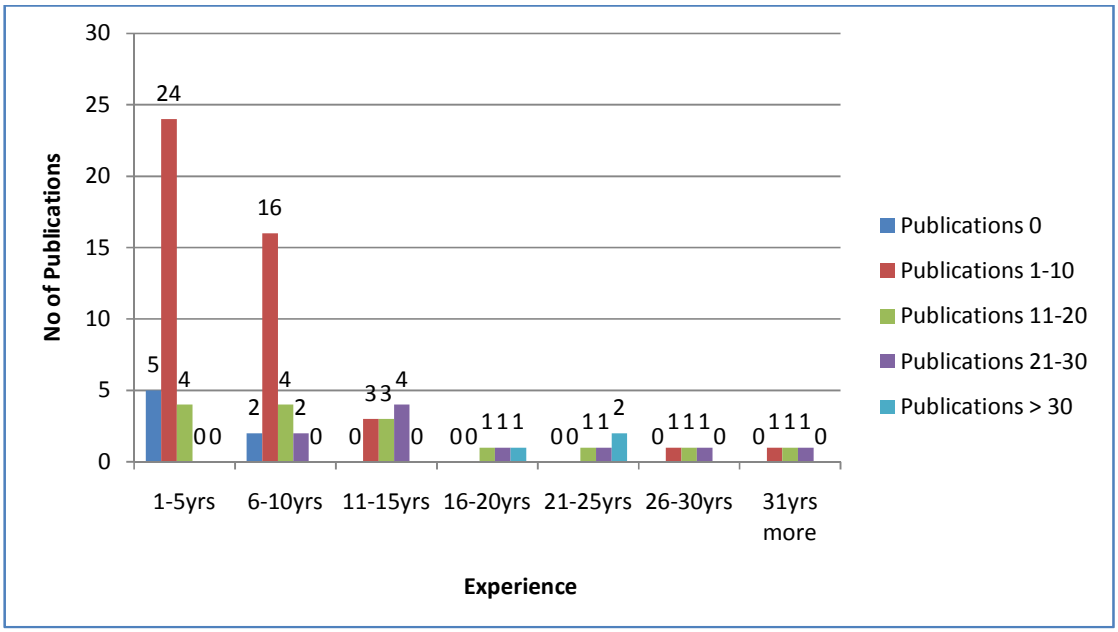

Fig 4.7: Teaching Experience versus Publications

The data from table 4.8 reveals that out of the 80 faculty members who responded to the questionnaire, 41.25% had 1-5 years of teaching experience, 30% had 6-10 years of teaching experience, 12.5% had 11-15 years of teaching experience, 3.75% had 16-20 years of teaching experience, 5% of had 21-25 years of teaching experience, 3.75% had 26-30 years of teaching experience and it is worth mentioning that only 3.75% of the total population had more than 31 years of teaching experience. Further, on the vertically analysis of table 4.8, it had been observed that 8.75% had no any publication during 5 years of time while majority of the faculty members (56.25%) had 1-10 publications during last five academic years. There was 18.75% faculty members had only 11-20 publications during the above said period whereas 12.5% had 21-30 publications in said period. More than 30 publications during the last five academic years had been reported by only 3.75% faculty members having experience of 16-25 years. On the cross analysis of the table 4.8, it has been found that as experience increases number of productive faculty members decreases, thus reduction in total number of publications also.

4.2.8 Preferred Medium of Research Publications

Analysis of the preferred medium of research publications during July 2009 – June 2014 has been discussed in table 4.9.

Table 4.9: Preferred Medium of Research Publication

Publication Type/ Medium	Frequency	Percentage
Text books	2	2.5%
Book chapters	17	21.25%
Co-authored books	0	0
Journal articles	70	87.5%
Technical reports	1	1.25%
Conference papers	39	48.75%
Others	2	2.5%

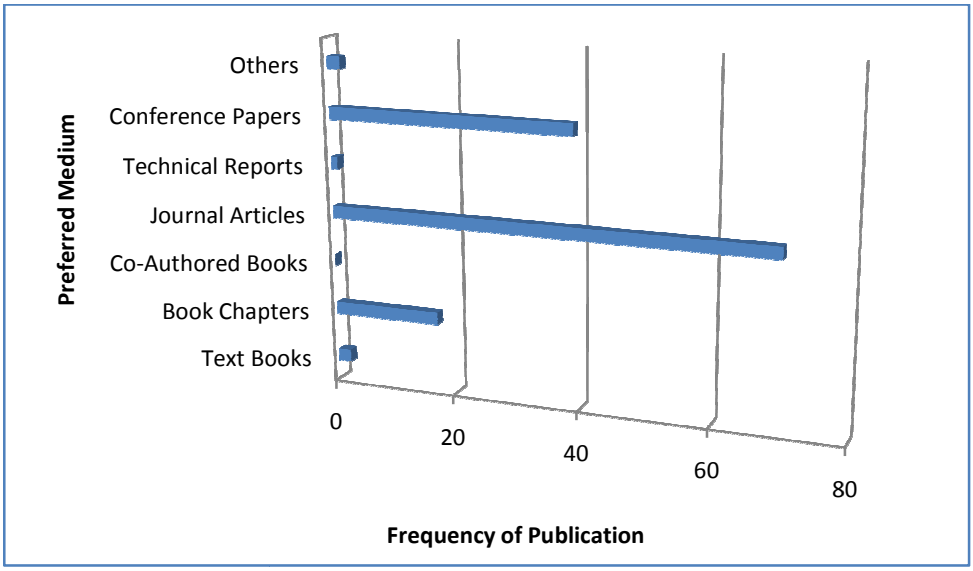

Fig 4.8: Preferred Medium of Research Publication

On the observation of table 4.9 and figure 4.8, it has been found that 87.5% faculty members preferred articles published in the form of journal for their research publications followed by conference papers (48.75%) and book chapters (21.25%). There were 2.5% faculty members who preferred text book as a medium of their research publication while 1.25% had published in the form of technical report. None of them had found co-authored books as a publication medium. Few (2.5%) of them has some other means of publication.

4.2.9 Total Number of Publications and Publication Media (Year wise breakup)

Analysis of the total published items in the various publications media (year wise breakup) has been discussed in table 4.10.

Table 4.10: Total Number of Publications in Publication Mediums (Year wise)

SN	Publication Media	2009-10	2010-11	2011-12	2012-13	2013-14	Total
1.	Journal articles	94	102	113	119	172	600
2.	Abstracts	2	1	2	6	1	12
3.	Reviews	0	0	1	1	1	3
4.	Editorials	0	0	2	0	0	2
5.	Chapters in book	7	6	13	21	26	73
6.	Conference proceedings	27	33	27	40	27	154
7.	News items	0	0	0	0	0	0
8.	Patents	0	0	0	0	0	0
9.	Others	4	0	2	2	1	9
Total		134	142	160	189	228	853

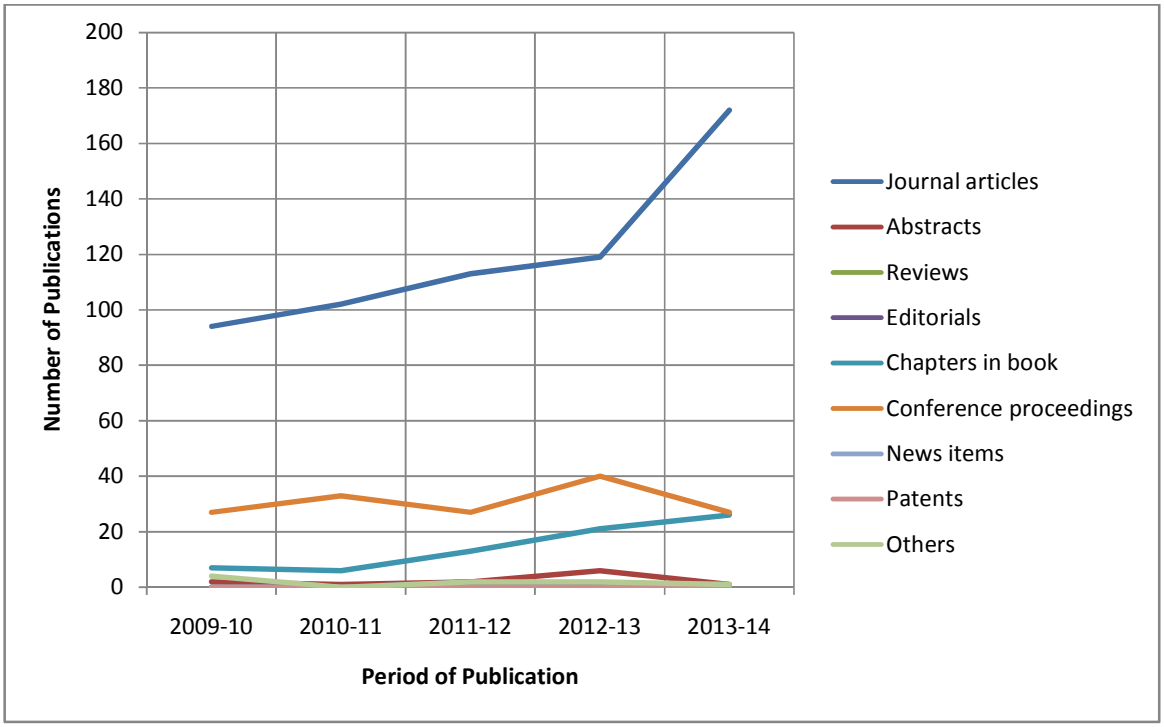

Fig 4.9: Number of Publications in Publication Mediums (Year wise)

From the table 4.10 and figure 4.9, it has been observed that faculty members of Science & Technology departments of Mizoram University had published their most of the research output in the form of journal articles followed by conference proceedings and chapters in books. Very few research output published in the form of abstracts (12), reviews (3), editorials (2), and others (9). News items and patents had not been published during last five academic years. Further on the observation of figure 4.9, it has been noted that journal articles and book chapters had shown

tremendous growth during five years of duration while publication as conference papers had shown fluctuations year wise but still second most published medium.

In case of journal articles only, 29% journal articles published during 2013-14 academic year followed by 20% articles during 2012-2013, 19% articles during 2011-2012, 17% articles during 2010-2011, and 15% articles during 2009-2010. In case of abstracts only, 50% abstracts were published during 2012-2013 followed by 17% abstracts published during 2009-10 and 2011-12 academic years separately. There was 8% abstracts published during 2010-2011 and 2013-2014 academic years separately. In case of reviews only, it was found that 33% reviews were published by the faculty members during 2011-2012, 2012-2013 and 2013-2014 academic years separately whereas no reviews published during 2009-10 and 2010-11 academic years.

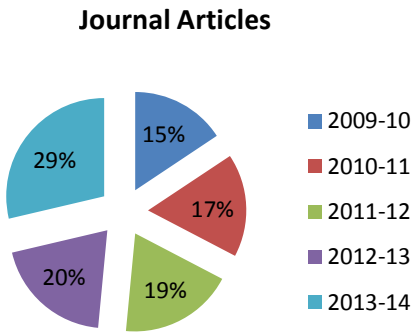

Fig 4.9a: Journal Articles

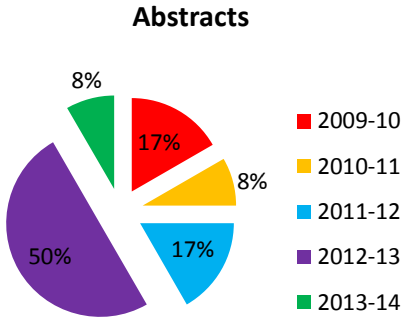

Fig 4.9b: Abstracts

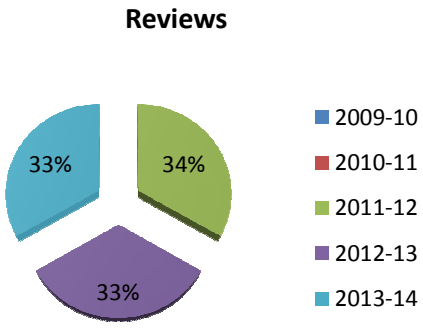

Fig 4.9c: Reviews

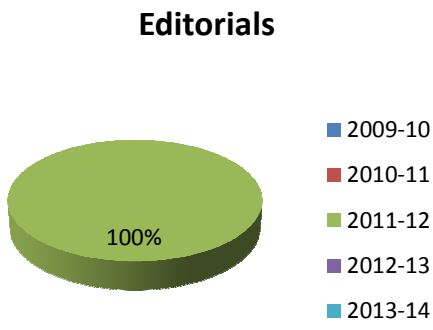

Fig 4.9d: Editorials

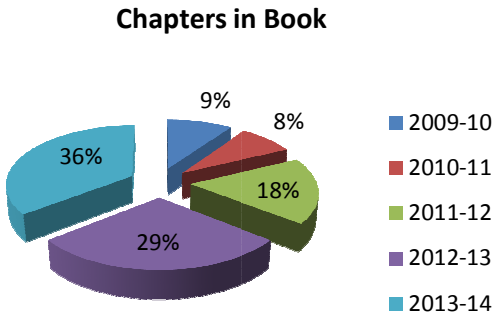

Fig 4.9e: Chapters in Book

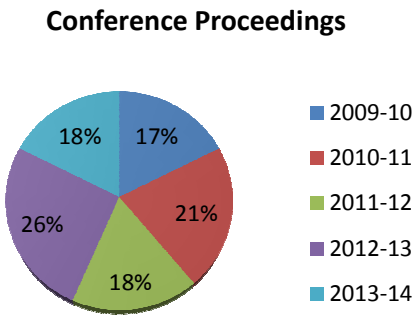

Fig 4.9f: Conference Proceedings

In case of editorials, 100% editorials were published during 2011-12 academic years. Rest of the period, no editorials had been published. For chapters in the book, it was found that 36% book chapters were published during 2013-2014 followed by 29% book chapters during 2012-2013, 18% book chapters published during 2011-2012, 9% book chapters during 2009-2010, and 8% book chapters during 2010-2011 academic years. In case of conference proceedings, it was observed 26% conference papers published during 2012-2013 followed by 21% conference papers during 2010-2011 whereas 18% conference papers published during 2009-2010, 2011-2012 and 2013-2014 academic years separately.

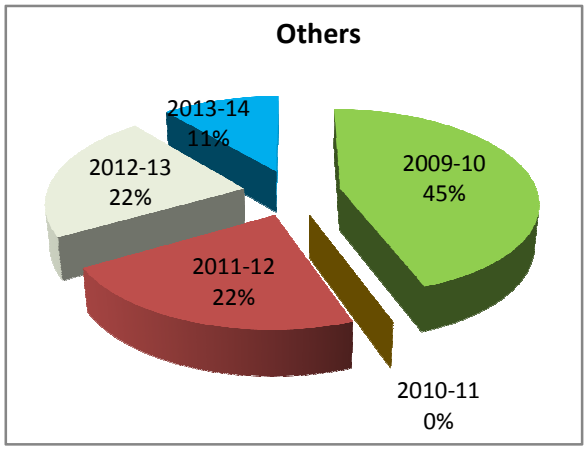

Fig 4.9g: Other Forms of Publication Medium

In the form of other publication medium, it was observed that 45% publications came out during 2009-2010 academic year followed by 22% publications came out during 2011-2012 and 2012-2013 academic years separately. Further, only 11% publications came out during 2013-2014 academic year while no publications has been reported in any other medium during 2010-2011 academic years.

4.2.10 Distribution of Authorship Pattern

Following table 4.11 display authorship patterns of faculty members of Science & Technology departments of Mizoram University supported by different figures below.

Table 4.11: Distribution of Authorship Pattern

SN	Authorship Patterns	2009-10	2010-11	2011-12	2012-13	2013-14	Total
1.	Single Author	18	19	16	29	40	122
2.	Two Authors	27	39	59	43	59	227
3.	Three Authors	24	25	34	47	44	174
4.	Four Authors	22	13	12	17	43	107
5.	Five Authors	13	15	9	6	14	57
6.	More than Five Authors	5	14	8	13	5	45
Total		109	125	138	155	205	732

From the analysis of table 4.11 and figure 4.10, it has been observed that two authorship pattern had shown tremendous growth (218%) among faculty members of Science & Technology with few ups and downs during the study period. The three authorship pattern had shown 183% growth during the study period among faculty members with continuous ups for four academic years and downs during last academic year.

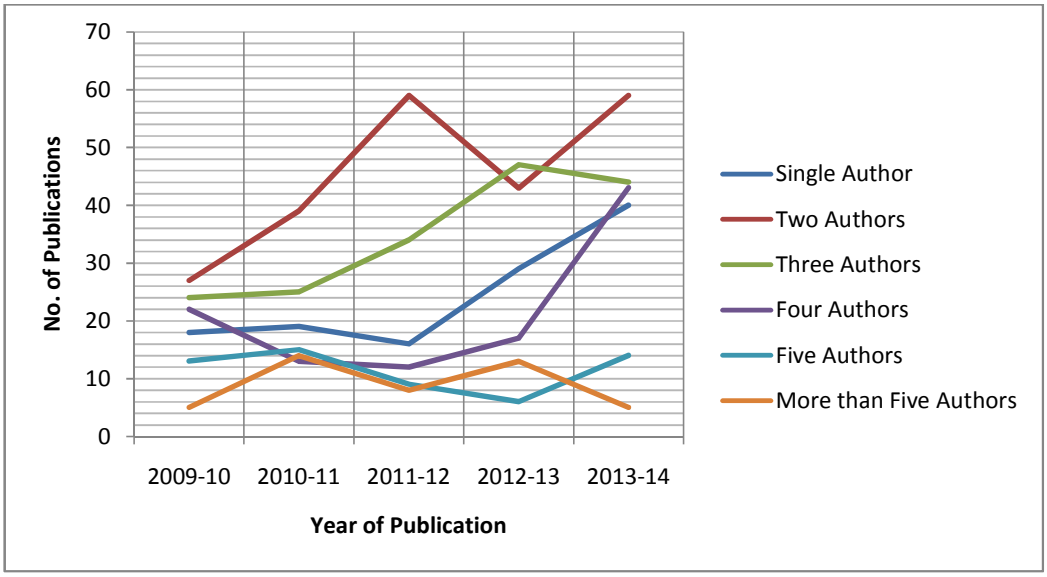

Fig. 4.10: Distribution of Authorship Pattern

The single authorship pattern had shown tremendous (222%) growth among faculty members during the study period with one down in authorship during 2011-12. Four authorship patterns had shown 195% growth during the study period while five

authorship patterns had shown 107% growth among faculty members. Moe than five authorship patterns also existed with no growth during whole study period but during three academic years some growth had been observed for more than five authorship pattern.

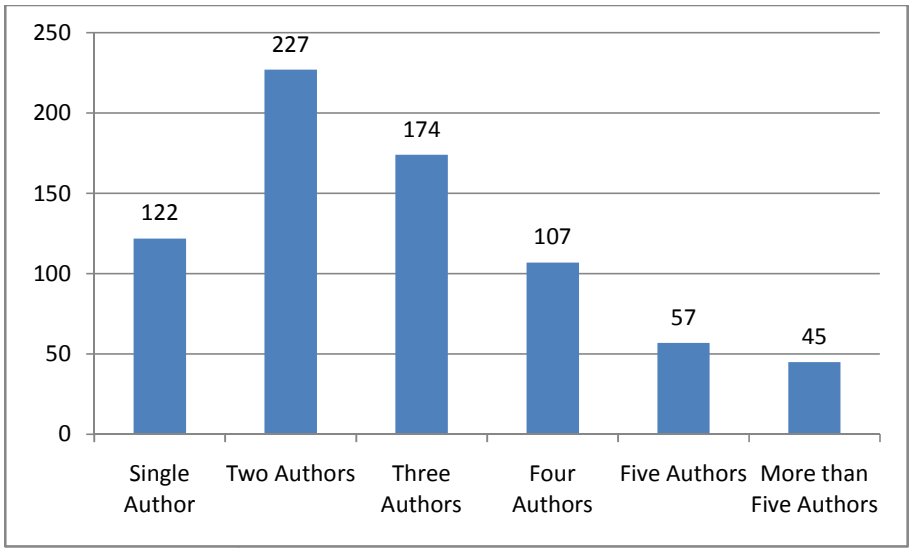

Fig. 4.11: Authorship Patterns - Comparison

From the analysis of figure 4.11, it had been found that two authorship pattern is most prevalent amongst faculty members of Science & Technology departments under Mizoram University followed by three authors, single author, four authors, five authors and more than five authors.

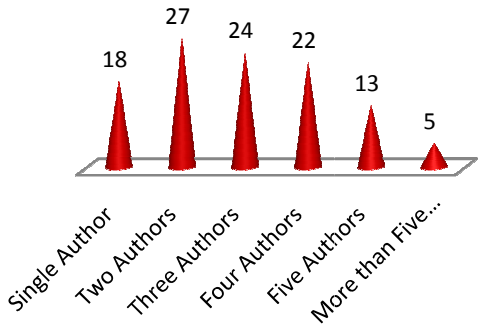

Fig 4.11a: 2009-2010

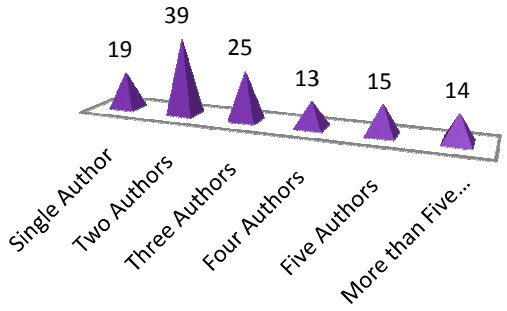

Fig 4.11b: 2010-2011

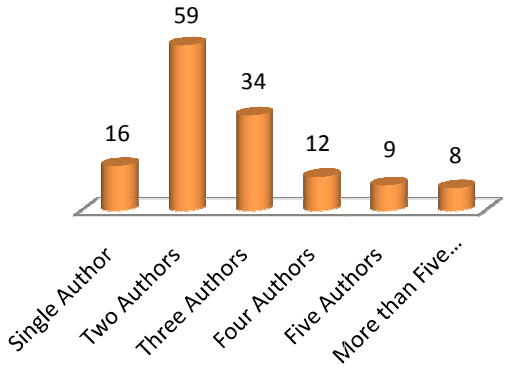

Fig 4.11c: 2011-2012

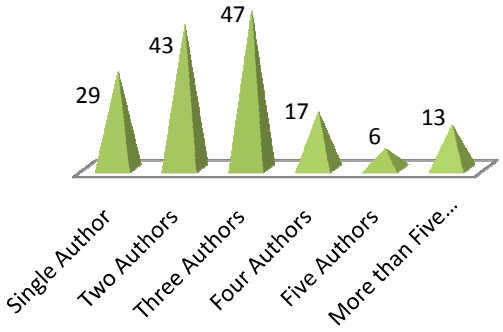

Fig 4.11d: 2012-2013

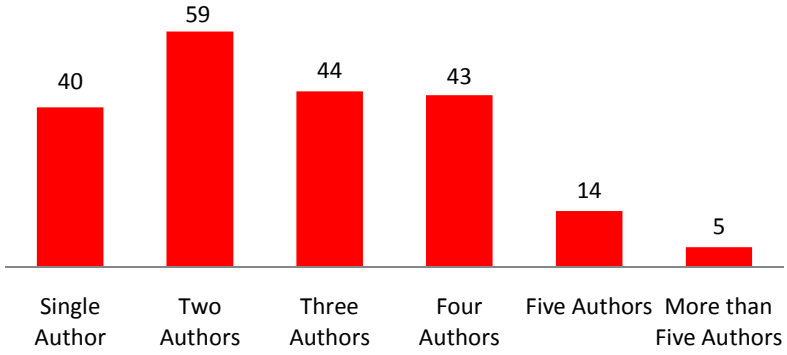

Fig 4.11e: 2013-2014

As per year wise analysis of authorship pattern, it had been found that during 2009-2010 academic years, 25% publications were published as two authorship pattern followed by 22% publications as three authorship, 20% publications as four authorship, and 16.5% publications as single authorship patterns. For the case of 2010-2011 academic years, it was found that 31.2% publications were published as two authorship pattern while 20% publications were published as three authorship and 15.2% publications were published as single authorship patterns. In the 2011-2012 academic years, 43% publications had been published by two authorship pattern while 25% publications published as three authorship pattern followed by 11% publications were published as single authorship patterns. For the academic year 2012-2013, three authorship patterns had shown 30% publications followed by 28% publications as two authorship and 19% publications as single authorship patterns. In the case of 2013-2014 academic years, it was found that 29% publications were published as two

authorship pattern followed by 21.4% publications as three authorship, 21% publications as four authorship, and 19.5% publications as single authorship patterns.

4.2.11 Numbers of Productive Journals

The journals preferred for publication of research output of individual faculty members is treated as productive journals. Each faculty members had different productive journals where their research output had been published. The total counting of such productive journals for the same department had been given here and names of the productive journals subject wise provided in the appendix - II.

Table 4.12: Number of Productive Journals

SN	Name of Department	No. of Productive Journals
1	Biotechnology	16
2	Botany	28
3	Chemistry	36
4	Civil Engineering	4
5	Computer Engineering	3
6	Electrical Engineering	3
7	Electronics & Communication Engineering	19
8	Environmental Science	12
9	Forestry	36
10	Geography & Resource Management	24
11	Geology	10
12	Horticulture, Aromatic & Medicinal Plants	24
13	Information Technology	4
14	Mathematics & Computer Science	19
15	Physics	34
16	Zoology	30

From the table 4.12, it was found that Department of Forestry (36) and Chemistry (36) had highest number of productive journals where faculty members published their research output followed by Physics (34), Zoology (30), Botany (28), HAMP (24), Geography & RM (24), Mathematics & Computer Science (19), Electronics and Computer Engineering (19), Biotechnology (16), Environmental Science (12) and Geology (10). Other departments had less than 10 productive journals majority belong to Engineering stream.

4.2.12 Research Output in Impact Factor Journals (July, 2009 - June, 2014)

Analysis of the number of research output published in Impact Factor (IF) journals during the period of 2009-2014 has been discussed in table 4.13.

Table 4.13: Research Output in Impact Factor Journals

SN	Category of Impact Factor (IF)	No. of Publications	Percentage
1	Without IF	149	46%
2	IF between 1-5	170	52.3%
3	IF between 6-10	6	1.7%
4	IF between 11-15	0	0
5	IF More than 15	0	0
Total		325	100%

(Source: Data as reported by faculty members)

From the table 4.13, it has been found that 52.3% research publications had been published in the journals with Impact Factor (IF) 1-5 whereas 1.7% publications appeared in journals with Impact Factor 6-10. There was significant number of publications (46%) that published in the journals without any Impact Factor. However no publications were reported with Impact Factor between 11-15 and Impact Factor with more than 15.

4.2.13 Number of Citations based on Google Scholar Database (since 2010)

Analysis of the number of citations based on Google Scholar database since 2010 has been discussed in table 4.14.

Table 4.14: Number of Citations based on Google Scholar (since 2010)

SN	Number of Citations	No. of Publications	Percentage
1	Without Citations	285	52%
2	Citations between 1-25	229	42%
3	Citations between 26-50	16	3%
4	Citations between 51-75	7	1%
5	Citations more than 75	9	2%
Total		546	100%

(Source: Data as reported by faculty members)

On the analysis of table 4.14, there was 52% publication without any citation as reported by faculty members. Further, 42% publications had citations between 1-25 followed by 3% publications had citations between 26-50, 1% publications had

citations between 51-75, and 2% publications had citations more than 75 since 2010 based on Google Scholar database.

4.2.14 Number of Citations based on Scopus Database (since 2009)

Analysis of the number of citations based on Scopus database since 2009 has been discussed in table 4.14.

Table 4.15: Number of Citations since 2009 based on Scopus Database

SN	Number of Citations	No. of Publications	Percentage
1	Without Citations	63	58.3%
2	Citations between 1-25	37	34.2%
3	Citations between 26-50	6	5.5%
4	Citations between 51-75	1	1%
5	Citations more than 75	1	1%
Total		108	100%

(Source: Data as reported by faculty members)

Based on the observation of table 4.15, there was 58.3% publication without any citation as reported by faculty members. Further, 34.2% publications had citations between 1-25 followed by 5.5% publications had citations between 26-50, 1% publications had citations between 51-75 and more than 75 respectively since 2009 based on Scopus database.

4.2.15 *h-index* and *i-10* index since 2010 based on Google Scholar and Scopus

Analysis of the *h-index* and *i-10 index* since 2010 based on Google Scholar and Scopus databases has been discussed in table 4.16.

Table 4.16: *h-index* and *i-10* index since 2010 based on Google Scholar and Scopus

School	**Name of Faculty**	***h*-index value**		***i-10* index value**	
		Google Scholar	**Scopus**	**Google Scholar**	**Scopus**
School of Life Science	Bhim Pratap Singh	6	--	5	--
	Thangjam Robert Singh	4	--	--	--
	G S Solanki	6	--	3	--
	G C Jagetia	31	--	72	--
	HT Lalremsanga	2	--	1	--
	Zothansiama	1	--	--	--

	A K Trivedi	5	--	4	--
	Vikas Kumar Roy	4	--	2	--
School of Physical Science Mathematics & Computer Science	Diwakar Tiwari	18	18	27	--
	Ved Prakash Singh	5	--	2	--
	S S Singh	5	2	3	1
	Jay Prakash Singh	2	--	--	--
	R K Thapa	8	--	5	--
	B Lalremruata	5	--	3	--
School of Earth Science & Natural Resources Management	U K Sahoo	6	--	3	--
	S K Tripathi	13	--	14	--
	Kalidas Upadhyaya	3	--	2	--
	Kewat Sanjay Kumar	2	1	1	1
	V P Sati	6	--	3	--
	Ch Udaya Bhaskara Rao	1	1	--	--
	Benjamin L Saitluanga	1	--	--	--
	A C Shukla	7	--	6	--
	T K Hazarika	4	--	2	--
	Awadhesh Kumar	4	--	--	--
School of Engineering & Technology	N Gopil Singh	1	--	--	--
	L Lolit Kumar Singh	4	--	--	--
	N P Maity	2	--	--	--
	Reshmi Maity	1	--	--	--

(Source: Data as reported by faculty members)

From the analysis of table 4.16, it has been found that out of 80 respondents; only 35% faculty members had shared their h-index and i-10 index value. Rest of the respondents may not be aware with their h-index and i-10 index value or may not want to disclose to public. Amongst these *h-index* values given by Google Scholar database has been reported by all the faculty members and the highest value of *h-index* is 31 of Prof. G C Jagetia followed by Prof. Diwakar Tiwari (18) and Prof. S K Tripathi (13). The *i-10 index* value given by Google Scholar was also reported by some faculty members having highest value of 72 by Prof. G C Jagetia followed by Prof. Diwakar Tiwari (27) and Prof. S K Tripathi (14). For the case of *h-index* and *i-10 index* values based on Scopus database, few of them reported their values. Majority of the respondents does not have this value due to non subscription of Scopus database in the university library and respondents may not be aware of that also. Respondents those had reported Scopus based values; they might have got it from some other place or library or university.

4.2.16 Ph. D and M. Phil. Dissertations Submitted/Awarded

Analysis of the number of Ph. D. and M. Phil. dissertations submitted/awarded during the period July, 2009 – June, 2014 has been discussed in table 4.17 and supported by figure 4.12.

Table 4.17: Ph. D. and M. Phil. Dissertations Submitted/Awarded

SN	Time Duration	No. of M. Phil.		No. of Ph. D.	
		Submitted	Awarded	Submitted	Awarded
1	2009-10	0	1	1	3
2	2010-11	0	0	3	5
3	2011-12	0	0	2	7
4	2012-13	0	1	6	20
5	2013-14	1	1	12	18
Total		1	3	24	53

(Source: Data as reported by faculty members)

Based on the observation of table 4.17 and figure 4.12, it has been found that number of M. Phil. submission and award was very less during the five year of study period. This may be due to less number of Departments offered M. Phil. courses in Science & Technology stream. School of Engineering and Technology had only under graduate courses and does not offers Post Graduate and Research which also causes less number of M. Phil. Production by the faculty members.

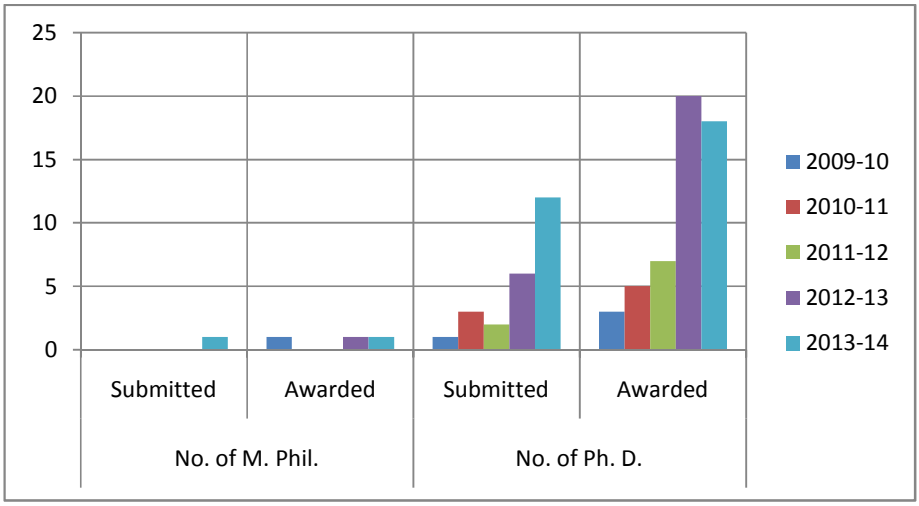

Fig. 4.12: No. of Ph. D. & M. Phil. Submitted/ Awarded

In case of Ph. D. submission and award, total numbers of awarded Ph. D. dissertations were more than submitted. Though increase was observed in submitted and awarded Ph. D. dissertations during five years of study period.

4.2.17 Minor/ Major Research Projects Undertaken

The number of minor/major research projects undertaken during July, 2009 – June, 2014 has been discussed in table 4.18 supported by figure 4.13 for clear interpretation.

Table 4.18: Minor /Major Research Projects Undertaken

SN	Time Duration	Minor Projects		Major Projects	
		Ongoing	Completed	Ongoing	Completed
1	2009-10	0	2	4	3
2	2010-11	0	3	4	6
3	2011-12	0	2	4	9
4	2012-13	0	4	13	8
5	2013-14	5	2	25	9
Total		5	13	50	35

(Source: Data as reported by faculty members)

The table 4.18 and figure 4.13 clearly indicates that ongoing minor projects during the study period were few and observed in 2013-2014 academic year only whereas completed minor projects were more than ongoing during study period and on an average 2.6 projects completed every year during five years of time. In case of major research projects, numbers of ongoing projects were more than completed. Sudden increase has been observed during 2012-13 and 2013-14 academic years for ongoing major projects while completed projects have shown their completeness since 2011-12 to 2013-14 academic years. In another way, Science and Technology departments of Mizoram University tends to get more number of major research projects than minor projects. The detailed list of some minor and major research projects have been given in appendix - III.

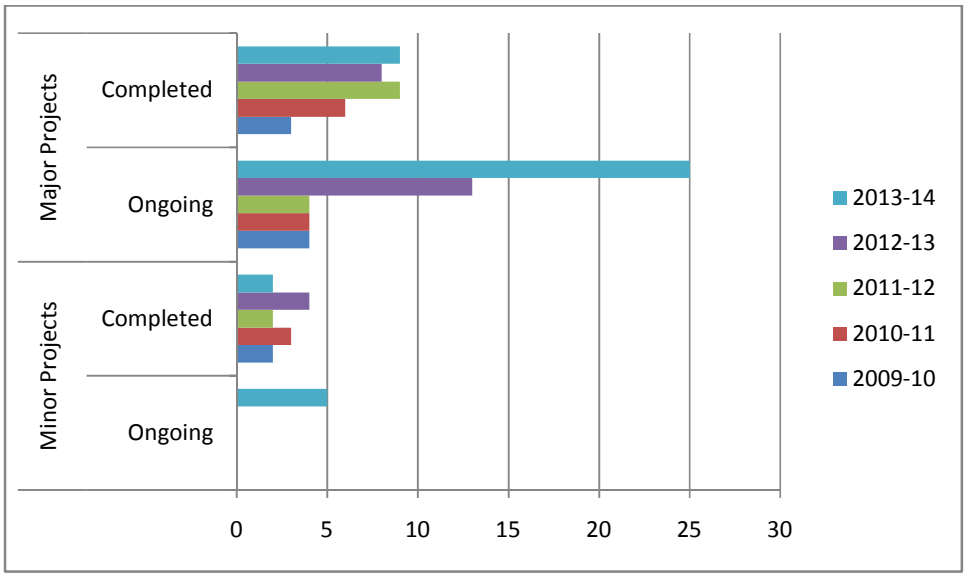

Fig. 4.13: No. of Minor & Major Research Projects

4.2.18 Constraints Faced during Research Activities

During conduction of research, a researcher has to face many challenges. These challenges affect researcher's performance in research activities. To know the problems faced by a researcher during his/her research work, some genuine problems had been notified and asked to give their views on these problems. Table 4.19 is showing such constraints faced by researchers and measured based on the five point scale. The responses were recorded as 'Strongly Disagree', 'Disagree', 'Not Sure', 'Agree' and 'Strongly Agree'. There were total 80 respondents having different views on each constraint.

Table 4.19: Constraints Faced during Research Activities

SN	Inhibitors/ Constraints	SD	D	NS	A	SA	Total
1	Difficulty in locating the appropriate information resource in library.	3	26	18	29	4	80
2	Isolate location of central library from your work place.	3	16	8	33	20	80
3	Lack of physical infrastructure at your department.	5	19	9	34	13	80
4	Internet connectivity problem.	1	23	12	30	14	80
5	Lack of financial support from university.	1	26	15	34	4	80
6	Lack of research projects / funding from sponsoring agency.	3	37	16	22	2	80
7	Lack of your personal interest in research activity.	31	40	7	2	0	80
8	Family responsibilities decrease your research interest.	17	28	17	17	1	80

Legends: SD=Strongly Disagree, D=Disagree, NS=Not Sure, A=Agree, SA=Strongly Agree

❖ **Difficulty in Locating the Appropriate Information Resources in Library**

It is evident from the figure 4.14a, 36% (29) faculty members were 'Agree' and 5% (4) were 'Strongly Agree' that they faced difficulty in locating the appropriate information resources in library whereas 32.5% (26) were 'Disagree' and 4% (3) were 'Strongly Disagree' to this constraint. Approximately 22.5% (18) faculty members were 'Not sure' to this constraint. If we divide the opinion into two responses 'Agree' and 'Disagree', it has been found that 41.25% (33) faculty members were 'Agree' and 36% (29) were 'Disagree' to the question raised.

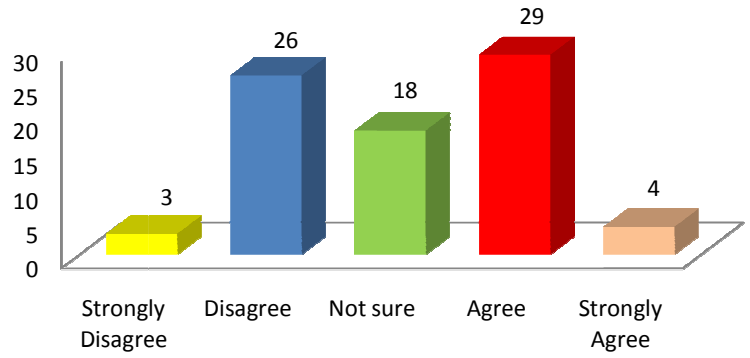

Fig 4.14a: Difficulty in Locating the Information Resources in Library

❖ **Isolate Location of Central Library from Work Place**

From the figure 4.14b, it is evident that 41% (33) faculty members were 'Agree' and 25% (20) were 'Strongly Agree' to the isolate location of central library from their work place and caused a problem/difficulty in their research work.

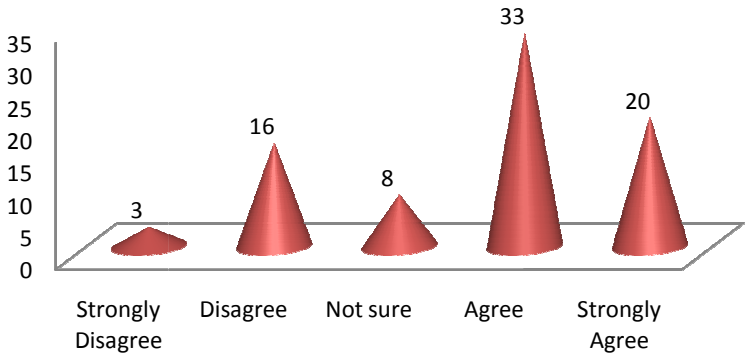

Fig 4.14b: Isolate Location of Central Library from Work Place

In spite of that 20% (16) were 'Disagree' and 4% (3) were 'Strongly Disagree' feels isolate location of central library was a constraint to their research work. 10% (8) faculty members were 'Not Sure' that isolated location of central library was a problem for their research work or not.

❖ **Lack of Physical Infrastructure in the Department**

It is evident from the figure 4.14c, 43% (34) faculty members were 'Agree' and 16% (13) were 'Strongly Agree' that physical infrastructure available at the department was not sufficient to undertake research whereas 24% (19) were 'Disagree' and 6% (5) were 'Strongly Disagree' to this constraint. Approximately 11% (9) faculty members were 'Not sure' that physical infrastructure affects their research activity. Approximately 58.75% faculty members were 'Agree' or more than that to the lack of physical infrastructure as a problem for their research activity.

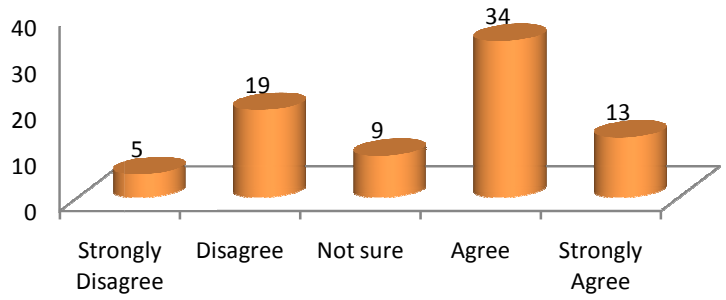

Fig 4.14c: Lack of Physical Infrastructure at the Department

❖ **Internet Connectivity Problem**

With regard to Internet Connectivity problem, from the figure 4.14d, it has been observed that 37.5% (30) faculty members 'Agree' to the constraint and 17.5% (14) were 'Strongly Agree' that they were facing Internet Connection problem in their research work while 29% (23) were 'Disagree' and 1.25% (1) was 'Strongly Disagree' to it. Further, 15% (12) faculty members were 'Not Sure' for the Internet Connection as a problem for their research activity. Further, 55% faculty members were facing Internet Connection as a problem for running their research activities within the university premises.

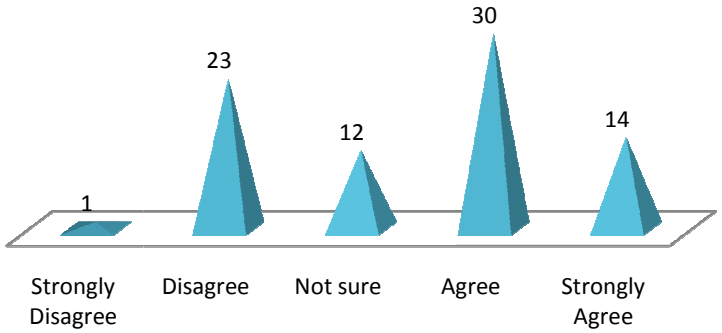

Fig 4.14d: Internet Connectivity Problem

❖ **Lack of Financial Support from University**

The faculty members were asked to express their opinion regarding 'lack of financial support from university' in their research work and found that 42.5% (34) faculty members were 'Agree' to this inhibition while 32.5% (26) were 'Disagree' to it. However, 19% (15) faculty members were 'Not Sure' about this inhibition. Further 5% (4) were 'Strongly Agree' to it and 1.25% (1) faculty members were 'Strongly Disagree' to this constraint.

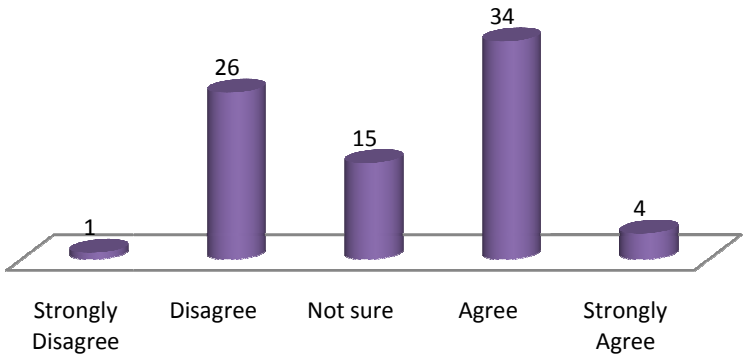

Fig 4.14e: Lack of Financial Support from University

❖ **Lack of Research Projects/ Funding from Sponsoring Agency**

With regard to lack of research projects/ funding from sponsoring agency, from the figure 4.14f, it has been observed that 46% (37) faculty members were 'Disagree' to this opinion while 4% (3) were 'Strongly Disagree' to this opinion. However, 27.5% (22) were 'Agree' that financial assistance is a problem in conducting their research work whereas only 2.5% (2) were 'Strongly Agree' to it. Moreover, 20% (16) faculty members were 'Not Sure' about this constraint. Though majority of them feels that

research projects/ funding from sponsoring agency was not a big problem in their research activities.

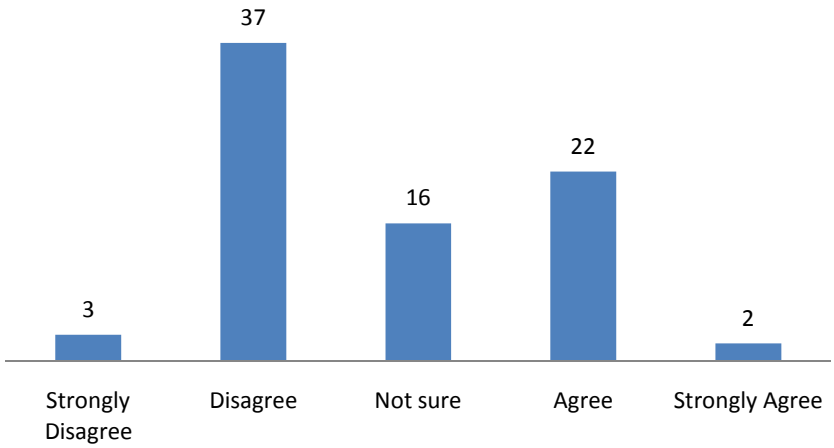

Fig 4.14f: Lack of Research Projects/ Funding from Sponsoring Agency

❖ **Lack of Personal Interest in Research Activity**

The faculty members were asked to state whether they have lack of personal interest in research activity. The figure 4.14g indicates that 50% (40) faculty members were 'Disagree' with this opinion whereas 39% (31) were 'Strongly Disagree' to it. Though, 9% (7) faculty members were 'Not Sure' about this opinion while only 2.5% (2) were 'Agree' that they did not have any personal interest to do research activity. Based on the observation, it has been concluded that 88.75% faculty members had personal interest to conduct research and this was not a problem in their low research output.

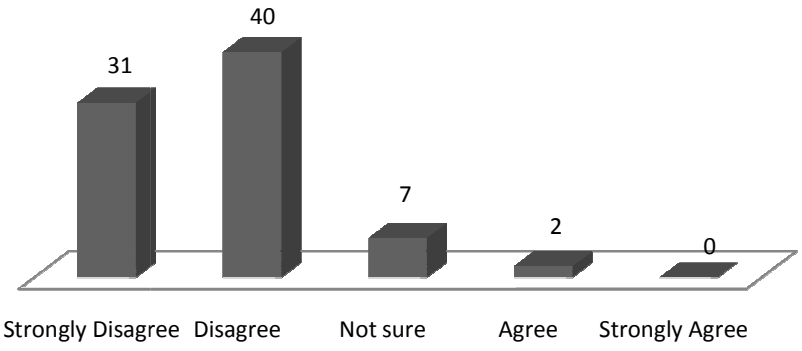

Fig 4.14g: Lack of Personal Interest in Research Activity

❖ **Family Responsibilities Decreases Research Interest**

To know whether family responsibilities played a role in decreasing research interest, 35% (28) faculty members expressed that they 'Disagree' to this opinion while 21.25% (17) were 'Strongly Disagree'. Further, 21.25% (17) faculty members were 'Not Sure'. Approximately 21.25% (17) faculty members feel that family responsibilities affected their research interest while only 1.25% (1) was 'Strongly Agree' to it.

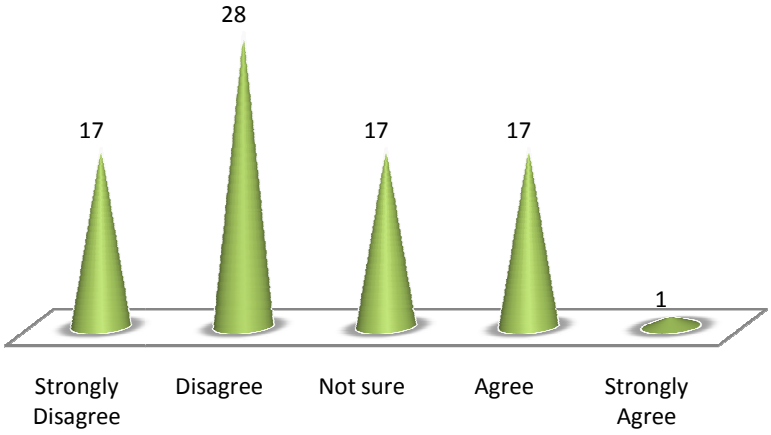

Fig 4.14h: Family Responsibilities Decreases Research Interest

4.2.19 Suggestions for Improvement of Research Output

The faculty members have been asked to provide suggestions, if any, for the improvement of Science & Technology department's research output. Following are some genuine suggestions provided by the faculty members belong to Science & Technology departments of the university.

a. All kind of local interferences should be stopped during selection of suitable and research minded research scholars in the departments. Research scholars selected through some interference does not have any research capability and tends to scholarship only.
b. There is lack of subscription of sufficient online journals and databases of Science & Technology stream in the library which should be increased.
c. There is inadequate research scholars' laboratory, equipments, facilities, glassware, and classroom facilities which should be improved. Apart from the physical infrastructure, land facility is inadequate to carryout field based research in some Science departments.

d. There are many complications in financial assistance with the sponsoring agency and sometimes from university itself hampers the research activities.
e. The extra workload of CBCS pattern of academic programs reduces the time slot for research activities.
f. The poor and disturbed Internet connectivity creates problem during research communication, data collection, information or literature searching, and updating the existing knowledge.
g. Due to hilly terrain, location of Central Library is not easier for every department which causes transport problem and it is more time consuming also. Library opening hours on paper is more but library staffs used to close it before time and sometimes not co-operative also.

4.3 Research Findings

The analysis of the data collected through the questionnaires has revealed a number of findings which are as follows:

1) Out of total, 80.8% faculty members responded to the questionnaires distributed to them. The highest response rates (100%) came from Botany, Geography & Natural Resources Management, Civil Engineering, and Planning & Architecture departments amongst 17 Science & Technology departments of the university. Amongst 5 schools of studies School of Fine Arts and Fashion Technology had highest response rate (100%).
2) There were 80% male and 20% female respondents. Majority (47.5%) of the respondents belong to 31-40 age groups which show that majority of the faculty members of Science & Technology departments are younger in age. Interestingly, all the female faculty members were young and they all were belongs to less than 30 and 31-40 age groups only.
3) Majority (74%) of faculty members belong to Assistant Professor Category. Further 18.75% faculty members belong to age group less than 30 which included 100% Assistant Professors. Out of total, 47.5% faculty members belong to age group 31-40 which included 95% Assistant Professors only. At all levels of academic positions, Assistant Professors were more than Professors and Associate Professors. In terms of age and academic positions, again Assistant Professors were more at younger age group while Professors were more at higher age group.

4) Majority (74%) faculty members belong to Assistant Professor Category followed by 21% Professors and 5% Associate Professors only. Approximately 66% faculty members were Ph. D. qualified and only 5% were M. Phil. Further, amongst Ph. D. qualified faculty members 62% belong to Assistant Professor only. Amongst all the Assistant Professors, 56% had Ph. D. qualified, 37% Masters qualified and only 7% M. Phil.
5) There were 41% faculties had experience of 1-5 years in their career while 30% faculties had the experience of 6-10 years. Majority of them belong to Assistant Professors only. All Professors had experience more than 10 years and majority of them had 11-20 years of experience.
6) There were 75% faculties had publication range from 1-20 in last five academic years i.e. July 2009 – June 2014 and most of them belong to Assistant Professor category. Out of total Assistant Professor Category, 68% had publication range from 1-10 whereas in Professor Category, 53% had more than 21 publications.
7) Out of the 80 faculty members who responded to the questionnaire, more than 71% had 1-10 years of teaching experience.
8) 88% faculty members preferred articles published in the form of journal for their research publications followed by conference papers (48.75%) and book chapters (21.25%).
9) Faculty members of Science & Technology departments of Mizoram University had published their most of the research output in the form of journal articles followed by conference proceedings and chapters in books. Further it has been noted that journal articles and book chapters had shown tremendous growth during five years of duration while publication as conference papers had shown fluctuations year wise but still second most published medium. In case of journal articles only, majority (29%) of journal articles published during 2013-14 academic years. For chapters in the book, it was found that majority (36%) of book chapters were published during 2013-2014 academic years. In case of conference proceedings, majority (26%) of conference papers published during 2012-2013 academic years.
10) In Science & Technology departments, single authorship pattern (222%), two authorship pattern (218%), four authorship pattern (195%), and three authorship pattern (183%) had shown tremendous growth during the study

period among faculty members. From the analysis, it had been found that two authorship pattern is most prevalent amongst faculty members of Science & Technology departments under Mizoram University followed by three authors, single author, four authors, five authors and more than five authors.

11) As per year wise analysis of authorship pattern, during 2009-2010 academic years majority (25%) of publications were published as two authorship pattern; for the case of 2010-2011 academic years, 31.2% publications were published as two authorship pattern again; during 2011-2012 academic years, majority (43%) of publications had been published by two authorship pattern; for the academic year 2012-2013, three authorship patterns had shown major (30%) publications; and for the 2013-2014 academic years, majority (29%) of publications were published as two authorship pattern.
12) Department of Forestry (36) and Chemistry (36) both had highest number of productive journals followed by Physics (34), Zoology (30), Botany (28), HAMP (24), and Geography & RM (24).
13) More than 52% research publications had been published in the journals with Impact Factor (IF) 1-5 whereas 46% publications were without any Impact Factor.
14) Approximately 52% publications were without any citation while 42% publications had citations range 1-25 since 2010 based on Google Scholar database. Higher citation range has not been observed for many publications during the study period.
15) Based on Scopus database (since 2009), there were more than 58% publications without any citation. Approximately 34% publications had citations between 1-25 whereas 6% publications had citations between 26-50.
16) Out of 80 respondents, only 35% faculty members had *h-index* and *i-10 index* value. Few faculty members have high *h-index* and *i-10 index* value for their publications.
17) The number of M. Phil. submission and award was very less during the five year of study period. In case of Ph. D., total numbers of awarded Ph. D. dissertations were more than submitted.
18) In case of minor projects, completed minor projects were more than ongoing minor projects during study period and in case of major research projects, numbers of ongoing projects were more than completed. Science and

Technology departments of Mizoram University tend to get more number of major research projects than minor projects.

19) Majority (41%) of faculty members accepted that they faced difficulty in locating the appropriate information resources in library. Further 66% faculty members were 'Agree' that isolate location of central library from their work place caused a problem/difficulty in their research work.

20) For the case of lack of physical infrastructure in the department, majority (59%) of faculty members were inclined that physical infrastructure available at the department was not sufficient to undertake research. With regard to Internet connectivity problem, 55% faculty members were facing Internet connectivity is a problem for running their research activities within the university premises.

21) More that 47% faculty member found lack of financial support from university is an inhibition in their research activity. Further, with regard to lack of research projects/ funding from sponsoring agency, 50% faculty members were declined to this opinion and feel that research projects/ funding from sponsoring agency was not a big problem in their research activities.

22) Majority (89%) of faculty members were not in favor with the opinion that they do not have personal interest in research activities. Further, to know whether family responsibilities played a role in decreasing research interest, 56% faculty members expressed negatively that family responsibilities did not affected their research interest.

23) The faculty members have been asked to provide suggestions, if any, for the improvement of Science & Technology department's research output. Following are some genuine suggestions provided by the faculty members belong to Science & Technology departments of the university:

    a. All kind of interferences should be stopped during selection of suitable and research minded research scholars in the departments
    b. More number of online journals and databases should be subscribed.
    c. Physical infrastructure at the department should be increased for research purposes.
    d. Financial complications should be reduced in any kind of research projects.
    e. Teaching workload should be reduced to get more time for research.

f. Internet connectivity problem should be shorted out quickly.

g. Proper transportation should be available for visiting library and timing should be proper.

CHAPTER- V

CONCLUSION & SUGGESTIONS

5.1 Introduction

Research plays a vital role in the development of society. Many research oriented organizations and academic institutions are involved in research to find out the solutions for the problems exists within the society. Universities and their various departments' conducts research to find out the problems associated with their subject domains for the betterment of the society. Research output of university departments' comes in the form of research publications, patents, drug discovery, trademarks etc. These research outputs measured through various tools and techniques available in the academic and research field viz. *h-index*, *i-10 index*, citations, impact factors etc. Measuring the research output of university departments' is a kind of assessment. Information regarding factors that influence research output of academic staff in universities will be of interest to a large number of institutions that are currently dealing with ways to retain their academic status in the global university community.

5.2 Conclusion

Research output measures the outcome of a researcher in the form of publications, patents or any other. This becomes the criteria for evaluation of scholarship of a researcher since long. More research output by a researcher gives him more reputation and scholarly credit among academic world. Citations to the research papers and Impact Factor of the journals have given new dimension to this research output. Faculty members are trying to publish their research outcome in quality journals with high impact factors for getting more academic credit which helps in their personal promotion during his academic career also. With regard to present study conducted on faculty members of Science & Technology departments of Mizoram University, it has been observed that except few cases, faculty members were worried to produce more research output. The conclusion has been divided into following three sections as raised in the form of objectives of the study:

a) Socio-Demographic Characteristics of Faculty Members

With regard to demographic data about male and female, male faculty members were dominant over female in Science & Technology departments of Mizoram University. The younger generation of faculty members was more that elder one and all female belongs to younger generation only. The faculty members at younger age were almost all Assistant Professor Level while elder persons were almost all Professor Level

except few Associate Professors in both age levels. The age and designation have direct relationship with each other and that reflected positively in the present study also. In terms of age and academic positions, Assistant Professors were more at younger age group while Professors were more at higher age group. Academic qualification is one of the criteria for selection as well as for observation of scholarship of the faculty also. In this regard, out of total respondents, about three fourth (¾) faculty members belong to entry level i.e. Assistant Professor and out of them majority have been Ph. D. qualified. In all academic positions, two third of the faculty members have highest academic qualification i.e. Ph. D. Since majority of faculty belongs to Assistant Professor Level, so their working experience and research experience were also less than those who were in higher academic positions.

b) Trend, Growth and Forms of Research Output

During the study period, Assistant Professor Level faculties were having less number of total research output than Associate Professor and Professor. The numbers of publications were affected by the experience of faculty members. More experienced faculty have more number of publication during the period, may be due to more number of research projects they have as well as more number of research scholars and research collaborations they have developed than less experienced faculties. More than 2/3 faculties had less than 10 years of experience which also reduces their research output. Research output in the form of journals article was prevalent amongst faculty members followed by conference papers and book chapters. Further it has been noted that journal articles and book chapters had shown tremendous growth during five years of duration while publication as conference papers had not shown the same growth but still second most published medium. The growth in authorship patterns have observed during study period while two authorship pattern was the most prevalent amongst faculty members of Science & Technology departments under Mizoram University followed by three authorship, single authorship, and four authorship.

With regard to publications in Impact Factor journals, still majority of science & technology research output published with journals having Impact Factor (IF) 1-5. But more or less half of the total research outputs were published in the journals without any Impact Factor. Majority of science & technology publications were without any

citation as generated by Google Scholar since 2010. Higher citation range has not been observed for many publications during the study period. Similarly based on Scopus database (since 2009), majority of publications were without any citation and only one third of publications had citation range between 1-25 and lacks higher citation range. Moreover, only 35% faculty members had *h-index* and *i-10 index* value for their research outputs. Faculty members were producing more number of doctoral researchers than M. Phil. In case of research projects, Science and Technology departments of Mizoram University tend to get more number of major research projects than minor projects.

c) Inhibitors on Research Activity

There were many inhibitors to the research activities as observed by faculty members. Location of appropriate information resources in the library and isolated location of central library create hindrance in research work. Further, lack of physical infrastructure at the department and poor Internet connectivity is also a problem for running research activities properly. Lack of proper financial support from the university is an inhibition in research while research projects/ funding from sponsoring agency is not a big problem in research. With regard to lack of personal interest in research and family responsibilities cause barrier to research activities, majority of faculty members were not in favor with both the opinions.

5.3 Suggestions

During the research work, many points have been observed for the improvement of Science & Technology department's research output. Following are some suggestions:

a) Physical infrastructure of Science & Technology departments of Mizoram University needs to upgrade and maintained properly and for this purpose separate fund should be allocated.
b) Poor connectivity of Internet and low bandwidth should be improved.
c) University should also start to give financial support for minor projects level so that new faculty members can take the benefit of it and based on that experience they may apply for major research projects in future.
d) More number of online journals and databases should be subscribed in central library. Mobile library facility can be started for university departments.

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Appendix - I

RESEARCH OUTPUT OF SCIENCE & TECHNOLOGY FACULTY MEMBERS OF MIZORAM UNIVERSITY

Dear Sir,

I am pursuing M. Phil. from Department of Library and Information Science, Mizoram University, Aizawl. As a component of the syllabus, I have to submit my dissertation on the above mentioned topic under the guidance of Dr. Akhandanand Shukla. You are requested to kindly fill up this questionnaire, which will be used for only academic purpose.

(Please answer the question or tick mark in the box provided against each question)

R. Lalengmawia
M. Phil. Student
Department of Library and Information Science
Mizoram University, Aizawl

1. Name of the Respondent : _____

2. Name of the Department : _____

3. Name of the School which you belongs to
   - School of Life Sciences ☐
   - School of Physical Sciences ☐
   - School of Earth Sciences & NRM ☐
   - School of Engineering & Technology ☐
   - School of Fine Arts, Architecture & Fashion Technology ☐

4. Gender
   - Male ☐
   - Female ☐

5. Age
   - Less than 30 yrs ☐
   - Between 31-40 yrs ☐
   - Between 41-50yrs ☐
   - 51 yrs or more ☐

6. Academic Position
   - Assistant Professor ☐
   - Associate Professor ☐
   - Professor ☐

7. Last academic qualification :
   - Ph. D. ☐
   - M. Phil. ☐
   - Master Degree ☐
   - Others (please specify)……

8. Teaching Experience:
   - 1-5 yrs ☐
   - 6-10 yrs ☐
   - 11-15 yrs ☐
   - 16-20 yrs ☐
   - 21-25 yrs ☐
   - 26-30 yrs ☐
   - 31 yrs or More ☐

9. How many publications do you have since last five years (July 2009 – June 2014)?
   - 1-10 ☐
   - 11-20 ☐
   - 21-30 ☐
   - More than 30 ☐

10. What is the preferred medium of research publication during July 2009 – June 2014?
    - Textbooks ☐
    - Book chapters ☐
    - Co-Authored Textbooks ☐
    - Journal Articles ☐
    - Technical Reports ☐
    - Conference Papers ☐
    - Others ☐

11. Kindly give the number of publications published in the various Publication Media.

S/N	Publication Media	2009-10	2010-11	2011-12	2012-13	2013-14
1.	Journal Articles					
2.	Abstracts					
3.	Reviews					
4.	Editorials					
5.	Chapters in Book					
6.	Conference Proceedings					
7.	News Items					
8.	Patents					
9.	Any other; please mention					

12. Kindly give number of publications published as per distribution of authorship pattern.

S/N	Authorship Pattern	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014
1.	Single Author					
2.	Two Authors					
3.	Three Authors					
4.	Four Authors					
5.	Five Authors					
6.	More than Five Authors					

13. Name of productive journal(s) where your research article(s) are published.

S/N	Name of productive journals
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

14. Kindly give number of research output published according to Journals Impact Factor (JIF) during the period from 2009-2014.

S/N	Category of Impact Factor (IF)	No. of Publications
1.	Without IF	
2.	IF between 1-5	
3.	IF between 6-10	
4.	IF between 11-15	
5.	IF more than 15	

15. Kindly give number of Citations since 2010 based on Google Scholar Database.

S/N	Number of Citations	No. of Publications
1.	Without Citation	
2.	Citations between 1-25	
3.	Citations between 26-50	
4.	Citations between 51-75	
5.	Citations more than 75	

16. Kindly give number of Citations since 2009 based on Scopus Database.

S/N	Number of Citations	No. of Publications
1.	Without Citation	
2.	Citations between 1-25	
3.	Citations between 26-50	
4.	Citations between 51-75	
5.	Citations more than 75	

17. Kindly give *h-index* and *i-10 index* of your research publications since 2010 based on Google Scholar & Scopus Databases.

h-index value		*i-10 index value*	
Google Scholar	Scopus	Google Scholar	Scopus

18. Kindly give number of Ph. D. & M. Phil. Dissertations submitted/produced under your direct supervision (not as joint supervisor) during the period from July 2009 – June 2014.

Duration	No. of M. Phil. Production		No. of Ph. D. Production	
	Submitted	Awarded	Submitted	Awarded
2009-10				
2010-11				
2011-12				
2012-13				
2013-14				

19. Kindly give the number of Minor/Major Research Projects undertaken during the period from July 2009 – June 2014.

Duration	Minor Projects		Major Projects	
	Ongoing	Completed	Ongoing	Completed
2009-10				
2010-11				
2011-12				
2012-13				
2013-14				

20. Kindly give the basic details of Minor/Major Research Projects undertaken by you during the period from July 2009 – June 2014.

Name of Project(s)	Minor/ Major	Amount of Project (Rs.)	Sponsoring Agency	Current Status Ongoing/ completed

21. What are the constraints faced by you when embarking on research activities?

SN	Inhibitors/Constraints	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
1.	Difficulty in locating the appropriate information resource in library.					
2.	Isolate location of central library from your work place.					
3.	Lack of physical infrastructure at your department					
4.	Internet connectivity problem					
5.	Lack of financial support from university					
6.	Lack of research projects/funding from sponsoring agency					
7.	Lack of your personal interest in research activity					
8.	Family responsibilities decreases your research interest					
9.	Any other problem (please specify):					

22. Please suggest if any, for improvement of research output in Science & Technology.

_____
_____
_____
_____
_____
_____
_____
_____

Thanking you very much

(Signature)

Appendix - II

List of Productive Journals – Department Wise

(Source: As reported by faculty members)

SN	Department	Name of the Productive Journals
1.	Biotechnology	Acta Physiologiae Plantarum
		African Journal of Biotechnology
		Applied Biochemistry Biotechnology
		Asian and Australian Journal of Biotechnology
		Austin Journal of Biotechnology and Bio-Engineering
		Current application in Biotechnology
		Current Science
		Desalination
		International Journal of Plant, Animal & EVS
		Journal of Hazardous material
		Journal of Plant Breeding and Genetics
		Microbiological Research
		Mycopathologia
		Science and Technology Journal
		Science Vision
		Surface and Colloid Interface
2.	Botany	American Eurasian Journal of Agriculture
		American Journal of Food Technology
		Applied Microbiology Biotechnology
		Chemosphere
		CRL Critical Reviews in Biotechnology
		Current Science
		Ecological Engineering
		Ethnobotany
		European Journal of Protistology
		Indian Forester
		Indian Journal of Tropical Biodiversity
		Inorganic Biochemistry
		Insect Molecular Biology
		International Journal of Current Microbiology & Applied Sciences
		International Journal of Scientific Research
		Journal of Agroforestry System
		Journal of Econ. Taxon.
		Journal of Nature Conservation
		Journal of Tropical Forestry
		New Phytologist
		Not. Sci. Biology
		Plant Cell and Molecular Biology
		Plant Cell Report
		PLOS One
		Redosphine

		Science Vision
		The Indian Journal of Forestry
		Tropical Forest Ecology
3.	Zoology	Acta Histochemical
		Alternative and Integrative Medicine
		Alytes
		Biological Rhythm Research
		British Journal of Radiology
		Chemico-Biological Interactions
		Current Science
		Ecoprint
		Folia Primatologica
		General & Comparative Endocrinology
		Indian Journal of Experimental Biology
		Integrated Cancer Therapus
		International Journal Environmental Science and Ecology
		International Journal of Biodiversity Bioprospecting & Development
		International Journal of Pharmacet Research
		International Journal of Primatology
		International Wound Journal
		Journal of Molecular Biochemistry
		Journal of Bombay National History Society
		Journal of Natural History Museum
		Journal of Biological Rhythms
		Journal of Experimental Biology
		Journal of Threaten Taxa
		Medicinal and Aromatic Plant Science & Biotechnology
		Multilogic in Science
		Reproduction and Development
		Research in Pharmaceutical Biotechnology
		Science and Technology Journal
		Science Vision
		Zootaxa
4.	Chemistry	Applied Surface Science
		Arkivoc
		Asian Journal of Chemistry
		Biodiversity & Traditional System
		Bioorganic Chemistry
		Chemical and Pharmaceutical Bulletin
		Chemical Engineering Journal
		Cinnese Chemica Letters
		Colloids & Surface Science
		Current Genetics
		Der Chemicasinica
		Environment Science Pollution Research
		Experimental Parasitology
		Geochimica et. Cosmochimca Acta

		Indian Journal of Science & Technology
		International Journal of Researchers in Biosciences Agriculture & Technology
		International Journal of Science & Research
		International Journal of Spectroscopy
		Journal Biomolecular Technology
		Journal Chemistry Engineering Data
		Journal of Advances in Biology
		Journal of Applied Chemistry
		Journal of Chem. and Pha. Research
		Journal of Chemical Science
		Journal of Chemistry
		Journal of Experimental Sciences
		Journal of Indian Engineering Chemical
		Journal of Molecular Structure
		New Journal Chemistry
		NS Journal
		Organic Letters
		Pedosphere
		Research Journal Pharm BiolChem Sci.
		RSC Advances
		Separation and Purification Technology
		Spectrochemica Acta
5.	Mathematics & Computer Science	Applied Mathematics and Computation
		Biosystems
		Bull. Cal. Math. Soc.
		Creative Education
		Far East Journal of Mathematical Education
		Fluid Dynamics Research
		ICCCNT
		International Journal for Numerical and Analytical Methods in Geomechanics
		International Journal of Applied Mathematical & Mechanics
		International Journal of Applied Mathematical Sciences
		International Journal of Mathematical Analysis
		Journal of Vibration and Control
		Meccanica
		Non-Linear Analysis - Real World Applications
		Novi Sad Journal Mathematics
		Science Vision
		Tansui Oxford Journal of Information & Mathematical Sciences
		The Anzian Journal
		The IUP Journal of Computer Applications
6.	Physics	Advanced Condensed Matter Physics
		Annals of Geophysics
		Annals of Nuclear Energy
		Applied Radiation and Isotopes

		Asian Journal of Water, Env. and Pollution
		Bull. Arunachal Forest Res.
		Indian Journal of Radio & Space Physics
		Indian Journal of Scientific Research & Technology
		International Journal of Engineering Science & Research Technology
		International Journal of Engineering Technology Science & Research
		International Journal of Innovative, Engineering & Technology
		International Journal of Modern Physics B
		International Journal of Pharma Research & Bioci.
		International Journal of Physics & Applications
		International Journal of Pure & Applied Physics
		IOSR Journal of Applied Physics
		Journal of Alloys & Compounds
		Journal of Earth System Science
		Journal of Magnetism & Magnetic Matters
		Journal of US-China Medical Science
		Modern Physics Letters B
		Natural Hazard
		Nuclear Data Sheets
		Nuclear Physics A
		Physica B
		Physica Script
		Physica Status Solidi
		Physical Review C
		Physical Review D
		Physical Review Letters
		Science & Technology
		Science Vision
		Surface Reviews Letters
		Surface Science
7.	Environmental Science	Current Science
		Ethnobotanical Leaflets
		Ethnobotany
		Forest Resources of Mizoram
		Indian Journal Tropical Biodiversity
		Journal of Non-Timber Forest Products
		Journal of Threatened Taxa
		Ne Bio
		Pleione
		Science Vision
		Technological Exploration of Fresh Water
		Zootaxa
8.	Forestry	Acta Ecologicasinica
		African Journal of Plant Science
		Agriculture, Ecosystems & Environment, the Netherland

		Agroforestry Systems
		Allelopathy Journal
		Annals of Forest Science
		Current Science
		Food, Agriculture and Environment, the Finland
		Forest Research Paper
		Forests, Trees & Livelihood
		Genetic Resources & Crop Evolution
		Green Farming
		Indian Forester
		Indian Journal of Ecology
		Indian Journal of Forestry
		Indian Journal of Soil Conservation
		International Journal of Environmental Science
		International Journal of Agriculture and Forestry
		International Journal of Pharm. Tech. Research
		Journal of Bamboo and Rattan
		Journal of Forestry Research
		Journal of Hydrology & Hydromechanics
		Journal of Non-timber Fresh Products
		Journal of Science & Technology
		Journal of Sustainable Forestry
		Journal of the Indian Academy of Wood Science
		Journal of Tropical Forest Science
		My Forest
		Plant Ecology
		Researches in Population Ecology, Japan
		Science & Technology Journal
		Sustainable Forestry
		The Bioscan
		The Scientific World Journal
		Tree & Forestry Science & Biotechnology
		Weed Research
9.	Geography & Natural Resource Management	African Journal of Food, Agriculture, Nutrition & Development
		Annals, National Association for Geographers
		ARRJ
		Culture & Space, India
		Geographic
		Hill Geographer
		IJSS & L
		International Journal of Forest Soil & Erosion
		Journal of Demography
		Journal of Earth Sciences & Engineering
		Journal of Earth System Science
		Journal of Ecology & Application
		Journal of Environmental R&D
		Journal of Forests

		Journal of Geography Association of Mizoram
		Journal of Geophysics
		Journal of Livestock Science
		Journal of Mountain Science
		Journal of Scientific Research & Reports
		Journal of Tourism Challenges & Trends
		Journal of Transaction
		JSSR
		Singapore Journal of Tropical Geography
		Social Indicator Research
10.	Geology	E-Journal Earth Sciences of India
		Gondwana Geological Magazine
		Journal of Earth Science
		Journal of Earth System Science
		Journal of Geological Society of India
		Journal of Geographic
		Journal Paleontological Society of India
		Memoir, Geological Society of India
		Paleontological Society of India
		Science Vision
11.	Horticulture, Aromatic & Medicinal Plants	Advances in Environmental Biology
		Against Water Borne Pathogens
		American Journal of Plant Sciences
		Biomed Research International
		Crop Improvement
		Current Discovery
		European Journal of Environmental Ecology
		Genetic Resources and Crop Evolution
		Indian Journal of Agricultural Sciences
		Indian Journal of Horticulture
		International Journal of Ecobiotechnology
		International Journal of Experimental Sciences
		Journal of Experimental Sciences
		Journal of Horticulture & Forestry
		Journal of Phytology
		Journal of Plant Nutrition
		Journal of Stored Products & Post Harvest Research
		National Academy Science Letter
		Natural Products Communication
		Plantamedica
		Progressive Horticulture
		Science & Technology Journal
		Science Vision
		Vegetable Sciences
12.	Civil Engineering	Environmental Science Process & Reports
		Environmental Monitoring & Assessment
		International Journal of Scientific & Engineering Research
		International Journal of Goswims

13.	Computer Engineering	European Journal of Applied Engineering & Scientific Research
		International Journal of Computer Applications
		International Journal of Computing, Communications and Networking
14.	Electrical Engineering	International Journal of Modeling & Optimization
		International Journal of Electrical Engineering
		International Journal of Advanced Information Science & Technology
15.	Electronics & Communication Engineering	Advanced Materials Research
		Advances in Material Science & Engineering
		Applied Mechanics and Materials
		ICFAI Journal of Electric and Electronic Engineering
		International Journal of Electronic and Communication Technology
		International Journal of Computer & Technology
		International Journal of Computer Science & Technology
		International Journal of Computer Sciences Issues
		International Journal of Electronic & Electrical Engineering
		International Journal of Electronics & Communication Engineering
		International Journal of Electronics & Communication Technology
		International Journal of Electronics Engineering Research
		International Journal of Microwave & Optical Technology
		International Journal of Research in Engineering & Technology
		JEEE Antenna and Wireless Propagation
		Journal of Nano- and Electronic Physics
		Journal of Pure Applied Ultrasion
		Microwave & Optical Technology Letter
		Procedia Material Science
16.	Information Technology	International Journal for Research in Engineering & Technology
		International Organization of Scientific Research
		Hybrid System Ltd.
		Science & Technology Journal

Appendix – III

List of Minor and Major Research Projects Undertaken (during July, 2009 – June, 2014)

(Source: As reported by faculty members)

SN	Name of Faculty	Department	Minor/ Major	Name of the Project	Amount (Rs.)	Sponsoring Agency	Ongoing/ Completed
1	SK Mehta	Botany	Major	Screening of freshwater microalgae for biodiesel	58,00,000	DBT	Completed
			Major	Cyanobacterial diversity in Tamdil wetland	51,00,000	MoEF	Completed
2	RC Laha		Major	Ethnobotanical survey and documentation of traditional knowledge of selected ethnic tribal groups of Mizoram	14,00,000	CSIR	Completed
			Major	Developing a digital database on Bio-Resources of North East India through a network approach among North-Eastern States	27,00,000	DBT	Completed
3	F Lalnunmawia		Major	Demonstration and dissemination of sustainable land use technology in the hilly terrains of Mizoram	20,39,417	DST	Ongoing
			Major	Networking Project on NTFP (Co-PI)	15,00,000	ICFRE	Ongoing
			Major	Capacity development for forest management and training of personnel	1,25,000	JICA	Ongoing
4	R Lalfakzuala		Minor	Scouting & documentation of traditional knowledge practice on medicinal plants of Pang and Bawm tribes in Mizoram	2,80,000	NIF	Completed
			Major	Characterization of Phosphate solubilizing bacteria and Nitrogen fixing Cyanobacteria from paddy fields of Mizoram for development of location specific biofertilizer	23,00,000	CSIR	Ongoing
			Major	Biochemical and molecular assessment of Phosphate solubilizing bacteria in traditional Jhum field of Mizoram	24,80,000	SERB-DST	Ongoing

S N	Name of Faculty	Department	Minor/ Major	Name of the Project	Amount (Rs.)	Sponsoring Agency	Ongoing/ Completed
5	YT Singh		Major	Assessment of genetic diversity of local land races of rice of North East India using SSR markers	23,00,000	SFRB-DST	Ongoing
			Major	Assessment of genetic diversity of local land races of rice of Manipur	6,00,000	UGC	Ongoing
6	BP Singh	Biotechnology	Minor	Isolation and characterization of plant growth promoting Rhizobacteria associated with banana rhizophere from Mizoram	---	UGC	Completed
			Major	DBT mission for quality planting material production & utilization for the North East	80,52,000	DBT	Completed
			Major	DNA fingerprinting of Actinomicetes and screening for their bioactive compounds from water sediments of Mizoram	20,40,000	DBT	Ongoing
			Major	DNA fingerprinting of endophytic Actinomicetes isolated from protected forest areas of Assam and Mizoram	20,60,000	DBT	Ongoing
			Major	Characterization and utilization of mushrooms biodiversity of Mizoram	40,04,000	DBT	Ongoing
			Major	DNA fingerprinting of Lignocellulose degrading microbes isolated from protected forest areas of Assam and Mizoram	27,37,600	DBT	Ongoing
7	H Lalhruaitluanga		Major	State Biotech Hub Project	3,00,00,000	DBT	Ongoing
			Minor	Chromatic remodeling	2,00,000	SBH	Ongoing
8	Esther Lalnunmawii		Major	State Bio-informatics facility	60,00,000	DBT	Ongoing
9	Th. Robert Singh		Major	DBT mission for quality planting material production and utilization for the North East	80,52,000	DBT	Completed
10	GS Solanki	Zoology	Major	Ecological studies on primates and evaluation of their habitat in Mizoram	18,08,000	DBT	Ongoing

S N	Name of Faculty	Department	Minor/ Major	Name of the Project	Amount (Rs.)	Sponsoring Agency	Ongoing/ Completed
			Major	Diversity distribution and habitat selection by Pheasants in Mizoram	18,60,000	DST	Ongoing
11	GC Jagetia		Major	Evaluation of the radioprotective activity of *Zingiber officinale* rhizome in mice exposed to different doses of gamma radiation	22,00,000	ICMR	Ongoing
			Major	Anti-cancerous drug development from important ethnomedical plants of Mizoram	75,00,000	DBT	Ongoing
			Major	UGC one time grant	7,00,000	UGC	Ongoing
12	VK Roy		Major	Role of carnitine on testicular steroidogenesis in context with PGC-1 a in mice	6,00,000	UGC	Ongoing
13	D Tiwari	Chemistry	Major	Ferrate (VI): a green chemical for the treatment of aqueous wastes containing metal complexed species	36,14,000	DST	Completed
			Major	Hybrid materials in the environmental remediation: organ or inorgano- organomodified clay materials in the remediation of As(III), As (V) and EDCs contaminated aquatic environment	25,00,000	CSIR	Ongoing
14	Muthukumaran R		Major	Synthesis & magneto-structural correlation study of transition metal complexes with controlled nuclearity	---	DST	Completed
			Major	Mitochondrial and nuclear gene mutations / polymorphism and their association with gastic camen in Mizoram & West Bengal	17,00,000	DBT	Ongoing
15	VP Singh		Minor	Molecular recognition: synthesis studies of weak interactions in Aromatic systems	6,00,000	UGC	Ongoing
16	N. Mohondas Singh		Major	Comparative absorption spectral analysis and kinetic study of 4f-4f transition for the complexation of Pr (III) / Nd(III) with the biological important Ligands	---	DST	Completed

S N	Name of Faculty	Department	Minor/ Major	Name of the Project	Amount (Rs.)	Sponsoring Agency	Ongoing/ Completed
			Minor	Evaluation of etiologic factors and Vitamin-D Receptor (VDR) start-codon Foki polymorphism associated with high prevalence of Urolithiasis in the selected urban areas of Mizoram & Manipur	1,36,000	DBT	Ongoing
			Minor	Physio-Chemical studies on Ion pair association of some transition metal salts in aqueous and aquated organic solvents using conductance and spectroscopic methods	4,41,000	SERB-DST	Ongoing
17	J Hussain	Mathematics & Computer Science	Major	Applicability of artificial neural network for intrusion detection systems	46,00,000	DIT	Completed
18	SS Singh		Minor	Elastic properties and wave propagation	1,50,000	UGC	Completed
			Major	Wave propagation in elastic continua	11,16,000	DST	Completed
			Major	Wave propagation in the micropolar materials with voids	7,00,000	CSIR	Ongoing
19	JP Singh		Minor	Some differentiable structures on a manifold	1,40,000	UGC	Completed
20	Z. Pachuau	Physics	Major	A study of photocurrent and band structure calculation from the semi-conducting spintronic materials	---	CSIR	Completed
21	RK Thapa		Major	Study of photofield emission by using the full-potential linear augmented plane wave (FP-LAPW) method and band structure calculations	1,17,000	DAE	Completed
			Major	Study of the electronic & magnetic properties of half metallic transmission based Heusler compound	11,00,000	UGC	Completed
22	RC Tiwari		Major	Study of Radon anomalies as a precursor to earthquakes along Mat Fault in Mizoram	---	MoES	Completed
			Major	Investigation of the structure & dynamics of the equatorial Ionization anomaly along 95 Degree through a network of GNSS receives	---	DST-SERB	Ongoing

S N	Name of Faculty	Department	Minor/ Major	Name of the Project	Amount (Rs.)	Sponsoring Agency	Ongoing/ Completed
			Major	Study of radiation safety measures of X-Ray installation in Mizoram	---	HERB	Ongoing
23	Hranghmingthanga		Major	Measurement, EXFOR compilation and theoretical study of nuclear data	24,69,250	BRNS	Ongoing
24	B Lalremruata		Major	Measurement, EXFOR compilation and theoretical study of nuclear data	24,69,250	BRNS	Ongoing
25	H Lalramnghinglova	Environmental Sciences	Major	Establishment of botanical garden in MZU campus	---	MoEF	Completed
			Major	Biodiversity exploration in the protected area (Murlen National Park) of Mizoram	---	UGC	Completed
			Major	Inventory on biomass resources and livelihood strategies in Mizoram	---	GBPIHED	Completed
			Major	Preventing extinction status of threatened plants through biotechnical	29,35,000	DST	Compplete d
			Major	National level networking project on non-timber forest products (NTFP)	15,00,000	ICFRE	Ongoing
			Major	Preventing extinct & improving conservation status of threatened plants through application of biotechnological tools	29,35,200	DBT	Ongoing
26	Lalnuntluanga		Major	Modelling atmospheric pollution and networking	20,32,000	IITM	Ongoing
			Major	Preventing extinct and improving conservation status of threatened plants through application of biotechnological tools	29,35,200	DBT	Ongoing
			Major	Inventory survey of Rattan resources and their distribution in the state of Mizoram, India	12,00,000	DST-SERB	Ongoing
			Major	Assessment of Bamboo short haunting and its effects on Bamboo stand in the state of Mizoram, India	15,00,000	ExF Dept of Mizoram	Ongoing

S N	Name of Faculty	Department	Minor/ Major	Name of the Project	Amount (Rs.)	Sponsoring Agency	Ongoing/ Completed
27	J Zothanzama		Minor	Environmental impact assessment of Municipal solid waste dumping site at Tuirial, Aizawl	1,50,000	DST Mizoram	Completed
			Major	Identification and molecular characterization of wood rotting fungi of Mizoram	40,00,000	DST-SERB	Ongoing
28	UK Sahoo	Forestry	Major	An inventory of non-timber fresh products of Mizoram	9,27,000	GBPIHED	Completed
			Major	Socio-cultural of political aspects of market and non-market benefit of forest resources with special reference to non-timber forest products and conservation in and around Dampa Tiger reserve in Mizoram	11,40,000	MoEF	Completed
			Major	Development and demonstration of integrated farming systems in Mizoram	15,25,000	DST	Completed
			Major	Studies on structural diversities and functional dynamism in relation to livelihood in undivided Aizawl District, Mizoram	18,36,000	CSIR	Completed
			Major	Livelihood improvement of empowerment of rural poor through sustainable farming systems in N.E. India	1,29,37,000	World Bank/ ICAR	Completed
29	SK Tripathi		Major	Impact of forest disturbance due to stone mining on the dynamic of fine root and soil Carbon and Nitrogen in Aizawl District of Mizoram	10,68,000	UGC	Completed
			Major	Changes in fine roots and soil nutrients in secondary successional forests following shifting cultivation in Mizoram	19,40,000	CSIR	Ongoing
			Major	Impact assessment of Jhuming on native plants and soil microbiota and restoration of sustainable Jhum agro-ecosystem in Northeast India	39,40,000	DBT	Ongoing

S N	Name of Faculty	Department	Minor/ Major	Name of the Project	Amount (Rs.)	Sponsoring Agency	Ongoing/ Completed
			Major	An improved understanding on how plant microbes intractive mediate Carbon storage in temperate forest along depositor gradient	11,50,000	DBT	Ongoing
30	K Upadhyaya		Minor	Studies on decomposability, nutrient release pattern and mulching potential of *Melocanna baccifera* (Roxb.) Kurtz leaf litter in Mizoram condition	1,00,000	UGC	Completed
			Major	Mapping and quantitative assessment of geographic distribution and population status of plant resources of eastern Himalayan region	14,30,000	DBT	Completed
			Major	Studies on structural diversity and functional dynamism of traditional home gardens in relation to livelihood support in undivided Aizawl district of Mizoram	17,36,000	CSIR	Completed
			Major	Preventing extinction and improving conservation status of threatened plants through application of biotechnological tools	29,35,200	DBT	Ongoing
31	VP Sati	Geography & Natural Resource Management	Minor	Sustainability of Man-land relationship & spatial regulation in upper reach of Minjiang river based on resource and environment safety	---	CASP	Completed
			Major	Sustainable livelihood approach to poverty reduction: a geo-empirical study of Mizoram	8,00,000	ICSSR	Ongoing
32	CUB Rao		Major	Detailed database on Geology, structure Geomorphology, slope, land use cover and landslide causative factors between Aizawl Town and Lengpui Airport	11,28,000	DST	Ongoing
33	KC Lalmalsawmzauva		Major	Baseline studies for national rural livelihood mission	54,00,000	RD	Completed

S N	Name of Faculty	Department	Minor/ Major	Name of the Project	Amount (Rs.)	Sponsoring Agency	Ongoing/ Completed
34	BL Saitluanga		Minor	Spatial pattern of urban livability: a case of Aizawl City	1,30,000	UGC	Completed
35	KS Rao	Geology	Minor	Evaluation of Shillong plateau	4,64,000	DST	Completed
			Major	Magnetostratigraphic, palaeontological and sedimentological studies in some selected sections of Tripura-Mizoram accretionary belt	27,80,000	DST	Completed
36	J Lalnunmawia		Major	Petrological and Geochemical studies of neogene succession of Surma basin exposed in and around the Aizawl district of Mizoram, NE India	---	UGC	Ongoing
37	P Lalnuntluanga		Minor	Magnetostratigraphic study of selected section in the tertiary of Champhai district, NE India	6,00,000	UGC	Ongoing
38	AC Shukla	Horticulture, Aromatic & Medicinal Plants	Major	Traditional medicinal plants of Mizoram: selection, categorization, documentation and bioactive investigations and resource centre		DST	Completed
			Major	Anti-cancerous drug development from important ethno-medicinal plants of Mizoram	74,48,000	DBT	Ongoing
			Major	Characterization, documentation and bio prospection of Lichens from Murlen National Park, Mizoram	26,71,000	---	Ongoing
39	N Khawlhring		Minor	Improvement of cultivation techniques of *Anthurium andreanum*: a high value floriculture crop for Mizoram condition establishment of germplasm	80,000	UGC	Completed
40	TK Hazarika		Minor	Standardization of INM package for growth, yield and productivity of tissue cultural banana cv. Grand Naine in Mizoram condition, NE India	1,20,000	UGC	Completed
			Major	Seed biology and germplasm evaluation of *Cinnamomum verum* birth & presl. & MAP & extention activities in Mizoram, India	17,92,000	CSIR	Ongoing

S N	Name of Faculty	Department	Minor/ Major	Name of the Project	Amount (Rs.)	Sponsoring Agency	Ongoing/ Completed
41	A Kumar		Major	Inventory, characterization and conservation of medicinal plants used by ethnic group of Mizoram through traditional knowledge system up to pharmaceutical level	29,73,500	DST	Ongoing
42	NP Maity	Electronics & Communication Engineering	Major	High-K dielectric materials for metal-oxide semi-conductor devices: stimulation & characterization	9,60,000	DST	Completed
			Major	Development of vocational educational modules & use of haptic devices; virtual laboratories in VLSI & embedded systems	3,95,000	MHRD	Completed
43	R Maity		Major	Capacitive micromachined ultrasonic transducer modelling simulation & characterization	75,00,000	DST	Completed
			Major	Simulation and characterization of HfO2 & ZrO2 based metal-oxide semiconductor devices	11,96,000	UGC	Completed