CHAPTER IV

FINDINGS AND DISCUSSION

This chapter focuses on findings pertaining to various objectives of the investigation. The five sections of the chapter are as follows :

4.1 Description of the sample of teachers of agricultural universities of India.

4.2 Problems of teachers in conducting research ; intensity of problems, differences and correlations among problems and personal characteristics of teachers.

4.3 Attitudes of teachers toward research : median, mean scores and differences; and correlations among attitudes of teachers and their personal characteristics.

4.4 Research output of teachers : mean scores, differences and correlations among research output of teachers according to their personal characteristics.

4.5 Interrelationships among problems, attitudes and output related to research and their implications.

4.1 Description of the Sample of Teachers of Agricultural Universities of India

The teachers of the ranks of professors, associate professors from all the colleges of agricultural universities and in addition the assistant professors from colleges of home science comprised the population for the study which numbered to 1303 teachers. Fifty percent of the population i.e. 664 teachers constituted the sample of the study which was drawn by systematic stratified random sampling method. Out of 664 teachers, 345 teachers sent back the filled in questionnaires. Ten questionnaires out of 345 received, had to be discarded due to the incomplete information provided in them. Thus, the total number of 335 teachers formed the sample of the study.

Majority of the respondents were in the age group of 41 - 50 years. Approximately one third of the teachers received their last degree between 1966-1970, which reflected that the knowledge of their disciplines was not very old. Again, majority of the teachers had teaching experience ranging from 11 to 15 years. According to their professional status, majority of the teachers were

associate professors and the lowest number was of those of the rank of assistant professors (Table 11).

It may be inferred from Table 11 that teachers having age between 31 to 50 years, received their last degree between 1966 - 1975, had teaching experience from 11 years to 20 years, were either M.Sc. or Ph.D. and were mainly belonging to the status of associate professors and professors.

The majority of the teachers comprising the sample were married. There was a very low percentage of female teachers, who were mainly from colleges of Home Science. Most of the teachers were having their fields of specialisation in biological sciences. Almost half of the teachers were from Colleges of Agriculture. The large number of the teachers were occupying the accommodation provided by their respective universities. (Table 12).

A conclusion may be drawn that the majority of the teachers in the sample were males, married, belonging to biological sciences, serving in Colleges of Agriculture and living on the campus, having age from 30 to 50 years,

TABLE 11

DESCRIPTION OF TEACHERS' AGE, YEAR OF RECEIVING THE LAST DEGREE, TEACHING EXPERIENCE, ACADEMIC QUALIFICATIONS AND PROFESSIONAL STATUS

S.No.	Characteristics		F	%
1.	Age	20 - 30 years	22	6.57
		31 - 40 years	113	33.73
		41 - 50 years	139	41.50
		51 and above	61	18.20
		Total	335	100.00
2.	Year of receiving last degree	1940 - 1955	9	2.80
		1956 - 1960	20	6.21
		1961 - 1965	59	18.32
		1966 - 1970	104	32.30
		1971 - 1975	88	27.32
		1976 - 1979	42	13.04
		Total	322@	100.00
3.	Teaching Experience	1 - 5 years	31	9.25
		6 -10 years	48	14.32
		11 -15 years	103	30.75
		16 -20 years	89	26.58
		21 and above	64	19.10
		Total	335	100.00
4.	Academic qualifications	M.A.	2	0.60
		M.Sc.	117	34.92
		Ph.D.	214	63.88
		B.A./B.Tech.	2	0.60
		Total	335	100.00
5.	Professional Status	Professors	116	34.63
		Associate Professors	191	57.01
		Assistant Professors	28	8.36
		Total	335	100.00

@ 13 teachers did not want to give their year of receiving the last degree.

TABLE 12

DESCRIPTION OF TEACHERS ACCORDING TO THEIR MARITAL STATUS, SEX, AREA OF SPECIALISATION, COLLEGE AND PLACE OF RESIDENCE

S.N.	Characteristics		F	%
1.	Marital Status	Married	315	94.03
		Unmarried	20	5.97
		Total	335	100.00
2.	Sex	Male	293	87.46
		Female	42	12.54
		Total	335	100.00
3.	Area of Specialization	Biological sciences	226	68.28
		Social Sciences	29	8.76
		Applied Sciences	63	19.03
		Natural Sciences	13	3.93
		Total	331@	100.00
4.	College	College of Agriculture	170	50.75
		College of Agri.Engineering	21	6.26
		College of Veterinary Science	74	22.08
		College of Basic Science and Humanities	18	5.38
		College of Home Science	43	12.83
		College of Animal Science	6	1.80
		College of Fisheries	3	0.90
		Total	335	100.00
5.	Place of Residence	University accommodation	219	65.37
		Private House	54	16.12
		Rented House	62	18.51
		Total	335	100.00

@ Four teachers did not give their area of specialisation

passed their last examination in between 1966 - 1975, having teaching experience from 11 to 20 years.

4.2 Problems of Teachers in conducting Research

The problems faced by teachers in conducting research have been discussed in this section, which is subclassified as :

4.2.1 Intensity of the problems.

4.2.2 Significant differences in the problems of the teachers according to their personal characteristics.

4.2.3 Significant correlations of the problems with personal characteristics of teachers.

4.2.4 Interrelationships among various areas of problems related to research.

4.2.5 Supplementary information provided by the teachers regarding problems in doing research.

4.2.6 An overall view of the problems faced by the teachers in conducting research.

Conclusion

4.2.1 Intensity of the Problems

The teachers were asked to rate the problems on a five-point scale which was on a continuum ranging from 1 to 5 scores (Figure 4). The mean scores ranged from 1 to maximum 5. The mean scores above 3 showed a high intensity of the problem while mean score nearing 2 was less severe, but 1 meant the problem hindering the research work of the teachers was never felt.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

FIGURE 4

Continuum of the Scale

4.2.1.1 Personal Problems. Mean scores for each problem according to each selected characteristics of the teachers were calculated. Collegewise calculated mean scores for personal problems ranged from 1 to 2.74 indicating that some problems were felt less intensively as compared to others. The problems having the mean scores nearing 2 and above 'rarely' 'faced were 'lack of sincere guidance,' 'lack of adequately knowledge in research methodology', 'uncooperative respondents', 'lack of statistical knowledge' and 'number of family responsibilities' for all the colleges

of agricultural universities (Appendix 8). Thus, it was evident that even if the colleges were different, the problems faced by the teachers were almost the same. It may further be explained that since research process has the uniform stages of development, whether pure or applied, the same problems may be felt by the teachers belonging to different areas of specializations and different colleges of different universities.

The above mentioned problems were felt more intensively by the teachers of 20 to 30 years of age as compared to teachers belonging to higher age groups. In addition, the younger teachers also felt that because they did not possess doctorate degree, their research work was hindered. 'Lack of sincere guidance', 'uncooperative respondents', 'lack of statistical knowledge' and 'number of family responsibilities' were more severely felt by younger teachers. Being young in age, having less teaching experience and less exposure to research work and in addition low professional status, the teachers may have some reservation in going to senior teachers for help in their research. On the other hand the senior teachers may also be thinking that the junior teachers are not capable of doing research as they do not

possess a higher research degree. The situation may be different for a teacher of higher age, having more teaching experience even if he did not do his doctorate. Because he is respected for his teaching experience and also for research experience which he may have had by conducting or guiding research.

Irrespective of their marital status, academic qualifications, sex, professional status, teaching experience and place of residence, the same problems were expressed by the teachers which hindered their research work. Teachers having M.A. or B.A. or B.Tech. degrees, holding the status of assistant professor, having teaching experience of 1 year to 5 years, felt the problems of 'lack of statistical knowledge', 'lack of confidence in research', 'lack of sincere guidance', 'lack of command over English language', and non-attainment of Ph.D. degree more severely than their other counterparts (Appendix 8).

The younger teachers in every respect i.e. their age, status, teaching experience and academic qualifications, were found to face personal problems more intensively because being new in the college, not having any official

power and not very intimate with the staff members, had to face more problems in all the colleges of the agricultural universities. Because of their low academic qualifications and lack of command over English language there was a reason to feel 'the lack of confidence'. It is not always that a Ph.D. teacher will have better command over language and more statistical knowledge, buthe is much more confident about what he knows and what he would do if he did not know certain things.

Conclusion (Section 4.2.1.1) of personal problems: The problems faced by all the teachers were 'lack of sincere guidance', 'uncooperative respondents', 'lack of statistical knowledge' and 'number of family responsibilities'. The young teachers with less teaching experience and low level of academic qualifications and professional status faced some of the personal problems more severely than their senior colleagues. In addition to the above mentioned problems faced by all the teachers, the younger teachers pointed out the problems of 'lack of confidence', 'lack of adequate training in research methodology', 'non-attainment of Ph.D. degree' and 'lack of command over English language'.

The college, sex, marital status and place of residence were not found to be contributing to the intensity of the personal problems.

4.2.1.2 Lack of Time. The mean scores for 2 problems which contributed to the lack of time for research i.e. 'lot of clerical work' and 'too many teaching assignments' ranged from 2.93 to 3.83 which indicated that the problems were quite intensively felt by the teachers irrespective of their college, age, teaching experience, sex, and marital status and professional status (Appendix 9). Only the teachers of College of Animal Sciences and College of Fisheries felt less severely these problems. The problem of 'lack of time' may be due to the examination system being followed in the agricultural universities. The 'Trimester system' of examinations keeps the teachers quite occupied.Being an internal system, the teachers have to teach, set the examination papers (theory as well as practical), conduct examinations, evaluate the answer books and prepare the final grade lists of the students. The number of examinations i.e. First Hourly, Mid-term, Second Hourly, and final; assignments and projects leave very little time for doing research. Lot of clerical work like

filling in grades, making copies of grade sheet also result in lack of time for research.

The teachers having B.A. or B.Tech. degrees 'rarely' felt the problem of 'too much clerical work'. May be these teachers are helping the senior teachers in teaching, so it becomes the responsibility of the senior teachers to check all grades and do all related work. However, these teachers felt that 'too many teaching assignments' were given to them.

The mean scores for the problems of 'excess of extra curricular activities' and 'too many staff meetings' were in the range of 2.00 to 2.98, indicating that the problems were 'rarely' or 'sometimes' faced by the teachers in conducting research. Attending to extra-curricular activities, curricular activities and attending staff meetings are the professional responsibilities of teachers irrespective of their age, experience or any other characteristic. For example, a teacher who has a normal load of teaching, may be incharge of dramatic clubs of students, sometimes has to perform certain extension activities, attend staff meetings both departmental and college level ; will certainly feel the

which have been established during the last 5 to 7 years may not be having that sufficient facilities as to the libraries in universities which came into existence in early sixties. In short, the teachers having B.A. or B.Tech. or M.A. degrees 'rarely' felt the problems regarding library while the other teachers 'very rarely' felt these problems.

4.2.1.4 Problems due to Lack of Laboratory Facilities. The teachers irrespective of their characteristics, expressed the problem of laboratory facilities due to 'lack of chemicals, ingredients and other materials', 'equipments being out-of-order' and 'uncooperative and inactive laboratory attendents'; more intensively than other factors. The mean scores for these problems ranged from 2 to 3, in very few cases less than 2 showing that the problems were 'rarely' or 'sometimes' faced by the teachers (Appendix 11). The Colleges of Basic Sciences and Humanities felt these problems less severely. The College of Fisheries negligibly felt the problem of 'lack of ingredients and materials' as compared to other laboratory problems. These problems being uniformly felt by ythe teachers of all the colleges may be interpreted as a result of lack of funds with the universities. Besides lack of funds the

controlled system of administration, may also result in these problems.The teachers' professional status, teaching experience or age may not help them much in overcoming these types of problems.

The problem of 'uncooperative and inactive laboratory attendents' was felt more severely by the teachers having B.A. or B.Tech. or M.A. degree as compared to the other teachers. On the whole, this problem was faced by all the teachers. At present class IV employees which include the laboratory attendents, peons etc. have their associations which work quite actively for the benefit of their members. If the teachers treat them with respect, they will be more cooperative and active. But if the teachers try to be bossy, they may face this problem, which seems to be the case.

The problems of 'lack of laboratory chemicals or materials or ingredients' were felt more severely by the teachers of colleges conducting more of basic research than those of other colleges. The teachers having less academic qualifications expressed the problem of 'uncooperative and inactive laboratory attendents' more severely than their other counterparts.

4.2.1.5 Problems due to Lack of Transportation Facilities. Problems due to lack of transportation facilities were felt by all the teachers in the sample though with slightly different intensities. The mean scores for the transportation problems ranged from 1 to 3.50, most of them being around 2 to 2.50, which indicated that the problems due to lack of transportation facilities were 'rarely' to be faced (Appendix 12). But a few teachers faced 'sometimes' the problem of transportation. The teachers belonging to the Colleges of Basic Sciences and Humanities and College of Fisheries expressed transportation problems at a lower level of the continuum (1 to 1.57 mean scores) as compared to those of other colleges; indicating that the problems were 'very rarely' faced. This may be due to the fact that since these colleges conduct majority of their research in the laboratories and require vehicle very rarely, the problem is not felt at that higher degree reaching to the mean scores of 3 or above. Irrespective of their age, marital status, sex, professional status, teaching experience and place of residence, the teachers felt the problem of

transportation.

Conclusion (Section 4.2.1.5) of Problems of Teachers due to Lack of Transportation Facilities. The teachers of the colleges where most of the research conducted is basic, felt less severely the problems of gvehicle as compared to those of the colleges which undertook more of applied research. On the whole, problem of transportation was faced either 'rarely' or 'sometimes' as the overall mean scores were below 3.

4.2.1.6 Problems due to Human Relations. Three expressions of human-relationship problems studied were : lack of cooperation from Head or Dean, lack of emphasis on production of research by the Dean or Head and lack of intimacy among staff members; the possible score ranges were from 16 to 80, 9 to 45 and 22 to 110 respectively. Mean scores for the teachers of each expression of human-relation problems were calculated according to their personal characteristics. The actual score range for the 'lack of cooperation from Head or Dean', was 30 to 48, for 'lack of emphasis on production of research' was 19 to 27, and for 'lack of intimacy among staff members' was 50 to 82 (Appendix 13).

Place of residence of the teachers did not effect the mean scores regarding 'lack of emphasis on production of research by Head or Dean'. The teachers residing away from the campus perceived the problem of 'lack of intimacy among staff' more intensely, than those staying on the campus, though the difference was not found statistically significant.

4.2.1.7 Problems due to Administrative Duties. Out of the 335 teachers in the sample, 182 (54.33%) teachers were either Heads or Incharges of the departments. These Heads or Incharges were asked to rate the administrative problems according to the intensity of the problem they felt on the same five point continuum (Figure 4). The mean scores for all the problems due to administrative duties ranged from 2.04 to 3.39, indicating that some problems were faced 'rarely' or 'sometimes' respectively (Appendix 14). The problems of 'too much paper work' and 'shortage of teachers' were felt intensively as the mean scores for these two problems were 3.39 and 3.28 respectively. It is indicated that 'too much paperwork' hindered the research work of teachers who were either Heads or Incharges. Head of the department being the highest authority in the department has to sign all the official

letters concerning teaching extension and research activities. The Head or Incharge will definitely read the contents of the letters before putting his signatures, which may consume quite a lot of his time, leaving lesser time for research. Secondly, due to shortage of teachers, the Head or Incharge himself may have to teach certain courses or take some teaching assignments besides his usual work-load. If the department had sufficient number of teachers, this extra time which was spent in teaching, could have been spent on research work. Similarly, many other administrative problems (Appendix 14) made teachers (Heads or Incharges) unable to give more time for research activities.

4.2.2 Significant Differences in the Problems of the Teachers according to their Personal Characteristics

To find out whether the teachers differed in their problems according to their personal characteristics, chi-square test were computed. On the basis of calculated chi-square values, null hypotheses were also tested. Only the table of significant differences has been put in this section

(Table 13). The Tables of non-significant differences have been put in the Appendix 15.

Chi-square values were found to be signifient for teachers of agricultural universities regarding their problems in conducting research indicating a difference in teachers' problems due to their universities. Some teachers belonged to agricultural universities established during 1960-1965 and some to universities 1965-1970 and quite a few universities established after 1970. In India, agricultural universities are continuously being started in different states since 1960, Himachal Pradesh Agricultural University being the last to come into existence, in 1978. It is generally assumed that more the number of years of establishment of an agricultural university larger is the number of teachers, more teaching, extension and research activities, more facilities and thus, lesser may be the problems faced by the teachers in doing research. It is further assumed that more are the research and extension activities in an agricultural university, more are the funds available to enhance these activities which will

TABLE 13

SIGNIFICANT DIFFERENCES IN PROBLEMS OF TEACHERS ACCORDING TO THEIR CHARACTERISTICS

S.N.	Characteristics	Problems	df	Chi-square values
1.	University	1.1 Personal problems	170	202.49 *
		1.2 Lack of time	180	152.52 *
		1.3 Lack of library facilities	255	296.97 *
		1.4 Lack of transportation facilities	204	252.76 **
		1.5 Lack of intimacy among staff	238	194.74 **
2.	College	2.1 Lack of time	66	94.64 **
		2.2 Lack of laboratory facilities	84	61.07 *
		2.3 Problems due to administrative duties/responsibilities	48	69.05 *
		2.4 Lack of cooperation from Head / Dean	84	60.23 *
3.	Marital Status	3.1 Lack of laboratory facilities	14	24.36 *
4.	Professional Status	4.1 Lack of library facilities	30	49.59 **
		4.2 Lack of intimacy	30	45.67 *
5.	Teaching Experience	5.1 Problems due to administrative duties/responsibilities	32	53.02 **
6.	Place of Residence	6.1 Lack of cooperation from Head / Dean	28	41.20 *

* denotes values significant at 0.05 level

** denotes values significant at 0.01 level

3. Different colleges have different number of departments.
4. Each department is different from other departments within the college in respect of the number of teachers, facilities available and research being conducted.

It is a commonly accepted fact that smaller the number of teachers in the college, more is the teaching load of teachers and thus, more problems due to lack of time. The problems felt by teachers of a college with sufficient number of teachers may be different from those of a college with insufficient number of teachers.

Due to the nature of research being carried out, the problems were felt differently by teachers of different colleges. It may be that teachers who conducted more of basic research, felt 'lack of laboratory facilities', hindering their research more severely than teachers conducting applied research. The difference in the funds alloted to each college may also lead to the difference in the problems of teachers in respect of laboratory facilities.

Since there are differences in departments in respect of the number of teachers; educatiohal courses

being offered; facilities available for teaching, research and extension; differences are bound to be there in the problems of teachers either Heads of Incharges of departments while performing administrative duties. Larger the department, more the number of teachers, more will be the number of academic activities, hence more administrative duties and problems.

The problem of 'lack of cooperation' from Head or Dean was also differently perceived by teachers belonging to different departments or colleges. As every individual is different, so are his ways of dealing with subordinates and superordinates. Some Heads or Deans who may be more research-minded than others, provided more cooperation to their subordinates in doing research. On the contrary, those Heads or Deans who had fear of being surpassed by their juniors in the academic field, would always try to be uncooperative. So, depending upon the academic standing, research orientation and personality of the Heads or Deans, their degree of cooperation will vary. Since the teachers in the sample belonged to 76 colleges, which were different fom each other in many

aspects, the teachers differed in their problems regarding 'lack of cooperation' from Head or Dean.

Again, the null hypotheses of no differences in the problems of teachers in doing research, due to their different colleges were only partially rejected as teachers differed in problems of lack of time, lack of laboratory facilities, and lack of cooperation from Head or Dean, as well as problems due to administrative duties.

Due to their marital status, the teachers were found to be significantly different in their problems regarding laboratory facilities only. But, logically in general, marital status of a teacher should not make any difference in the problems regarding laboratory facilities, because laboratories and equipments are meant to be used by teachers irrespective of their marital status. However, since the intensity of the problem of laboratory facilities significantly differed with the marital status, null hypothesis of no differences in the problems of lack of laboratory facilities by the teachers due to their marital status was, rejected.

It was found that the teachers due to their different professional status, differed in problems regarding 'library facilities' and 'lack of intimacy among staff members' (Table 13). Teachers with higher professional status i.e. professors, may feel the problems of library facilities less severely than the teachers of lower professional status i.e. assistant professors. Generally, it is assumed that higher the professional status of a teacher, more the books and other reading materials are owned by him. The teachers belonging to lower status, being new in the service, may not be investing much in the books etc. So the majority of these teachers depend upon the facilities provided by the university library for their reference work. This may result in the difference in the problems felt by teachers regarding library facilities due to their different professional status.

The teachers experienced the problem of 'lack of intimacy among staff members' differently due to their professional status. It is the general experience, that the teachers of the same status will be more intimate irrespective of their departments or colleges. The vertical mixing of teachers is not to the extent as

horizontal mixing. The junior teachers are often a bit hesistant to mix freely with teachers of higher ranks. Besides, the hesitation may be due to their age difference, difference in interest, personalities and difference in academic responsibilities. Since there are some inhibitions to mix freely with teachers of different professional status, the problem of 'lack of intimacy' was experienced differently by teachers of different professional status.

The null hypotheses that there are no differences in the problems felt by teachers due to their professional status, were only partially rejected because teachers differed in their problems of 'library facilities' and 'lack of intimacy among staff' due to their different professional status, but did not differ in personal problems, problems of lack of time, lack of transportation facilities, lack of cooperation from Head or Dean and lack of emphasis on production of research by Head or Dean.

The findings of the study revealed that the teachers due to their different teaching experience differed in their problems regarding administrative duties (Table 13). The difference in the problems, probably is due to the fact that higher the teaching experience, more the number of years

of being Head or Incharge of the department, more the knowledge about administrative procedures and thus, less are the administrative problems.

If a teacher having lesser teaching experience is Incharge of the department, he may face more problems due to lack of knowledge in administrative procedures. The null hypothesis of no difference in the problems of teachers regarding administrative duties due to their teaching experience was rejected.

Table 13 shows that the teachers perceived the 'cooperation from Head or Dean' differently due to their place of residence. Generally, the Heads or Deans are provided with the residential accomodation on the university campus only. Teachers residing on the campus may be having more friendly relations with the Head or Dean as compared to those staying away from the campus, as they may be visiting them also after the college hours. Due to the short distance in approaching the Head or Dean any time when required, may result in more cooperation from him in the official hours also. Thus, the place of residence may result in the difference of the perception of the problem of lack of cooperation from the Head or Dean. The place of

residence of teachers made difference in the problem of 'lack of cooperation from Head or Dean'; the null hypothesis was thus, rejected.

Conclusion (Section 4.2.2) of significant differences in the teachers' problems: The general expectations are that age and academic qualifications do make teachers differ in their problems in doing research. A teacher of higher academic qualifications certainly will have lesser problems and vice-versa. Same will be true with age of the teacher. Though unexpected, the findings of the study revealed that the teachers did not differ significantly in their problems due to their age, academic qualifications and sex. On the whole, the teachers differed in their problems in doing research due to their university, college, marital status, professional status, teaching experience and place of residence.

4.2.3 Significant Correlations of Problems with Personal Characteristics of the Teachers

Product-Moment Coefficient of Correlations were computed to find out whether change in one variable was accompanied by a change in the other variable.

Table 14 indicates that age of teachers was related to their problems regarding 'transportation facilities'. As the age of the teacher increased, the intensity of the problems increased. This correlation is supported by the mean scores on the problem of lack of transportation facilities (Appendix 16). It may be observed that the mean scores for transportation problems in majority of the cases were somewhat higher in the group of teachers of age of 51 years and above. In some cases the mean was higher for teachers of younger age also. This probably is due to the fact that more the age, higher is the professional status of a teacher and more is the involvement in field research, hence more are the chances of his facing problems of transportation which may hinder his research work. On the basis of mean scores, the intensity of the 'personal problems' and of the problems of 'lack of time' was higher for the teachers having lesser teaching experience as compared to that of the teachers having higher teaching experience (Appendices 8 and 9). But the correlation test showed that more the teaching experience of a teacher, higher is the intensity of the problems felt with regard to 'personal problems' and 'lack of time' (Table 14). It may be because teachers having

TABLE 14

SIGNIFICANT CORRELATIONS IN THE PROBLEMS OF TEACHERS ACCORDING TO THEIR CHARACTERISTICS

S.N.	Characteristics	Problems	df	r values
1.	Age	1.1 Lack of transportation facilities	333	0.11 *
2.	Teaching experience	2.1 Personal problems	333	0.12 **
		2.2 Lack of time	333	0.11 *
3.	Year of receiving the last degree	3.1 Personal problems	321	-0.12 **
		3.2 Lack of time	321	-0.14 **
		3.3 Lack of laboratory chemicals	321	-0.11 *
		3.4 Lack of transportation facilities	321	-0.10 *
		3.5 Lack of intimacy among staff	321	-0.10 *
4.	Academic qualifications	4.1 Lack of transportation facilities	333	-0.10 *

* denotes values significant at 0.05 level

** denotes values significant at 0.01 level

more teaching experience, have higher professional status and thus, they have a number of responsibilities leading to the problems of lack of time. If the teacher is the Head or Incharge of the department, many administrative duties may also result in the lack of time. A teacher having more years of teaching experience means he received his last degree earlier than those having lesser years of teaching experience. He may feel that he needs to refresh his knowledge regarding research methodology, statistical method and the recent researches in his field. And if he is a senior member of the family, he may have a number of responsibilities which also add to his personal problems.

On the contrary, teachers having lesser teaching experience may feel less intensely the 'personal problems' and problems due to 'lack of time.'

Correlation coefficients were also worked out between the year of receiving the last degree and each of the following problems of teachers; personal problems, lack of time, lack of laboratory facilities, lack of transportation facilities and lack of intimacy among staff members. It was found that longer the period which had

lapsed after receiving the last degree, more intensely were of all these problems felt. However, for purposes of calculating the correlations, the variable namely the year of receiving the last degree, was scored in such a way that earlier the year smaller the score and hence, the coefficient of correlation showed a negative sign. It may be inferred that earlier the teacher received his last degree, more is his teaching experience and higher professional status resulting more research activities which may make the senior teachers feel the problems stated above. The teachers who have received their last degree recently, may not be actively participating in research. In other words, a teacher with more age, and teaching experience and higher professional status can perceive better the problems hindering his research activities than the junior teachers.

It was found that the academic qualifications of the teachers were negatively correlated with the problems regarding 'lack of transportation facilities' as shown in Table 14. In other words, lesser the academic qualifications of the teachers, more intense were their problems regarding transportation facilities. Many a times, higher the academic qualifications, higher is the status

previliged with more official powers and vice-versa. Therefore, the teachers having lesser academic qualifications may feel more problems regarding transportation.

Conclusion (Section 4.2.3) of Significant Correlations of problems with personal characteristics of the teachers. It may be concluded that higher the age of the teacher, more were the problems faced regarding transportation. But the teachers with higher academic qualifications faced lesser problems in respect of transportation than those having lower academic qualifications. More was the teaching experience of the teacher, more were the 'personal' and 'lack of time' problems faced. The teachers having received their last degree earlier, faced more problems than those who received the same recently.

In short, the teachers who were of higher age, having more teaching experience and received their last degree long before faced more problems in doing research.

4.2.4 Interrelationships among Various Areas of Problems related to Research

Various areas of problems in research were found to be significantly related to each other (Table 15). Personal problems, lack of time, lack of all kinds of facilities and

human-relation problems were highly related to one another. Pearson's product moment correlations were computed to study the interrelationships.

It was found that personal problems were related to lack of time. More were the personal problems of the teacher, more was the lack of time. Personal problems like 'too many family responsibilities', may result in lack of time needed for research. Similarly, 'too many staff meetings', 'heavy teaching responsibilities', and 'extra-curricular activities' may result in lack of time required for independent research activities. If the teacher has enough free time, he may overcome some of his personal problems like studying the research methodology courses, improving his language and also learning the regional language required for certain type of research. Personal problems and lack of time were further related to lack of facilities with regard to library, laboratory and transportation.

Human-relation problems were found to be very significantly related to personal problems, lack of time and facilities regarding library, laboratory and transportation. It may be explained that if a teacher already

has some personal problem with regard to research activities, he expects some cooperation and guidance in those matters from the Head or Dean. If the Head or Dean is unable to provide the expected cooperation, the teacher may feel that the Head or Dean is not being cooperative. Problems of lack of time and transportation could be reduced if the Head or Dean is cooperative. Teaching loads could be evenly distributed among the staff members and so also the extra-curricular activities. Cooperation from Head may also reduce the transportation problems by making the vehicle available for research when required. The teachers may feel that because the Head or Dean does not emphasise on research that is why he is not cooperating in providing facilities which could facilitate their research work. Interest in research shown by the Head or Dean may also affect the human-relation problems.

'Lack of intimacy among staff members' may also result in 'lack of cooperation' and 'lack of emphasis on research' by the Head or Dean. If there is a high degree of intimacy among the teachers of the department or college, they may pursue together to get the required

facilities for research from the Head or Dean. If the department or college is like a family, and the Head or Dean being a member and head of the family, may see that every one gets the facilities, so that nobody's work suffers. In otherwords, more is the intimacy among teachers, more will be the cooperation from Head or Dean with more emphasis on research. Teachers with more personal problems may experience more human-relation problems than those who have lesser or no personal problems. Lack of time may make a teacher unable to be intimate with other teachers and this may result in other problems.

'Lack of cooperation' and 'lack of emphasis on research' by the Head or Dean may also result in the transportation problems faced by the teachers.

In short, it could be concluded that all the areas of problems of teachers in doing research, were related to each other, some more strongly than others.

4.2.5 Supplementary Information provided by the Teachers regarding Problems in Doing Research

The structured questions were answered by 335 teachers to provide information regarding the problems felt by them in doing research. Besides the structured questions, 150

teachers (45%) also provided some additional information regarding the problems hindering their way of research which have been shown in Table 16.

The problem of lack of funds was pointed out by 23 (15%) teachers. Lack of funds hinder the research work especially when the required laboratory chemicals or materials or ingredients cannot be purchased, the equipment cannot be repaired; vehicle can not be used, the books or required research reading materials cannot be bought; new equipment cannot be purchased, laboratory chemicals cannot be procured due to improper storage facilities; research helpers cannot be employed and so many other problems arise due to this factor. Above mentioned finding of the study is in consistency with the findings of Sibley (1951), Walker (1956) and Fincher (1968) who found the same problem hindering the research work of teachers.

Shortage of junior staff was felt by senior teachers or Heads or Incharges of the departments and shortage of senior teachers was felt by junior teachers where the department was still in its infancy. It is assumed that junior and senior teachers together with mutual help and

TABLE 16

FREQUENCY AND PERCENTAGE DISTRIBUTION OF TEACHERS** WHO PROVIDED SUPPLEMENTARY INFORMATION REGARDING PROBLEMS IN DOING RESEARCH

S.No.	Problems	F	%
1.	Lack of funds	23	15.33
2.	Lack of junior and senior staff	17	11.33
3.	Centralised system of administration	17	11.33
4.	Lack of physical facilities	16	10.67
5.	Lack of incentives	13	8.67
6.	Lack of cooperation among staff	7	4.67
7.	Lack of academic environment	7	4.67
8.	Heavy teaching loads	7	4.67
9.	Lack of library facilities	5	3.33
10.	Undesirable politics in the dept./college	5	3.33
12.	Lack of transportation facilities	4	2.67
12.	Number of curricular activities	3	2.00
13.	Indifferent attitudes seniors/authorities	2	1.33
14.	Interference in the research work	2	1.33
15.	Lack of accommodation on the campus	2	1.33
16.	Non-availability of suitable guidance from seniors	1	0.67
17.	Lack of time	1	0.67
18.	Number of extension activities	1	0.67
19.	Lack of communication	1	0.67
20.	Research projects not approved in time	1	0.67
21.	Problems due to student interruptions	1	0.67
22.	Busy system of examinations	1	0.67
23.	Lack of research journals	1	0.67
24.	Lack of clerical help	1	0.67

(* Total responding teachers were 150 (44.79%) out of 335 for the open-end questions of the questionnaire).

cooperation will be able to do more research rather than each doing independently. The junior teachers felt that due to the shortage of well qualified senior staff, they faced the problem of lack of proper guidance in the field of research. Senior teachers were of the opinion that if they had sufficient number of junior teachers, the routine activities of the research might have been given to them, so that they could use their time even more productively.

Centralised system of administration was hindering the research work of teachers as pointed out by 17 (11%) teachers. There are too many formalities which have to be completed before any action is taken up. Supposing some equipment during its operation goes out of order, it will take a few weeks before it could start working again. The process goes like this : The teacher gives the writing to the Heads of the department that such equipment has gone out-of-order. The Head sends a letter to the local university workshop or to the university experts to help them put that equipment in working order. So if the local experts express their inability to repair that equipment, the matter goes to the Sales-Purchase office. Then, the local city experts are consulted, price-charges compared and finally the equipment goes for repairs. Thus, it takes sometimes, even

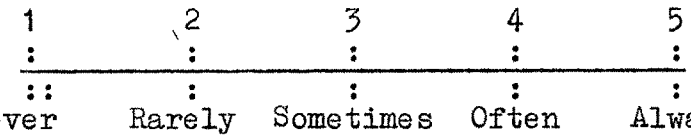
months to get the things done due to the centralised system of administration. The link between the research and the researcher breaks for sometime which may reduce his interest and even sometimes may frustrate him. Lack of physical facilities and lack of incentives were also expressed to be hindering the research work of the teachers.

It is not always that monetary rewards encourage teachers to do research. Teachers felt that even if monetary incentives were not possible, at least proper recognition in the department or college could be given by appreciation and praise; research could be given consideration at the time of promotions where it is justified. So, when proper incentives were not given, the research work of teachers suffered.

4.2.6 An Overall View of the Problems faced by the Teachers in conducting Research

The teachers were requested to rate a series of problems related to research on a five-point scale. The scale was on a continuum ranging from 1 - 5 scores. Thus, mean scores for all the problems ranged from 1 to 5. The mean score above 3 showed a high incensity of the

problem, while below 3 the intensity of the problem was considered to be low.



The means were calculated for all the teachers irrespective of their characteristics to know the research problems of the entire sample of the teachers of agricultural universities of India. Means above 1.50 only have been discussed in this section. Table 17 indicates that of all the problems, problem of 'lack of time' was most severely felt by the teachers. The problem of 'lack of time' pointed out 'often', was due to 'too many teaching assignments'. Trimester (14 working weeks) system which is followed in almost all the agricultural universities, is a system of internal evaluation. The teacher is the person incharge for both teaching and evaluation. Due to 4 to 6 internal evaluations in the trimester, correction work requires more time of the teachers working in the agricultural universities than that of those working under traditional universities. Increasing number of students especially in undergraduate classes, compel the authorities to divide the whole class in sub-groups. Along with practicals most of the teacher's

TABLE 17

OVERALL MEAN SCORES OF PROBLEMS OF TEACHERS RELATED TO RESEARCH OF AGRICULTURAL UNIVERSITIES OF INDIA

S.N.	Areas of Problems	S.No.	Problems	Mean Scores
1.	Lack of time	1.1	Due to too many teaching assignments	3.50
		1.2	Due to lot of clerical work	3.07
		1.3	Due to number of staff meetings	2.80
		1.4	Due to excess of extra-curricular activities	2.43
2.	Problems@ due to administrative duties	2.1	Too much paper work	3.40
		2.2	Lack of teachers in the department	3.28
		2.3	Too many meetings to attend	2.93
		2.4	Too much supervisory work	2.90
		2.5	Too many teaching assignments	2.85
		2.6	Too many functions to attend	2.75
		2.7	Too many students' problems	2.61
		2.8	Number of post-graduate students for guiding research	2.38
		2.9	Too many out-of-station meetings to attend	2.25
		2.10	Teachers in the department not willing to do research	2.10
		2.11	Teachers in the department lack research experience	2.00
3.	Lack of transportation facilities	3.1	Being alloted to other than research purposes	2.78
		3.2	Lack of funds for fuel	2.64
		3.3	Being out-of-order	2.43
		3.4	Lack of drivers	2.38
4.	Lack of laboratory facilities	4.1	Laboratory equipment being out of order	2.48
		4.2	Lack of ingredients and other materials	2.28
		4.3	Uncooperative and inactive laboratory attendents	2.17
		4.4	Lack of chemicals	2.04
		4.5	Insufficient number of technicians	1.71
		4.6	Poorly trained technicians	1.70
		4.7	Lack of laboratory attendents	1.63
5.	Personal problems	5.1	Lack of sincere guidance	2.32
		5.2	Uncooperative respondents	2.06
		5.3	Number of family responsibilities	1.80
		5.4	Lack of statistical knowledge	1.77
		5.5	Lack of adequate training in research methodology	1.59
6.	Lack of library facilities	6.1	Lack of library staff	1.66
		6.2	No cubicals for teachers or research workers	1.55
		6.3	No documentation facilities	1.52

@ Means were calculated from the responses of teachers who were either Heads or Incharges of the departments. Such teachers were 182 (54.33 %) in total.

time is spent on teaching activities. In such situations, the Head or Dean should distribute the work-load for the teachers, making provisions of time for research activities. Another suggestion could be to free each teacher for one trimester so that the intensive research could be carried out over a period of time. Depending on the need, the teachers who are doing more research, could be given a lesser teaching load. To reduce the unnecessary clerical work which teachers have to do, more administrative support (clerical staff etc.) could be given so that teachers' precious time is not wasted in these activities and the same could be used for research purposes.

The teachers who were either Heads or Incharges of departments faced 'Sometimes' the problems due to administrative duties. 'Too much paperwork' and the problem of 'lack of teachers in the department' consumed their major share of time. Delegating responsibilities related to administration to the teachers of the department may help the Head of Incharge to some extent. Having part-time teachers, training teachers from related disciplines, relaxing the conditions of appointing the teachers if they are otherwise competent, will help to some extent to have more teachers in the department, so

that teaching, research and extension activities could be carried out with proper balance. Wootton (1952) resigned the post of a professor and joined another institution as a research-fellow. She pointed out that administrative problems, teaching student problems and attending meetings, conferences etc., left hardly any time for research. The problems due to administrative duties faced by the Head or Incharges are in line with Wootton's experience.

Another 'rarely' or 'sometimes' faced problem was of 'lack of transportation facilities'. This problem was either due to its 'allotment to other activities rather than to research' or due to lack of funds leading to 'shortage of fuel', 'vehicle not repaired in time' etc. It is suggested that field visits could be so planned that all the activities of teaching, research and extension are carried out simultaneously by teacher-incharges. It may be difficult for the individual teacher to get the vehicle for his research work. The teacher should try to make use of the transport when it is being used by a group of students or teachers. On part of the authorities, a few

two-wheelers and auto-rickshaws if purchased, may also help the teachers in lessening the problem of transportation. Provision of sufficient finance and proper allotment of the vehicles will reduce the problems of transportation related to the research activities of the teachers.

The problem of 'lack of laboratory facilities' was faced 'rarely' by the teachers.

The intensity of library problems was not very high. But lack of cubicals, staff and documentation facilities in the libraries were expressed by the teachers. To employ more staff in the library, and to have cubicals and documentation facilities means more financial resources are required for libraries.

It may be concluded that teachers faced the problems of 'lack of time', problems due to 'administrative duties', 'lack of transportation facilities', and 'lack of laboratory facilities' more intensely than the 'personal' and 'library' problems.

Conclusion (Section 4.2) - Problems of Teachers in conducting research. The teachers of 20 to 30 years of age with lesser teaching experience and lower level of academic qualification and status, faced some of the personal problems

more severely than their senior colleagues. Personal problems faced by all the teachers in doing research were: 'lack of sincere guidance', 'uncooperative respondents', 'lack of statistical knowledge', and 'number of family responsibilities'. In addition to these problems, the young teachers pointed out the problems of 'lack of confidence', 'lack of adequate training in research methodology', non-attainment of Ph.D. degree and 'lack of command over English language' (Section 4.2.1.1).

Problems of lack of time due to 'lot of clerical work' and 'too many teaching assignments' were more severely felt than due to 'excess of extra-curricular activities' and 'number of staff meetings to attend', by teachers irrespective of their characteristics (Section 4.2.1.2).

Teachers having B.A. or B.Tech. or M.A. degrees felt problems regarding library more intensively irrespective of their personal characteristics (Section 4.2.1.3).

The problems of 'laboratory chemicals or materials or ingredients' were felt by teachers of colleges conducting more of basic research than those of other colleges. Teachers having lesser academic qualifications felt the problems of 'uncooperative and inactive laboratory attendents', more than their other counterparts (Section 4.2.1.4).

Regardless of their age, marital status, sex, professional status, teaching experience and place of residence; the teachers faced the problems of transportation (Section 4.2.1.5).

Due to their personal characteristics, teachers varied in their perception of problems regarding human-relationships. The differences which were later on proved statistically significant were : 'Lack of intimacy among staff' due to their university; 'lack of cooperation from Head or Dean' due to their college; 'lack of intimacy' due to their professional status and 'lack of cooperation from Head or Dean' due to their place of residence (Section 4.2.1.6).

The teachers who were either Heads or Incharges of the departments, faced the problems of 'too much paper work' and 'shortage of staff' in the department, more intensively than other problems (Section 4.2.1.7).

Significant differences were observed in the problems of teachers in doing research due to their university, college, marital status, professional status, teaching experience and place of residence (Section 4.2.2.).

Age was found to be related to teachers' problem of lack of transportation facilities. There were positive correlations between teaching experience and personal problems and lack of time. The earlier was the year of receiving the last degree of a teacher, more were the problems faced. A negative correlation was found between academic qualifications of teachers and problems of lack of transportation facilities. Thus, relational hypotheses that age, teaching experience, academic qualifications and year of receiving the last degree of teachers were related to problems, were partially accepted. (Section 4.2.3). All the areas of problems of doing research were highly inter-related at significant levels. Hence, the inter-relational hypothesis that areas of problems are related to each other, was accepted (Section 4.2.4).

Lack of funds, lack of junior and senior staff, centralised system of administration, lack of physical facilities and lack of incentives were some of the problems pointed out by many teachers in addition to the ones mentioned earlier (Section 4.2.5).

It may be concluded that teachers faced the problems of 'lack of time', problems due to 'administrative duties', and 'lack of laboratory facilities', 'lack of transportation more intensely than the 'personal' and 'library' problems (Section 4.2.6).

4.3 Attitudes Towards Research

The Attitude Scale of the investigation provided information regarding teachers' attitudes toward research. In this section the following findings are reported :

4.3.1 Frequency and percentage distribution of the teachers in 3 categories of attitudes : having less favourable attitudes, favourable attitudes and highly favourable attitudes toward research according to their personal characteristics.

4.3.1.1 Highly favourable attitudes of the teachers toward different aspects of research according to their personal characteristics.

4.3.2 Mean scores and differences in attitudes of the teachers toward research according to their personal characteristics.

4.3.3 Correlations among attitudes and personal characteristics of the teachers.

4.3.4 Interrelationships among the aspects of attitudes.

Conclusion

4.3.1 Frequency and Percentage Distribution of Teachers in Three Categories of Attitudes

A Likert's type of scale consisting of 36 items was used to measure attitudes of teachers toward research. The data were tabulated in frequency distribution of 5-score

class interval. On the basis of median of the distribution, the teachers were categorised as having less favourable and more favourable attitudes.

This section deals with attitudes of teachers toward research in general. Majority of the teachers held favourable attitudes in all the aspects. The teachers having 'highly favourable' attitudes toward different aspects of research, according to their personal characteristics, have been highlighted in the section 4.3.1.1. The Tables of frequency and percentage distribution of teachers according to their degree of favourableness towards each aspect of research, have been put in the Appendix 17.

Table 18 indicatest that the percentage of teachers varied in having 'less favourable', 'favourable' and 'highly favourable attitudes' toward research. Except teachers of colleges of Agricultural Engineering, majority of the teachers had favourable attitudes. As high as 52 percent of the teachers (Table 18) from Colleges of Agricultural Engineering had less favourable attitudes. It may be due to the type of research being carried out in these colleges. Agricultural Engineering Colleges mainly emphasise research in construction and designing of equipments which could be of use to public especially in agricultura. After an equipment

TABLE 18

FREQUENCY AND PERCENTAGE DISTRIBUTION OF TEACHERS ON ATTITUDES TOWARD RESEARCH ACCORDING TO COLLEGES

S.N.	Colleges	Attitudes						Total Teachers	
		Highly favourable		Favourable		Less favourable			
		F	%	F	%	F	%	F	%
1.	Colleges of Agriculture	47	27.65	86	50.59	37	21.76	170	100
2.	Colleges of Agricultural Engineering	3	14.28	7	33.33	11	52.39	21	100
3.	Colleges of Veterinary Sciences	17	22.97	29	39.19	28	37.84	74	100
4.	Colleges of Basic Sciences and Humanities	6	33.34	6	33.33	6	33.33	18	100
5.	Colleges of Home Science	14	32.57	23	53.48	6	13.95	43	100
6.	Colleges of Animal Sciences	1	16.67	3	50.00	2	33.33	6	100
7.	Colleges of Fisheries	1	33.33	2	66.67	0	0	3	100

Median = 135.5

has been constructed, it has to be given a field trial to test its function, economic utility, acceptability due to many socio-cultural factors. The teachers doing research in Engineering Colleges may have fear as to the non-acceptability of the gadgets they are producing. Whereas in other colleges, the degree of this type of uncertainty may be very low. It may be due to this reason that a majority of teachers of the Engineering Colleges have 'less favourable attitudes' toward research.

Table 19 reveals that majority of teachers of different age-groups had 'favourable attitudes' toward research. It could be seen from the table, that as the age of the teachers advance, their percentage increases from 'less favourable' to 'highly favourable', except in the age group of 41 - 50 years, in which case the percentage increased from highly favourable to 'less favourable' attitude. It is an accepted fact that as a teacher grows older, his attitudes too, become more positive. The decline at the age of 41 - 50 years may be due to not getting proper and due recognition of their research in terms of promotions and monetary rewards.

Percentage of married teachers having less favourable attitudes, was more than that of unmarried teachers (Table 20)

TABLE 19

FREQUENCY AND PERCENTAGE DISTRIBUTION OF TEACHERS ON ATTITUDES TOWARD RESEARCH ACCORDING TO THEIR AGE

S.N.	Age groups	Attitudes						Total Teachers	
		Highly favourable		Favourable		Less favourable			
		F	%	F	%	F	%	F	%
1	20 - 30 years	5	22.73	11	50.00	6	27.27	22	100
2	31 - 40 years	29	25.66	56	49.56	28	24.78	113	100
3	41 - 50 years	33	23.74	62	44.60	44	31.66	139	100
4	51 and above	22	36.07	27	44.26	12	19.67	61	100

Median = 135.5

TABLE 20

FREQUENCY AND PERCENTAGE DISTRIBUTION OF TEACHERS ON ATTITUDES TOWARD RESEARCH ACCORDING TO THEIR MARITAL STATUS

S.N.	Marital Status	Attitudes						Total Teachers	
		Highly favourable		Favourable		Less favourable			
		F	%	F	%	F	%	F	%
1.	Married	84	26.67	144	45.71	87	27.62	315	100
2.	Unmarried	5	25.00	12	60.00	3	15.00	20	100

Median = 135.5

On the whole the percentage for both the groups having 'highly favourable' attitudes was almost the same. The difference may be due to the family responsibilities of married teachers which demand their more time and attention. But, majority of the teachers, both married and unmarried, held 'favourable' and 'highly favourable' attitudes.

According to their academic qualifications, more than 70 percent of teachers in the qualification groups M.A., M.Sc., and Ph.D. held 'favourable' and 'highly favourable' attitudes toward research (Table 21). The change in the percentage distribution of teachers from M.Sc. group to Ph.D. group of qualifications, was not very significant. It may be true that as a teacher acquires higher qualifications, his interests in research also increases and he has a better appreciation of the importance of research and this shifts his attitude towards the 'highly favourable' side.

As shown in Table 22, majority of the female teachers were having 'favourable' and 'highly favourable' attitudes toward research. The percentage of male teachers having 'less favourable attitudes' was almost two and a half time more than the female teachers with less favourable attitudes. This may be due to male teachers having more responsibilities and academic and professional dissatisfactions. But it does

TABLE 21

FREQUENCY AND PERCENTAGE DISTRIBUTION OF TEACHERS ON ATTITUDES TOWARD RESEARCH ACCORDING TO THEIR ACADEMIC QUALIFICATIONS

S.N.	Academic Qualifications	Attitudes						Total Teachers	
		Highly favourable		Favourable		Less Favourable			
		F	%	F	%	F	%	F	%
1.	B.A./B.Tech.	0	0	1	50.0	1	50.0	2	100
2.	M.A.	2	100.0	0	0	0	0	2	100
3.	M.Sc.	28	23.93	58	49.57	31	26.50	117	100
4.	Ph.D.	59	27.57	97	45.33	58	27.10	214	100

Median = 135.5

TABLE 22

FREQUENCY AND PERCENTAGE DISTRIBUTION OF TEACHERS ON ATTITUDES TOWARD RESEARCH ACCORDING TO THEIR SEX

S.N.	Sex	Attitudes						Total Teachers	
		Highly favourable		Favourable		Less favourable			
		F	%	F	%	F	%	F	%
1.	Males	77	26.28	131	44.71	85	29.01	293	100
2.	Female	12	28.58	25	59.52	5	11.90	42	100

Median = 135.5

not mean that they would not be conducting research. Rather the findings (Table 34) showed male teachers had more research output than female teachers.

With respect to their professional status, majority of the teachers held 'favourable' and 'highly favourable' attitudes in all the categories, i.e., professors, associate professors and assistant professors (Table 23). It is evident from Table 23 that the percentage of teachers of associate professors' rank was high in 'less favourable' category of attitude and their percentage was also lowest in the 'highly favourable' attitude category.

The percentage of the teachers having different numbers of years of teaching experience and having 'less favourable' attitudes toward research, varied from 25 to 29 over all the groups. On the whole, teachers held 'favourable' attitudes (Table 24). Maximum percentage of teachers (39%) having highly favourable attitudes, was of the teachers having teaching experience of 21 years and above. So it may be true that as a teacher gains experience, his attitudes toward research are strengthened.

As seen from Table 25, the percentage of teachers showing 'highly favourable' attitudes, 'favourable' attitudes was higher among the teachers residing on the campus

TABLE 23

FREQUENCY AND PERCENTAGE DISTRIBUTION OF TEACHERS ON ATTITUDES TOWARD RESEARCH ACCORDING TO THEIR PROFESSIONAL STATUS

S.N.	Professional Status	Attitudes: Highly Favourable F	Highly Favourable %	Favourable F	Favourable %	Less Favourable F	Less Favourable %	Total Teachers F	Total Teachers %
1.	Professors	35	30.17	54	46.55	27	23.28	116	100
2.	Associate Professors	46	24.08	86	45.03	59	30.89	191	100
3.	Assistant Professors	8	28.57	16	57.14	4	14.29	28	100

MEDIAN = 135.5

TABLE 24

FREQUENCY AND PERCENTAGE DISTRIBUTION OF TEACHERS ON ATTITUDES TOWARD RESEARCH ACCORDING TO THEIR TEACHING EXPERIENCE

S.N.	Teaching Experience	Attitudes: Highly Favourable F	Highly Favourable %	Favourable F	Favourable %	Less Favourable F	Less Favourable %	Total Teachers F	Total Teachers %
1.	1 - 5 years	7	22.58	15	48.39	9	29.03	31	100
2.	6 - 10 years	11	22.91	25	52.09	12	25.00	48	100
3.	11 - 15 years	25	24.27	48	46.60	30	29.13	103	100
4.	16 - 20 years	21	23.60	45	50.56	23	25.84	89	100
5.	21 and above	25	39.06	23	35.94	16	25.00	64	100

Median = 135.5

TABLE 25

FREQUENCY AND PERCENTAGE DISTRIBUTION OF TEACHERS ON ATTITUDES TOWARD RESEARCH ACCORDING TO THEIR PLACE OF RESIDENCE

S.No.	Place of Residence	Attitudes: Highly Favourable F	Highly Favourable %	Favourable F	Favourable %	Less Favourable F	Less Favourable %	Total Teachers F	Total Teachers %
1.	University accommodation	61	27.85	104	47.49	54	24.66	219	100
2.	Private accommodation	14	25.93	23	42.59	17	31.48	54	100
3.	Rented accommodation	14	22.58	29	46.77	19	30.65	62	100

Median = 135.5

Majority of the agricultural universities are residential universities, and a larger number of the teachers live on the campus. A small percentage of teachers may be staying in private or rented accommodation. The higher percentage of teachers having 'less favourable' attitudes, in the category of those teachers staying out of the campus, may be due to the difficulties faced by them as a result of the distance between the place of work and place of residence, more time spent in commuting, and lack of academic environment which may be existing within the campus. In general, majority of the teachers held 'favourable' attitudes toward research irrespective of their place of residence.

Conclusion (Section 4.3.1) of Frequency and Percentage distribution of teachers on attitudes on the basis of median. Majority (More than 50 percent) of the teachers were having favourable attitudes towards research irrespective of their college (except colleges of Agricultural Engineering), and other characteristics, i.e. age-groups, marital status, academic qualifications (except teachers possessing B.A./ B.Tech. degree), sex, professional status, teaching experience and place of residence.

4.3.1.1 Highly Favourable Attitudes of Teachers Toward Different Aspects of Research according to their Personal Characteristics. On the basis of median, the teachers were categorised as having 'highly favourable', 'favourable' and 'less favourable' attitudes toward different aspects of research. The 'highly favourable' attitudes of the teachers are discussed in this section. Overall findings regarding teachers' attitudes toward different aspects of research (Appendix 17) are also presented in this section.

As is shown in Table 26, the majority of the teachers from all the colleges (except colleges of Agricultural Engineering and College of Fisheries) of agricultural universities, held 'highly favourable' attitudes toward guiding research. It indicates that on the whole, colleges were having post-graduate programmes and teachers were either guiding or aspiring to guide research. Those teachers who are competent and interested in research may be allowed to guide research, so that their attitudes are further strengthened. To keep in touch with the latest knowledge in research methodology, teachers from Colleges of Agricultural Universities are deputed to short courses in research methodology. Many educational organisations

TABLE 26

FREQUENCY AND PERCENTAGE DISTRIBUTION OF TEACHERS IN MAJORITY HAVING HIGHLY FAVOURABLE ATTITUDES TOWARD DIFFERENT ASPECTS OF RESEARCH ACCORDING TO THEIR PERSONAL CHARACTERISTICS

S.N.	Characteristics of Teachers		Teachers in majority having highly favourable attitudes toward different aspects of research							
			Importance of Research		Conducting Research		Guiding Research		Disseminating Research	
			F	%	F	%	F	%	F	%
1.	College	Colleges of Agriculture	-	-	-	-	115	67.65	-	-
		Colleges of Animal Sciences	-	-	-	-	4	66.67	-	-
		College of Fisheries	2	66.66	-	-	-	-	-	-
		Colleges of Home Science	-	-	-	-	28	65.12	23	53.49
		Colleges of Veterinary Sciences	-	-	-	-	41	55.41	-	-
		Colleges of Basic Sciences and Humanities	-	-	-	-	9	50.00	-	-
2.	Academic Qualifications	B.A./B.Tech. degree	1	50.00	-	-	1	50.00	1	50.00
		M.A. degree	-	-	2	100.00	-	-	1	50.00
3.	Age	20 - 30 years of age	-	-	-	-	-	-	15	68.18
4.	Professional Status	Assistant Professors	-	-	-	-	-	-	16	57.14
5.	Sex	Female	-	-	-	-	-	-	21	50.00
6.	Marital Status	Unmarried	-	-	-	-	-	-	10	50.00

in different disciplines organise such courses. The most common institution is National Institute of Community Development (NICD) Hyderabad, which hold such research related courses for teachers. The Indian Council of Agricultural Research, too, provides grants to those institutions who want to arrange such courses. The Head or Dean should depute more teachers if they could be spared from the routine duties.

The findings revealed that majority of the teachers either having B.A. or B.Tech. or M.A. degree, majority of the teachers having age 20 - 30 years, majority of assistant professors, had 'highly favourable' attitudes toward disseminating research. According to their sex and marital status, majority of female and majority of unmarried teachers were also possessing 'highly favourable' attitudes toward the dissemination of research. Young teachers of 20 to 30 years of age, having lower qualifications and lower professional status, are usually not allowed to guide research in many colleges of agricultural university. The 'highly favourable' attitudes of these junior teachers indicate that if they either guided/conducted any research, they could be expected to publish the research findings for disseminating knowledge.

On the whole, it was found that the teachers irrespective of their characteristics, held highly favourable attitudes toward guiding and disseminating research. It gives an impression that teachers were participating in the guidance of research and may be they were also publishing these guided research studies. It was found that 27.89 percent (Table 39) of the total research output of agricultural universities was in the form of guidance of research at both M.Sc. and Ph.D. levels. Since a teacher in an agricultural university is expected to show some researches and articles published during the academic year, the results of the guided researches are most convenient to publish. The more number of teachers having 'less favourable' attitudes or just 'favourable' attitudes toward importance of research and conduction of research may reflect that teachefs were not that intensively involved in conduction of research as they were in guiding of research.

It was surprising to find that teachers having more number of years of teaching experience, teachers having high professional status, teachers with high academic qualifications, married teachers, and male teachers; were found in majority, to have 'favourable' and 'less favourable

attitudes' (Appendix 17) in all the aspects of attitudes toward research. Logically, as a teacher advances in age, more becomes his teaching experience, higher in his status, and thus, his attitudes toward research should be highly favourable.

Conclusion (Section 4.3.1.1) ' highly favourable' attitudes of the teachers toward different aspects of research according to their personal characteristics. Except teachers from Colleges of Agricultural Engineering and College of Fisheries, majority of the teachers held 'highly favourable' attitudes toward guiding research. More than fifty percent of the teachers from Colleges of Home Science, teachers of 20 - 30 years of age, unmarried teachers, female teachers and teachers of assistant professors' status, were found to possess 'highly favourable' attitudes toward disseminating research.

4.3.2 Mean Scores and Differences in Attitudes of Teachers toward Research according to their Personal Characteristics

The Attitude Scale of the study comprised of 4 sub-scales. The sub-scales measured four aspects of attitudes :

1. Attitudes toward importance of research
2. Attitudes toward conducting research
3. Attitudes toward guiding research
4. Attitudes toward disseminating research

The combined score of all the sub-scales measured the attitudes toward research, in general.

To study the differences in attitudes and to test the significance of difference in the attitudes of teachers, mean scores and chi-square values were computed. Though there were some differences in the mean scores of teachers' attitudes due to personal characteristics, many of them were proved statistically insignificant. Table 27 indicates the mean scores of teachers' attitudes toward research according to their personal characteristics. The mean scores ranged from 130 to 138, showing that all the teachers held favourable attitudes toward research. The

TABLE 27

MEAN SCORES OF ATTITUDES TOWARD RESEARCH OF THE TEACHERS ACCORDING TO THEIR CHARACTERISTICS

S.N.	Characteristics of Teachers		Mean Scores
1.	College	: Colleges of Agriculture	135.58
		: Colleges of Agricultural Engineering	130.23
		: Colleges of Veterinary Sciences	17[illegible].03
		: Colleges of Basic Sciences and Humanities	133.88
		: Colleges of Home Science	137.56
		: College of Animal Sciences	131.67
		: College of Fisheries	130.33
2.	Age	: 20 - 30 years	134.54
		: 31 - 40 years	134.91
		: 41 - 50 years	132.84
		: 51 and above	136.80
3.	Marital Status	: Married	134.21
		: Unmarried	137.00
4.	Sex	: Male	134.28
		: Female	137.38
5.	Academic Qualifications	: B.A./B.Tech.	130.00
		: M.A.	150.00
		: M.Sc.	135.08
		: Ph.D.	133.83
6.	Professional Status	: Assistant Professors	136.42
		: Associate Professors	133.90
		: Professors	134.66
7.	Teaching Experience	: 1 - 5 years	133.71
		: 6 -10 years	135.42
		: 11 -15 years	133.45
		: 16 -20 years	133.99
		: 21 and above	135.94
8.	Place of Residence	: University accommodation	134.91
		: Private accommodation	134.26
		: Rented accommodation	132.58

teachers having M.A. degrees scored highest (score 150) of all the teachers, showing in their case, 'highly favourable' attitudes.

The calculated values of chi-square tests indicated that there were no significant differences in the attitudes of teachers in respect of their age, marital status, professional status and place of residence (Appendix 18).

Significant differences were observed in the attitudes of teachers in respect of their university, college, academic qualifications, sex and teaching experience, and this was so far all the four aspects of attitudes (Table 28). Table 28 reflects teachers' differences in their attitudes toward guiding research according to their universities. It may be recalled that the sample of the study was represented by 19 different agricultural universities of India which are located all over the country. Some universities were established in sixties and many in the seventees. The teachers of the universities, although have favourable attitudes toward guiding research, yet show significant differences. Teachers of all the different characteristics i.e. different professional status, teaching experience, academic qualification etc. are present in all

TABLE 28

SIGNIFICANT DIFFERENCES IN THE ATTITUDES OF TEACHING TOWARD RESEARCH ACCORDING TO THEIR CHARACTERISTICS

S.N.	Characteristics	Attitudes	df	Chi-square
1.	University	Attitudes toward guiding research	85	64.90 *
2.	College	Attitudes towards conducting research	30	49.18 *
3.	Academic qualifications	Attitudes towards disseminating research	12	22.70 *
4.	Sex	Attitudes towards guiding research	5	13.24 *
5.	Teaching experience	Attitudes towards importance of research	20	35.22 *

* denotes values significant at 0.05 level

the teaching institutions. Those who had obtained their last degree in 1950s or 1960s, belong to higher age groups, have higher teaching experience and may be having higher professional status also. These teachers mostly possess M.A./M.Sc. or both degrees. The teachers who obtained their last degrees in 1970 or later, are possessing Ph.D. degree or are intending to obtain a Ph.D. degree. Thus, it appears reasonable to assume that older universities will have larger proportion of teachers who obtained their degrees in 1950s or 1960s and among them smaller proportion of teachers who have Ph.D. degrees. While the newly established universities have teachers who obtained degree more recently and among them a larger proportion having Ph.D. degrees. This may account for differences in attitudes toward guiding research among the universities. The teachers in the older universities would naturally feel that years of teaching experience should be given a higher weight in qualifying for being research guide; while the teachers in the newly established universities would place a higher emphasis on a research degree in qualifying for being a research guide. This may explain significant universitywise differences in attitudes of teaching towards guiding research.

According to the colleges, the teachers differed in their attitudes toward conducting research. It may be repeated that an agricultural university generally has 5 colleges ; College of Agriculture, College of Agricultural Engineering, College of Veterinary Sciences, College of Basic Sciences and Humanities, and College of Home Science, which are comprised of different departments. Some universities according to their local need expand a department to a level of a college. Two such colleges were there in the sample i.e. College of Animal Sciences and College of Fisheries. A university may have a number of colleges located in the different parts of a State, but the main campus of the agricultural university must have atleast 3 different colleges with all the facilities. The teachers in the sample represented in all, 76 colleges out of 84 belonging to 19 agricultural universities.

The college-wise difference in the attitudes of teachers toward conducting research was significant at 0.01 level (Table 28). This may be due to significant difference among colleges in respect of facilities available for research, funds available, attitude of the Dean or the Head, and total academic environment.

Significant difference was found in attitudes of teachers toward disseminating research with respect to

their academic qualifications. It is a general experience that a teacher who possesses a doctorate degree, bases his lectures on research findings conducted by other scholars. A highly qualified teacher may feel that if a particular research has been conducted, its results must be put to use and other persons in the field must know about the particular research. Having a favourable attitude towards disseminating research, he may see to it, that when he himself guides or conducts research, its findings must be disseminated and used. A teacher having a lower academic qualification may differ from the highly qualified teacher in this respect. He may not appreciate as much the importance of disseminating results of newly conducted research. Another reason may be that for a Ph.D. teacher publishing a research article may not be that difficult as for an M.Sc./M.A. teacher. The editors of the reputed journals may be a bit hesitant in accepting articles from teachers not having a doctorate degree. This may lead to the differences in their attitudes towards disseminating research.

The teachers of the sample showed significant differences in their attitudes toward guiding research due to their sex, although the majority of the teachers in the sample were males i.e. 203 (88%) and very few females i.e. 42 (12%). The

female teachers were mainly from Colleges of Home Science. Again majority of them were possessing M.Sc./M.A. degrees. Due to their low academic degrees as compared to male teachers, having low professional status and also less teaching experience, there may be a feeling among them that teachers with M.Sc./M.A. degree should be allowed to guide without taking into consideration the status or the teaching experience. Some female teachers may aspire to do Ph.D., but due to some limitations they may not be able to do so. They may develop this attitude that teachers possessing Master's degree should be allowed to guide. This may be the reason of differences in their attitudes toward guiding research.

There were significant differences in the attitudes of teachers toward importance of research according to their teaching experience. Teachers with more number of years of teaching experience, may have more and varied exposure to research seminars and conferences as compared to teachers having less number of years of teaching experience, and hence may attach more importance to research.

Conclusion (Section 4.3.2) of Significant Differences in Attitudes of Teachers due to their Personal Characteristics. There were no significant differences in the attitudes of teachers with respect to their age, marital status, professional status, and place of residence. Thus, null hypotheses of no differences in attitudes due to the stated characteristics were accepted.

Differences were found to be significant in the attitudes of teachers due to their university (in the aspect of guiding research), due to their college (in the aspect of conducting research), due to academic qualifications (in the aspect of disseminating research), sex (in the aspect of guiding research) and due to teaching experience (in the aspect of importance of research). Thus, null hypotheses of no differences in the attitudes of teachers due to above stated characteristics were rejected.

4.3.3 Significant Correlations among Attitudes and Personal Characteristics of Teachers

To study whether the attitudes of teachers were related to their selected characteristics, the Pearson product-moment correlations were computed. Only significant correlations have been discussed under this section. The

non-significant correlations are put in the Appendix 19.

Table 29 shows that attitudes of teachers were related significantly to their academic qualifications, year of receiving the last degree and professional status. No significant correlations were found among attitudes and age of teachers and their teaching experience.

A negative correlation was found between teachers' academic qualifications and their attitudes toward guiding and disseminating research (Table 29). In other words, higher the academic qualifications, less favourable were the attitudes of teachers. Although the statistical test shows a negative correlation, logically it is an accepted fact that higher the qualifications of a teacher, more favourable will be his attitudes toward guiding and disseminating research.

A negative correlation was found between attitudes towards disseminating research and the year of teacher's receiving the last degree. It indicated that more recent was the year of receiving the last degree of the teacher, the less favourable were his attitudes toward disseminating research. It was found (Section 4.4.3) that teachers who had their degree during early 1950s or 1960s were producing more literature for disseminating knowledge than those who

TABLE 29

SIGNIFICANT CORRELATIONS IN THE ATTITUDES OF TEACHERS TOWARD RESEARCH ACCORDING TO THEIR CHARACTERISTICS

S.N.	Characteristics	Aspects of Attitudes	df	r values
1.	Academic qualifications	Attitudes toward guiding research	333	- 0.15 **
		Attitudes toward disseminating research	333	- 0.15 **
2.	Year of receiving the last degree	Attitudes toward disseminating research	329	- 0.14 **
3.	Professional status	Attitudes toward disseminating research	333	0.11 *

* denotes correlation values significant at 0.05 level

** denotes correlation values significant at 0.01 level

received in 1970s. The more recent degree also means a teacher is junior in experience, status and younger in age. His low orientation toward research may result in less favourable attitudes toward research.

Professional status of teachers was found to have positive correlation with attitudes toward disseminating research. Publishing or presenting research by teachers of a department or college will definitely add to the name of the department or college. Generally higher professional status teachers occupy senior positions in the institutions. Being more academic-minded and interested in building up the name of the institution, the higher status teachers may have more favourable attitudes toward disseminating than the lower status teachers.

An overall conclusion may be drawn from the significant correlations between attitudes and characteristics of teachers. It is not so much the academic qualifications but the number of years of experience and professional status which seems to be determining the attitudes i.e. more favourable attitudes, with more senior teachers who may not have doctorate degree. It was found that higher was the academic qualification, 'less favourable' were the attitudes of teachers. As it so happens, majority

of the teachers received their last degrees after 1966 (Table 11) which was either M.Sc. or Ph.D. resulting in junior teachers having higher qualifications. The older was the degree of the teacher, 'highly favourable' were his attitudes. Higher was the professional status, highly favourable were the attitudes of the teachers toward disseminating research.

4.3.4 Interrelationships among Different Aspects of Attitudes toward Research

To explore whether the four aspects of the attitudes were interrelated, the scores of 4 subscales were further analysed. The following subscales comprised the Attitude Scale of the study :

Sub-scale 1 : To find out the attitudes toward importance of research.

Sub-scale 2 : To find out the teachers' attitudes toward conducting research.

Sub-scale 3 : To find out attitudes toward guiding research

Sub-scale 4 : To find out attitudes toward disseminating research.

Favourable attitudes toward research, on the whole, do not necessarily mean that the attitudes will be equally favourable in all the aspects. Attitudes may be quite favourable in one aspect, slightly so in another and almost

unfavourable in the third aspect.

To know the interrelationships among aspects of research attitudes, Pearson-Product Moment Correlations were computed. Table 30 indicates the result of the calculated values.

It is evident from Table 30 that only attitudes toward conducting research and guiding research were not significantly related. But all the remaining aspects of attitudes showed significant correlations among them.

Attitudes toward importance of research are highly correlated with attitudes towafd conducting, guiding and disseminating research. It may be interpreted that teachers who have favourable attitudes toward importance of research, will also have favourable attitudes toward conducting, guiding and disseminating research. The degree of favourableness may vary in each aspect of attitudes. The educationists assume that teachers who realise the importance of research feel, that research should not only be conducted and guided but also disseminated. The duty of the teacher may be complete only after disseminating the research results.

TABLE 30

INTERRELATIONSHIPS AMONG DIFFERENT ASPECTS OF ATTITUDES TOWARD RESEARCH

S.N.	Aspects of attitudes	df	r values
1.	Attitudes toward importance of research and conducting research	333	0.12 **
2.	Attitudes toward importance of research and guiding research	333	0.23 ***
3.	Attitudes toward importance of research and disseminating research	333	0.33 ***
4.	Attitudes toward conducting research and guiding research	333	0.002
5.	Attitudes toward conducting research and disseminating research	333	0.21 ***
6.	Attitudes toward guiding research and disseminating research	333	0.20 ***

** Significant at 0.01 level : *** Significant at 0.001 level

It was observed that attitudes toward disseminating research were found to be related to attitudes toward guiding and conducting research. In other words, teachers having favourable attitudes toward guiding and conducting research will have favourable attitudes toward disseminating research also. Disseminating research findings either from guided research or conducted research, gives a recognition to the teacher. It makes him known among other academicians. Besides, unless the research results are used by people, their ultimate

Different aspects of attitudes i.e. attitudes toward importance of research, conducting, guiding and disseminating research, were found to be interrelated at significant levels (Section 4.3.4). Since the different aspects of attitudes toward research were interrelated, the interrelational hypothesis was accepted. On the whole, teachers held 'favourable' attitudes toward research.

4.4 Research Output of the Teachers

To find out the research output of the teachers, an inventory was prepared and the output was measured in the following three ways :

1. Research produced : Number of research papers published, research papers presented at conferences, seminars, symposia etc., and number of research projects completed and under process.

2. Research guided and examined : number of dissertations guided and examined at both M.Sc. and Ph.D. levels.

3. Literature produced : Number of books, monographs and chapters written, number of papers presented at departmental / college seminars, number of popular articles published, radio talks given, lectures written for correspondence courses, television talks given, and number of cyclostyled notes given to students both written by the teacher himself and taken from the text-books.

The production of literature is usually not considered a production of research. It is assumed that teachers who have more research output will produce more literature which may be based on their research. Literature produced by the teachers will be discussed in a separate section, while the research produced, guided and examined will be discussed together.

This section presents findings of research output of teachers under the following sub-sections :

4.4.1 Significant differences of research output of the teachers according to their personal characteristics.

4.4.2 Significant correlations among research output of the teachers and their personal characteristics.

4.4.3 Significant differences, mean scores and correlations of literature produced by the teachers according to their personal characteristics.

4.4.4 Interrelationships among various aspects of research output.

4.4.5 A general view of research output of agricultural universities of India.

4.4.1 Significant Differences of Research output of the Teachers due to their Personal Characteristics

The teachers in all the colleges of agricultural universities carry two types of researches : 'basic' or 'fundamental' and 'applied'. Sometimes 'adaptive' researches are also conducted. As pointed out by The Report of the National Commission on Agriculture (1976), fundamental research has either an intellectual exploratory or gap filling function or both of them together. It is carried out solely to increase our stock of knowledge. Such topics as genetic factors determining the yield potential, effect of radition on biological materials, physiology of nutrients absorption, structure of human

acids etc., constitute subjects of fundamental research. Physiological and biological requirements of cultivable fish, genetic, studies and antigenic analysis of bacterial and viruses are also examples of basic research in the fields of fishery and veterinary sciences respectively. Applied research is directed to attain a practical goal which may often be defined precisely by the application of known basic principles. Sometimes 'applied' research may suggest problems for fundamental research.

To find out the differences in research output of the teachers, chi-square values were computed. The statistically significant differences have been discussed under this section. The table of insignificant differences has been put in the Appendix 20 for reference.

The chi-square values (Table 31) indicated that the teachers differed significantly on the number of dissertations guided and examined. As shown in Table 32, the maximum percentage of researches guided and examined was reported by the Colleges of Agriculture. The percentage of research guided and examined by all other colleges was lower than that of the colleges of agriculture.

TABLE 31

SIGNIFICANT DIFFERENCES IN RESEARCH OUTPUT OF TEACHERS ACCORDING TO THEIR PERSONAL CHARACTERISTICS

S.N.	Characteristics	Aspects of research output	df	X^2 values
1.	College	Dissertations guided and examined	108	131.99 *
2.	Academic qualifications	Dissertations guided and examined	54	77.78 *
3.	Sex	Dissertations guided and examined	18	31.88 *

* denotes chi-square values significant at 0.05 level

It reflects that Colleges of Agriculture have more students, more post-graduate programmes, more teachers with high professional status and teaching experience, which might have resulted in highest number of research guided and examined. In brief, the size of the faculty, the number of departments in the college, number of post-graduate programmes in the college which may vary according to the age of the colleges, add to the difference in the number of researches guided and examined by the teachers.

It is suggested that a higher number of students should be admitted in post-graduate programmes, the qualified teachers should be employed, more financial aid should be

TABLE 32

FREQUENCY AND PERCENTAGE DISTRIBUTION OF DISSERTATIONS GUIDED AND EXAMINED BY THE TEACHERS ACCORDING TO THEIR COLLEGE

S.N.	Colleges	Number of Dissertations							
		Guided at				Examined at			
		M.Sc. level		Ph.D. level		M.Sc. level		Ph.D. level	
		F	%	F	%	F	%	F	%
1.	Colleges of Agriculture (Teacher=170)	392	62.03	342	57.87	204	54.26	278	54.40
2.	Colleges of Agricultural Engineering (Teachers = 21)	23	3.64	22	3.72	21	5.58	21	4.11
3.	Colleges of Veterinary Sciences (Teachers = 74)	101	15.98	131	22.16	76	20.21	123	24.07
4.	Colleges of Basic Sciences and Humanities (Teachers = 18)	52	8.23	29	4.91	22	5.85	33	6.46
5.	Colleges of Home Science (Teachers = 43)	54	8.54	53	8.97	43	11.44	47	9.20
6.	College of Animal Sciences (Teachers = 6)	6	0.95	10	1.69	7	1.86	6	1.17
7.	College of Fisheries (Teachers=3)	4	0.63	4	0.68	3	0.80	3	0.59
	Total	6322	100	591	100	376	100	511	100

made available for the colleges having low percentage of dissertations guided and examined.

The findings also revealed that the teachers differed significantly in the number of dissertations guided and examined when categorised according to their academic qualifications (Table 31). More than 60 percent of the researches guided and examined were by the teachers possessing Ph.D. degree. Though surprising, the teachers having B.A. or B.Tech. or M.A. degree, too were found to have guided and examined Ph.D. and M.Sc. level researches. The seniority and teaching experience with higher professional status might have enabled them to guide and evaluate researches (Table 33), though the percentage was very low. It is obvious that the teachers having Ph.D. degree are recognised for guiding and evaluating research even if they have fewer years of teaching experience than those not having Ph.D. degree. Due to this recognition, teachers having higher qualifications may guide and examine more researches than those having lower academic qualifications. It is suggested that the teachers should be deputed to get the doctorate degree to enhance the research output of the colleges.

TABLE 33

FREQUENCY AND PERCENTAGE DISTRIBUTION OF DISSERTATIONS GUIDED AND EXAMINED BY THE TEACHERS ACCORDING TO THEIR ACADEMIC QUALIFICATIONS

S.N.	Academic Qualifications	Number of Dissertations Guided at				Examined at			
		M.Sc. level		Ph.D.level		M.Sc. level		Ph.D.level	
		F	%	F	%	F	%	F	%
1.	B.A. or B.Tech. (Teachers = 2)	2	0.32	2	0.34	2	0.53	2	0.39
2.	M.A. (Teachers = 2)	2	0.32	2	0.34	2	0.53	2	0.39
3.	M.Sc. (Teachers = 117)	173	27.36	157	26.56	138	36.70	148	28.96
4.	Ph.D. (Teachers = 214)	455	72.00	430	72.76	234	62.24	359	70.26
	Total	632	100	591	100	376	100	511	100

The male teachers were found to have more research output in respect of dissertations guided and examined (Table 34), than those of the female teachers. The difference in the dissertations guided and examined by male and female teachers, was found statistically significant (Table 31). Majority of the female teachers were from the Colleges of Home Science and were of the status of assistant professors.

The low research output may be attributed to the small number of female (42 against 293 males) teachers and their having low professional status. Other reasons which do not have any empirical evidences, in the present study might have resulted in lower research output. Babchuk and Bates (1962) and Blackstone and Fulton (1975) had also found in their studies that female teachers were possessing lower productivity than that of male teachers. The findings of the study seem to be in congruent with the findings of the stated researchers.

To facilitate the research output of female teachers, their number in the profession needs to be increased. Emphasis on higher academic qualification and due promotions to the status of associate professor may also boost up the production of research.

TABLE 34

FREQUENCY AND PERCENTAGE DISTRIBUTION OF DISSERTATIONS GUIDED AND EXAMINED BY THE TEACHERS ACCORDING TO THEIR SEX

S.N.	Sex	Number of Dissertations							
		Guided at				Examined at			
		M.Sc. level		Ph.D. level		M.Sc. level		Ph.D. level	
		F	%	F	%	F	%	F	%
1.	Male (Teachers =293)	582	92.09	538	91.03	334	88.83	465	91.00
2.	Female((Teachers=42)	50	7.91	53	8.97	42	11.17	46	9.00
	Total	632	100	591	100	376	100	511	100

Conclusion (Section 4.4.1) of Differences in Research Output of the Teachers. Significant differences were observed in the researches guided and examined by teachers due to their college, academic qualifications, and sex. Null hypotheses of no differences in teachers research output with regard to researches guided and examined due to their college, academic qualifications and sex were, thus, rejected.

Since there were no significant differences in the production of research of teachers due to their age, marital status, professional status, teaching experience and place of residence, null hypotheses were accepted.

4.4.2 Significant Correlations among Research Output of the Teachers and Their Personal Characteristics

This section presents findings of correlations among research output of teachers and their personal characteristics. Only significant correlations are explained here. The Tables of insignificant correlation values have been put in Appendix 21.

As shown in Table 35, age was found to be related to the dissertations guided and examined by the teachers. The

TABLE 35

SIGNIFICANT CORRELATIONS AMONG RESEARCH OUTPUT OF TEACHERS AND THEIR PERSONAL CHARACTERISTICS

S.N.	Characteristics	Aspects of research output	r-values
1.	Age	Dissertations guided and examined	0.11 *
2.	Professional Status	Dissertations guided and examined	0.12 *
3.	Teaching experience	Dissertations guided and examined	0.15 **
4.	Place of Residence	Research produced	- 0.10 *

* denotes correlation values significant at 0.05 level with df 333

** denote correlation values significant at 0.01 level with df 333

correlation value indicated that higher the age of the teacher, more was the research guided and examined. It is generally accepted that teachers become more receptive to research activities as they grow older. Higher age of the teacher leads to more number of years of teaching experience. With independent study, a teacher may be able to gain insight of research, which again flourishes with the increase in age of the teacher. Thus, it may be possible that

as the age of the teacher increases, quantity of research guided and examined by him also increases.

Besides, the age of the teacher, professional status of the teacher was also found to have positive correlation with research guided and examined by the teacher. In other words it could be explained that higher the professional status of the teacher, more is the research guided and examined by him. The higher professional status which assumes to be accompanied by a higher degree of scholarship of the teacher, enables him to guide and evaluate more research. Added to this, a teacher with higher professional status is known in the academic field better than the teachers of lower status. Higher authorities, too, when requested to suggest teachers to act as external examiners for dissertations, recommend teachers of higher professional status. Therefore, it may be possible that teachers of higher professional status produce more research by guiding and examining than that of the lower status teachers.

A positive correlation was found between the teaching experience of the teacher and the researches guided and examined by him (Table 35). Higher was the teaching experience of the teacher, more was the research produced by guiding and evaluating, Some factors are generally thought

to be interrelated like age, teaching experience, and professional status. Since, teaching job itself broadens a teacher's research outlook especially if he is teaching research methodology courses, the research guided by him may also increase. Further, a teacher with more number of years of teaching experience will be asked to act as an evaluator for the dissertations more frequently than those having only 2 - 3 years of teaching experience. These factors may lead to guiding and examining more researches by teachers having more teaching experience.

Place of residence of teachers showed a negative correlation with research produced (Table 35). The lesser was the distance between the place of work and stay, more was the research produced by teachers. A large percentage (65%) of the teachers was residing in the university houses at the time of data collection. Research demands more time from the teacher, may it be basic research or applied research. Residing on the campus not only enables a teacher to spend more time on research activities but it fosters the informal academic discussions with colleagues and experts, in the evenings, who too live on the campus. The ease of approaching the place of work, guidance and clarification regarding research activities

from seniors, may result in more research produced by the teachers residing in the university houses.

Conclusion (Section 4.4.2) of Correlations among Research Output of Teachers and their Pefsonal Characteristics: Age, Professional status and teaching experience of teachers were found to be related to the research guided and examined by them. The research produced was found to have negative correlation with the place of residence of teachers. the 'relational' hypotheses that age, professional status, teaching experience and place of residence are related to research output, were accepted. It may further be added that age, professional status and teaching experience seem to be interrelated. Higher the age, more the teaching experience and higher is the professional status; and these together may result in more research output.

4.4.3 Significant Differences and Correlations of the Literature produced by the Teachers according to their Personal Characteristics

Though production of literature is not an output of research, it is assumed that teachers conducting or guiding research, may be more inclined to produce literature. The findings of the literature output have been presented under the following sub-categories :

4.4.3.1 : Significant differences in the literature produced by the teachers according to their personal characteristics.

4.4.3.2 : Significant correlations between literature produced and personal characteristics of the teachers.

4.4.3.1. Significant Differences in the Literature produced by the Teachers according to their Personal Characteristics.

The difference in the production of literature due to teachers' colleges was found to be statistically significant having chi-square value of 223.18 with 270 degrees of freedom, and significant at 0.05 level of significance. Frequency and percentage distribution for literature produced by teachers in different colleges differed in all the aspects of production of literature (Table 36). Colleges of Agriculture were found to have produced more than 50 percent of literature in all the aspects, followed by colleges of Veterinary Sciences.

Since all the colleges differ in their activities regarding teaching, research and extension, the production of literature tend to be different. Colleges with more teaching assignments will have more production of books, cyclostyled notes for students, seminar papers for the

TABLE 36

FREQUENCY AND PERCENTAGE DISTRIBUTION OF LITERATURE PRODUCED BY THE TEACHERS ACCORDING TO THEIR COLLEGE

S.N.	College	LITERATURE PRODUCED - NUMBER OF													
		Books written		Seminars given		Cyclostyled notes given		Published popular articles		Radio talks given		Correspondence lectures given		T.V. talks given	
		F	%	F	%	F	%	F	%	F	%	F	%	F	%
1.	Colleges of Agriculture (Teachers = 170)	147	60.24	398	53.64	478	51.12	465	57.05	349	59.45	217	52.93	222	53.75
2.	Colleges of Agricultural Engineering (Teachers=21)	21	8.61	47	6.33	116	12.41	41	5.03	22	3.75	21	5.12	21	5.08
3.	Colleges of Veterinary Sciences (Teachers=74)	49	20.08	155	20.89	197	21.10	160	19.63	130	22.15	97	23.66	96	23.24
4.	Colleges of Basic Sciences and Humanities (Teachers=18)	17	6.97	79	10.65	30	3.21	65	7.97	18	3.10	18	4.39	18	4.36
5.	Colleges of Home Science (Teachers = 43)	5	2.05	49	6.60	97	10.37	68	8.34	59	10.05	48	11.71	47	11.38
6.	College of Animal Sciences (Teachers=6)	5	2.05	10	1.35	9	0.96	11	1.35	6	1.02	6	1.46	6	1.45
7.	College of Fisheries (Teachers=3)	0	0	4	0.54	8	0.85	5	0.61	3	0.51	3	0.73	3	0.73
	Total	244	100.00	742	100.00	935	100.00	815	100.00	587	100.00	410	100.00	413	100.00

students and staff. Those having more extension activities, will produce more articles, give more radio talks and television talks.

4.4.3.2 Significant Correlations Between Literature produced and Personal Characteristics of the Teachers. The significant correlations are discussed under this section while Tables of non-significant values have been put in Appendix 21.

The age of the teacher was positively related to the literature produced (Table 37). As the Age increased the production of literature also increased. As a teacher gets older, his knowledge also increases. With the increased participation in various academic activities and independent study, the production of literature also increases.

Higher the academic qualifications, more was the literature produced (Table 37). Mean scores were also found to be higher for Ph.D. teachers on the production of literature. A teacher while undergoing the doctorate programmes gets exposed to the academic field more than a M.A. / M.Sc. teacher. With his wide reading and writing for assignments, seminars, etc. a Ph.D. teacher gains

TABLE 37

SIGNIFICANT CORRELATIONS AMONG LITERATURE PRODUCED BY THE TEACHERS AND THEIR PERSONAL CHARACTERISTICS

S.N.	Characteristics	df	r-values
1.	Age	333	0.12 **
2.	Academic qualifications	333	0.10 *
3.	Year of receiving the last degree	321	-0.10 *
4.	Professional status	333	0.12 *
5.	Teaching experience	333	0.18 ***
6.	Place of residence	333	-0.12 **

* denotes correlation values significant at 0.05 level

** denote correlation values significant at 0.01 level

*** denote correlation values significant at 0.001 value

experience in producing literature. He may keep on producing more even after he has finished his Ph.D.

The older was the last degree of the teacher, more was the production of literature. Teachers who graduated in 1950s produced more literature than those who graduated in 1960s. The more recent is the last degree of the teacher, the lesser will be the experience of the teachers. Since

experience affects the production of literature, so will the age and the last degree of the teacher. It may be further pointed out that teaching experience of a teacher was also negatively related to the year of receiving the last degree at a very high level of significance. (Correlation value -0.35 with 333 df and significant at 0.001 level of significance). It may be that the older was the last degree of the teacher, more was the teaching experience and also more literature was produced by the teacher. The professional status of the teacher was found to be again having a positive relationship with literature produced. Higher was the professional status of the teacher, more was the production of literature. A professor usually has, either many years of teaching experience or few years of teaching experience and a Ph.D. degree. Since both teaching experience and a doctorate degree, improve the communication skill, the production of literature may be more on the part of a professor than on the part of an associate professor or an assistant professor.

Lesser was the distance between the teacher's place of residence and place of work, more was the literature produced. Availability of library facilities, informal discussions with fellow colleagues, might have helped the

teachers residing on the campus to produce more literature than those staying away from the campus.

4.4.4 Interrelationships among Various Aspects of Research Output

As shown in Table 38, various aspects of research output were found to be very significantly related to each other. Research produced was positively and very significantly related to dissertations guided and examined, and literature produced. It may be that a teacher who produces more research also guides and examines more research. Because of his intense involvement in research activities, he is assigned more research responsibilities, and this may ultimately result in higher research output.

TABLE 38

CORRELATIONS AMONG VARIOUS ASPECTS OF RESEARCH OUTPUT OF TEACHERS

S.N.	Aspects of research output	Correlation values	
		Research produced	Dissertations guided and examined
1.	Dissertations guided and examined	0.38 ***	-
2.	Literature produced	0.32 ***	0.79 ***

*** denotes correlation values significant at 0.0001 levels with 333 degrees of freedom

The findings also revealed that the teachers who produced, guided and evaluated more research were the ones who also produced more literature.

A teacher's responsibility is not over with the research work being completed. The research findings have to be publicised, so that the ultimate goals of research are fully achieved. Researches published in various magazines and journals, and presented at national and international meetings, serve a number of purposes. Firstly, the findings are communicated to people for using them. Secondly the duplication of research is prevented. Thirdly, the teacher presenting the research, is recognised by teachers of other universities. He may then be approached to guide and examine research by authorities of other universities. It may in turn enhance the research output of teachers.

4.4.5 A General View of Research Output of Agricultural Universities of India

To have an overall view of the research output of teachers in agricultural universities of India, frequencies in each aspects of research were added and percentages were calculated.

The larger portion of the research output comprised of research papers published (Table 39), followed by researches guided at both M.Sc. level and Ph.D. levels. It seems that the teachers of agricultural universities are more particular in publishing research, which is one of the major responsibilities of the researcher. The raw data showed that teachers published the research in Local, National and Internationally reputed journals of research.

TABLE 39

PATTERN OF RESEARCH OUTPUT OF TEACHERS OF AGRICULTURAL UNIVERSITIES OF INDIA

S.N.	Aspects of research output	F	%
1.	Research papers published	952	21.72
2.	Dissertations guided at M.Sc. level	632	14.41
3.	Dissertations guided at Ph.D. level	591	13.48
4.	Dissertations examined at Ph.D. level	511	11.66
5.	Research papers presented	496	11.32
6.	Research projects completed	443	10.10
7.	Research projects under process	383	8.74
8.	Dissertations examined at M.Sc. level	376	8.57
	Total	4384	100.00

Research papers were presented more at National conferences, symposia and meetings than at International meetings. The percentages of research projects under

process was slightly lower than the research projects completed. This decline may be due to non-availability of financial assistance. It was observed that financial assistance for research was mainly sought from the University, State Government and other national agencies fostering the research activities. Lack of funds at the disposal of these organisations, too many formalities to be completed for getting assistance and lack of staff might have resulted in decrease of number of research projects being conducted. A large number of researches guided at M.Sc. and Ph.D. levels indicates that post-graduate programmes are strong in agricultural universities.

Almost 20 percent (Table 39) of the research output was in the form of researches examined at both M.Sc. and Ph.D. levels. Since external evaluation of the research conducted by the student is essential, many teachers seem to have evaluated students' researches at both levels of M.Sc. and Ph.D.

The major part (56.46 percent) of the research output was contributed by the teachers of colleges of Agriculture (Table 40), followed by colleges of veterinary sciences. It was observed that larger the number of teachers

TABLE 40

TOTAL RESEARCH OUTPUT OF COLLEGES
REPRESENTED IN THE STUDY

S.N.	Colleges	Number of Teachers	Quantity@ of Research Output	% of Teachers	% of Research output
1.	Colleges of Agriculture	170	2475	50.75	56.46
2.	Colleges of Veterinary Science	74	887	22.02	20.23
3.	Colleges of Home Science	43	375	12.83	8.55
4.	Colleges of Basic Sciences and Humanities	18	343	5.38	7.82
5.	Colleges of Agricultural Engineering	21	199	6.26	4.53
6.	College of Animal Sciences	6	68	1.80	1.56
7.	College of Fisheries	3	37	0.90	0.84

@ Total number of research papers published, presented, research projects completed, under process, dissertations guided and examined at both M.Sc. and Ph.D. levels, by teachers.

representing the college, more was the output of the college. The sample of the study included 170(50.70%) teachers from Colleges of Agriculture. To realise the goals of an Agricultural University, Colleges of Agriculture isthought to be a very important college. Since they (Colleges of Agriculture) are provided with all the possible facilities for research, more output can be expected of these colleges. The availability of facilities for research established post-graduate programmes, more experienced staff; might have resulted in the highest research output on part of the Colleges of Agriculture.

The research output of teachers representing Colleges of Home Science was almost 9 percent (Table 40) of the total research output. Teachers from the Colleges of Home Science were mainly of the rank of assistant professor (29 out of 43). Being younger in age having lesser teaching experience, and having low qualifications as compared to teachers of other Colleges, that might have kept them away from participating in research activities. McGrath and Johnson (1969) also reported that 40% (Staff members at 30 institutions out of 74 institutions of Home Economics) of the group of university faculty in home economics apparently had no research to their credit in the past 5 years. Since the Colleges of Home Science are still strengthening their foundations in agricultural universities, a low output may be expected. Besides, majority of the colleges were only teaching the undergraduate classes. Very low colleges had post-graduate programmes and that, too,not in all the areas of specialisation, which could definitely affect the research guided by the teachers.

Only one College of Home Science had Ph.D. programme (affiliated to Punjab Agricultural University) in the subjects of Foods and Nutrition and Home Management. At present there is a great need for experienced and highly qualified teachers in Colleges of Home Science affiliated to Agricultural Universities. Many colleges are deputing their staff members for higher studies who could come and strengthen the Home Science Colleges both in research and teaching. Table 41 indicates the details of the research output according to each college.

4.4.5.1 Literature Produced. Besides conducting research, teachers in Agricultural Universities are also expected to perform teaching and extension related jobs. Production of literature studied can be categorised under two major categories :

1. Literature produced related to formal teaching
2. Literature produced related to informal teaching (extension).

Number of books written, seminars given and number of cyclostyled notes given to the students fall under the first category, while the popular articles published, radio-talks, television-talks and number of lectures written for correspondence courses form the second category.

TABLE 41

FREQUENCY OF PERCENTAGE@ DISTRIBUTION OF ASPECTS OF RESEARCH OUTPUT AND PERCENTAGE OF TOTAL RESEARCH OUTPUT OF DIFFERENT COLLEGES

S.N.	Colleges	RESEARCH OUTPUT - NUMBER OF ...																Total
		Research papers published		Research papers presented		Research projects completed		Research Projects under process		Dissertations guided at M.Sc.level		Dissertations guided at Ph.D.level		Dissertations examined at M.Sc. level		Dissertations examined at Ph.D. level		
		F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%	
1.	Colleges of Agriculture (Teachers = 170)	511	53.68 (...66)	276	55.65 (6.30)	262	59.14 (5.98)	210	54.83 (4.79)	392	62.03 (8.94)	342	57.87 (7.80)	204	54.26 (4.65)	278	54.40 (6.34)	2475 (56.46)
2.	Colleges of Agricultural Engineering (Teachers=21)	33	3.47 (0.75)	30	6.05 (0.68)	25	5.64 (0.57)	24	6.27 (0.55)	23	3.64 (0.52)	22	3.72 (0.50)	21	5.58 (0.48)	21	4.11 (0.48)	199 (4.53)
3.	Colleges of Veterinary Sciences (Teachers=74)	215	20.90 (4.97)	77	15.52 (1.76)	81	18.74 (1.39)	78	20.36 (1.78)	101	15.98 (2.30)	131	22.16 (2.99)	76	20.21 (1.73)	123	24.07 (2.81)	887 (20.23)
4.	Colleges of Basic Sciences and Humanities(Teachers=18)	116	12.18 (2.65)	56	11.29 (1.28)	17	3.84 (0.39)	18	4.70 (0.41)	52	8.23 (1.19)	29	4.91 (0.66)	22	5.85 (0.50)	33	6.46 (0.75)	343 (7.83)
5.	Colleges of Home Science (Teachers=43)	48	5.04 (1.10)	43	8.67 (0.98)	44	9.93 (1.00)	43	11.23 (0.98)	54	8.54 (1.23)	53	8.97 (1.21)	43	11.44 (0.98)	47	9.20 (1.07)	375 (8.55)
6.	College of Animal Sciences (Teachers = 6)	14	1.47 (0.32)	11	2.22 (0.25)	7	1.58 (0.16)	7	1.83 (0.16)	6	0.95 (0.14)	10	1.69 (0.23)	7	1.86 (0.16)	6	1.17 (0.14)	68 (1.56)
7.	College of Fisheries (Teachers = 3)	12	1.26 (0.27)	3	0.60 (0.07)	5	1.13 (0.11)	3	0.78 (0.07)	4	0.63 (0.09)	4	0.68 (0.09)	3	0.80 (0.07)	3	0.59 (0.07)	37 (0.84)
	Total	952	100 (21.72)	496	100 (11.32)	443	100 (10.10)	383	100 (8.74)	632	100 (14.41)	591	100 (13.48)	376	100 (8.57)	511	100 (11.66)	4384 (100)

@ Figures in parenthesis indicate percentage of total research output

Table 42 reveals that almost 46 percent literature produced was related to 'formal teaching', and 54 % to 'informal teaching'. It may be said that teachers of agricultural universities were performing the expected duties with regard to teaching and extension also along with research activities.

The colleges of Agriculture were found to have produced maximum literature (Table 43) as compared to other colleges, followed by Colleges of Veterinary Sciences and Colleges of Home Science. Many agricultural universities have more than one college of agriculture, the other colleges of agriculture are situated in other parts of the state. For example, Gujarat Agricultural University has 3 Colleges of Agriculture located at Anand, Junagadh and Navsari. More the number of teachers employed by colleges, more could be the literature produced.

Regarding Colleges of Home Science, the raw data indicated that majority of the literature produced was in the form of cyclostyled notes given to students, popular articles published and radio-talks given. It indicated that the teachers of Colleges of Home Science were producing considerable literature related to both 'formal' and 'informal' teaching, though not at a higher level. Table 44 indicates

TABLE 42

PATTERN OF LITERATURE PRODUCED BY THE TEACHERS@ OF AGRICULTURAL UNIVERSITIES OF INDIA

S.N.	Aspects of literature produced	F	%
1.	Related to Formal Teaching		
1.1	Number of cyclostyled notes given to students	935	22.55
1.2	Number of seminars given at Department / College level	742	17.90
1.3	Number of books written	244	8.88
	Sub Total	1921	46.33
2.	Related to Informal Teaching (Extension)		
2.1	Number of popular articles published	815	19.66
2.2	Number of radio talks given	587	14.16
2.3	Number of T.V. talks given	413	9.96
2.4	Number of lectures written for correspondence courses	410	9.89
	Sub Total	2225	53.67
	Grand Total	4146	100.00

@ 335 teachers constituted the sample of this investigation

TABLE 43

TOTAL LITERATURE PRODUCED BY COLLEGES REPRESENTED IN THE STUDY

S.N.	Colleges	Number of Teachers	Quantity[@] of literature produced	Percentages of teachers	Percentages of Literature produced
1.	Colleges of Agriculture	170	2276	50.75	54.90
2.	Colleges of Veterinary Sciences	74	884	22.08	21.32
3.	Colleges of Home Science	43	373	12.83	9.00
4.	Colleges of Agricultural Engineering	21	289	5.38	6.97
5.	Colleges of Basic Sciences and Humanities	18	245	6.26	5.91
6.	College of Animal Sciences	6	53	1.80	1.27
7.	College of Fisheries	3	26	0.90	0.63
	Total	335	4146	100.00	100.00

[@] Total literature produced related to 'formal teaching' and 'informal teaching' (Extension).

TABLE 44

FREQUENCY AND PERCENTAGE DISTRIBUTION OF ASPECTS OF LITERATURE PRODUCED AND PERCENTAGE OF TOTAL LITERATURE PRODUCED OF DIFFERENT COLLEGES

S.N.	Colleges	LITERATURE PRODUCED - NUMBER OF														
		Books written		Seminars given		Cyclostyled notes given		Popular articles published		Radio talks given		Correspondence lectures written		T.V.Talks given		Total
		F	%	F	%	F	%	F	%	F	%	F	%	F	%	
1.	Colleges of Agriculture (N=170) (Teachers = 170)	147	60.24 (3.54)	398	53.64 (9.6	478	51.12 (11.53)	465	57.05 (11.22)	349	59.45 (	217	52.93 (5.23)	222	53.75 (5.35)	2276 (54.90
2.	Colleges of Agricultural Engineering (Teachers 21)	21	8.61 (0.51)	47	6.33 (1.13)	116	12.41 (2.80)	41	5 03 (0.99)	22	3.75 (0.54)	21	5.12 (0.51)	21	5.08 (0.51)	289 (6.97
3.	Colleges of Veterinary Sciences (Teachers = 74)	49	20.08 (1.18)	155	20.89 (3.74)	197	21.10 (4.75)	160	19.63 (3.86)	130	22.15 (3.14)	97	23.66 (2.34)	96	23.24 (2.32)	884 (21.32
4.	Colleges of Basic Sciences and Humanities (Teachers = 18)	17	6.97 (0.41)	79	10.65 (1.90)	30	3.21 (0.72)	65	7.97 (1.57)	18	3.10 (0.43)	18	4.39 (0.43)	18	4.36 (0.43)	245 (5.91
5.	Colleges of Home Science (Teachers = 48)	5	2.05 (0.12)	44	5.60 (1.18)	97	10.37 (2.34)	68	8.34 (1.64)	59	10.05 (1.42)	48	11.71 (1.16)	47	11.38 (1.13)	370 (8.92
6.	College of Animal Sciences (Teachers = 6)	5	2.05 (0.12)	10	1.35 (0.24)	9	0.96 (0.22)	11	1.35 (0.26)	6	1.02 (0.14)	6	1.41 (0.14)	6	1.45 (0.14)	53 (1.27
7.	College of Fisheries (Teachers = 3)	0	0	7	0.94 (0.10)	8	0.85 (0.19)	5	0.61 (0.12)	3	0 51 (0.07)	3	0.73 (0.07)	3	0.73 (0.07,	26 (0.63
	Total	224	100.00 (5.88)	742	100.00 (17.90)	935	100.00 (22.55)	815	100.00 (19.66)	587	100.00 (14.16)	410	100.00 (9.89)	413	100.00 (9.96)	4146 (100

@ Figures in parenthesis indicate percentage of total literature produced.

the details of the literature produced by the Colleges of Agricultural Universities.

The production of literature could be enhanced by providing short courses like 'writing for special groups', 'talking to special groups' coverings all related aspects of agricultural subject-matter.

To encourage the production of research and literature, many facilities like 'leave with pay' and grants especially are available to teachers. However, final authority in these matters is the U.G.C., and many formalities have to be completed before a teacher's application could reach the sanctioning authority. Powers to provide grants and leave for production of research should be delegated to Deans of the colleges, so that the facilities are provided to teachers when they are still motivated.

Along with the central library in the agricultural universities, if separate libraries could be provided in each college, the teachers would tend to spend more time in the college library. Though it will demand more library staff, space, facilities etc., the effort put in will be worth it.

Conclusion (Section 4.4) Research Output of the Teachers': Significant differences were found in the dissertations guided and examined by teachers due to their college, academic qualifications and sex (Section 4.4.1).

Age, professional status and teaching experience of teachers were positively related to research guided and examined. Place of residence of teachers was negatively related to research produced indicating lesser the distance between the places of work and stay, more was the research produced (Section 4.4.2).

With regards to literature produced, teachers differed significantly due to their colleges. Age, academic qualifications, professional status and teaching experience of teachers were positively related to the production of literature, indicating that higher the age, more was literature produced, higher the academic qualifications, more was production of literature and more the teaching experience, more was the production of literature. The older the last degree of the teacher, more was the production of literature. Lesser the distance between the places of work and stay, more was the literature produced (Section 4.4.3). Production of research, literature as well as dissertations guided and examined, were found to be very significantly related to each other. The interrelational hypothesis was, thus, accepted (Section 4.4.4).

Almost 22 percent of the research output was in the form of research papers published. Research guided at both M.Sc. level and Ph.D. level constituted 28 percent of the total research output of Agricultural Universities. Fifty six percent of the total research output was contributed by Colleges of Agriculture. Literature produced was mainly related to teaching and extension. Colleges of Agriculture were found to have produced maximum (55%) literature as compared to other colleges (Section 4.4.5).

4.5 Interrelationships among Problems, Attitudes and Output Related to Research and Their Implications

It is generally assumed that (1) more the problems of a teacher which hinder his research work, lower will be his research output and vice-versa, (2) more favourable are the attitudes of a teacher toward research, more will be his production of research; (3) A teacher with more favourable attitudes will face less problems impeding his research work. To know how far these assumptions hold true, correlation tests were carried out. The significant and non-significant correlations are discussed under this section.

TABLE 45

SIGNIFICANT CORRELATIONS AMONG PROBLEMS IN DOING RESEARCH AND ASPECTS OF RESEARCH OUTPUT

S.N.	Aspects of Research Output	Lack of Laboratory Chemicals		Lack of Transportation facilities	
		r-value	df	r-value	df
1.	Research produced	0.10*	333	0.12**	333
2.	Dissertations guided and examined	0.13**	333	0.10*	333

* denotes correlation values significant at 0.05 level

** denote correlation values significant at 0.01 level

Table 45 indicates the correlations among research output and problems. Both, research-production and research-guidance need either laboratory chemicals, equipments or transportation facilities and sometimes both. Since the research done in agricultural universities is of both types, basic and applied, these problems were faced equally by all the teachers. The positive relationships among problems and research output revealed that more was the research produced and guided, more were the problems of lack of laboratory chemicals and transportation facilities. It may be inferred that more the teachers conduct and guide research, more are the facilities regarding laboratory and transportation required. Teachers conducting more research, will encounter more problems than those conducting less research.

It is beyond the reach of teachers to overcome these problems to get their research work enhanced. The authorities of the university should try to lessen these problems. The laboratory chemicals could be stored in the university store-house so that no delay is caused by marketing formalities. Provision of more financial aid has to be made accordingly. Transportation problems could be reduced by providing economic vehicles like two-wheelers

and auto-rickshaws, so that teachers conducting field research may not suffer from lack of transportation problems. Another solution could be that teachers plan their field visits which could be combined with other educational groups going in the same direction or to the same village. Funds for fuel and repairs need to be extended.

TABLE 46

SIGNIFICANT CORRELATIONS AMONG PROBLEMS AND ATTITUDES OF THE TEACHERS TOWARD RESEARCH

S.N.	Areas of Problems	df	r-value
1.	Lack of time	333	0.121 *
2.	Lack of laboratory chemicals and materials	333	0.135 *
3.	Lack of cooperation from Head/Dean	333	0.154 **
4.	Lack of emphasis on production by Head / Dean	333	0.140 *
5.	Lack of intimacy among staff	333	0.16, ***

* denotes correlation values significant at 0.05 level

** denote correlation values significant at 0.01 level

*** denote correlation values significant at 0.005 level

It was found (Table 46) that the teachers having favourable attitudes faced more problems of lack of time, laboratory, chemicals etc. and problems of human-relationship. Their favourable attitudes might have resulted in making them

that the initiative in research work but the more they wanted to do research, more were the problems of lack of time, laboratory chemicals and human-relations. In other words, the teachers need to have very favourable attitudes to perceive more problems hindering their reseafch work. The attitudes of the teachers could be strengthened by making them more research oriented, giving them refresher courses in research methodology, giving them needed recognition and appreciation. It is expected that if the teachers have very strong attitudes toward research, they may feel more problems, but finally there will be more production of research.

TABLE 47

*CORRELATIONS AMONG RESEARCH OUTPUT AND ATTITUDES OF TEACHERS TOWARD RESEARCH

S.N.	Aspects of Research Output	df	r-value
1.	Research produced	333	- 0.01
2.	Dissertations guided and examined	333	- 0.03
3.	Literature produced	333	- 0.04

* None of the correlation values is significant at either 0.05 or 0.01 level

Table 47 reveals that attitudes of the teachers were not related to production of research. Though teachers held favourable attitudes, it did not seem to result in

more research output. Some underlying problems must have hindered their way of carrying out the research work. Or it may be possible that their attitudes were not so strong as to result in more research production. It may be suggested that the favourable attitudes toward research should be developed more intensely so that the expected research could be produced.

The findings showed that there (Table 47) was no relationship between attitudes and production of research. Studies conducted on attitudes and behaviour by Corey (1937), Green (1968), Minard (1969) and Wicker (1973) found that attitudes were independent of behaviour. The findings that the attitudes of the teachers toward research were not related to their production of research, is supported by the findings of the above mentioned researchers.

Implications of the Study

An overall picture of the findings of the study shows that the teachers faced 'sometimes' and 'rarely' the problems of lack of time, lack of laboratory chemicals etc. and transportation facilities. They also had some personal and administrative problems occuring only 'rarely'.

The attitudes of the teachers toward research were 'favourable'. The production was low in all aspects of research and literature. It may be inferred that because of the low research output, less problems were encountered by the teachers.

If the attitudes could be strengthened to a 'highly favourable' degree, the research output might increase, though teachers conducting or guiding more research may face more problems deterring their research work. Once the problems of highly committed teachers with more research output could be diagnosed, more production of research could be expected in the agricultural universities.
