REVIEW OF POST-GRADUATE RESEARCH IN AGRICULTURE (1973-1984): ARE WE BUILDING APPROPRIATE SKILLS FOR TOMORROW?

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DRAFT

REVIEW OF POST-GRADUATE RESEARCH IN AGRICULTURE (1973-1984) ARE WE BUILDING APPROPRIATE SKILLS FOR TOMORROW?

This is a very brief review of post-graduate theses pursued at various agricultural universities and colleges reported to HAU Journal of Abstracts in five disciplines. We are grateful to then Vice Chancellor ,Librarian and other colleagues at HAU, Hissar for enabling us to pursue this study.

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Abstract

Post Graduate Research (PGR) has been an important source of generating technological breakthrough in social as well as natural sciences. The skills for solving problem of 21st century have to be created now. We have reviewed all the abstracts of PGR reported to Haryana Agricultural University Journal of Abstracts of the period 1973-1984 (n = 1817). Five disciplines viz., Genetics and Plant Breeding (n = 242), Economics, Sociology and Extension (1229), and Agronomy (376)were selected for analyzing theses abstracts from the point of view of area , method, purpose, commodity/crop etc. of the study , Despite various limitations of the data, several vital research gaps emerge. We have specifically focussed on the importance attached to the problem of rainfed/dry farming regions.

Suggestions have been made for (a) making research on risky problems more attractive for students by modifying degree granting system and providing attractive fellowships, (b) periodically reviewing PGR so that corrective measures can be taken, (c) encourage research on research process itself, and linkage between on-station and on-farm research. Some other problems which need urgent attention are: crop-livestock interactions, institution building for common property resources as well as private resources under watershed development; problems of pastoralists rearing small and large ruminants, effects of stress fodder on post-drought performance of livestock; hand tools, conjunctive use of organic and inorganic fertilizer, breeding for low input environment as well as for grain and fodder quality and quantity ; screening under inter or mixed crop environments for crops that are predominantly sown under such conditions; longitudinal research on ecological systems including watershed, household adjustment with risks in different agro-climatic zones etc.

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REVIEW OF POST-GRADUATE RESEARCH IN AGRICULTURE (1973-1984): ARE WE BUILDING APPROPRIATE SKILLS FOR TOMORROWS?

We have tried to review the theses abstract published in the Haryana Agricultural University Journal of Abstracts (henceforth referred as Journal). for ten years i.e. 1974-1984 .The purpose was to understand the type of problems which have been looked at in five agricultural science disciplines namely plant breeding and genetics, agronomy, agricultural economics, extension and rural sociology. We are conscious of the fact that not every agricultural university supplies the abstracts of all the post-graduate research done to this journal. However, whatever bias may exist in reporting of theses abstracts to this Journal has been assumed to be randomly distributed over disciplines and years. Implications of findings reported here may not suffer too much on this account.

Further, it is also true that out of 32 agricultural colleges and universities which have reported abstracts, not every college has reported all abstracts every year. Various sources of bias in the analysis were unavoidable and inherent in the method of analysis that we chose, i.e., to base upon a single journal of abstracts. We do strongly suggest that ICAR as well as various agricultural research universities should undertake a rigorous

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This is a modified version of Chapter IX of our study on 'Matching Farmers' Concerns with Technologists' Objectives in Dry Regions: A Study of Scientific Goal Setting', Anil K Gupta, N.T. Patel and R.N. Shah, CMA, IIMA, mimeo, 1985 and revised in 1987.

review of the type of post graduate research being pursued in the country. If certain problems occupy considerable importance in the minds of planners but are not being given sufficient attention by the researchers then there is a cause for concern. Our submission is not that the problem which are being excluded are being deliberately ignored though that may be true in some cases.

There also appears to be a relationship between the nature of method which is chosen for analysis and the type of problem which allows that method to be used. During the informal discussion with the students it came out very strongly that several of them chose the method of analysis first and the problem later. For instance it was not surprising to hear from a post-graduate student in agricultural economics that he was doing research on 'linear programming'. He would not mention, to begin with, the problem for solving which linear programming was a method amongst many. Likewise if very few theses were done on rainfed crops and even amongst those very little research on crops under totally rainfed conditions the problem was with the method of granting degrees rather than with the students. The students may generally like to avoid taking research problems which would extend the time period in getting the degrees.

We have looked at several dimensions in the theses abstracts like the area , year , subject ,commodity (crop,livestock,trees etc.), nature of problem (intercropping,spacing ,weed control etc.,in Agronomy ,or breeding for disease resistance or yield improvement etc., in Genetics and Plant Breeding)and method of analysis

(trend or pattern analysis,path or discriminant analysis etc.,)

The Year-wise Distribution of Post-Graduate Research in Agronomy Pattern Over Years (Table 1)

There were 19 themes or problems in the discipline of agronomy on which about 375 research theses were reported to the Journal during 1973-1983. The maximum studies were done in case of inorganic fertilizer (around one-third) and majority of them have been done in the period preceding 1978. Subsequently there was a resurgence of interest in this problem again in 1982. The inter-cropping was the next most important problem and there did not seem to be a significant difference in the '70s or '80s except a marginal increase in '80s. In case of irrigation, weed control, water stress and spacing, the efforts appeared to be randomly distributed over the years. The problem of salinity was pursued only in three cases, crop rotation in seven cases and there were only eleven theses out of 376 where both organic and inorganic fertilizer have been included. There were eight theses dealing with only problems of organic fertilizer including green manure. It must be clarified here that intercropping in drylands did not include only the rainfed intercropping. Over a period of time the interest in organic fertilizers as also their interaction with inorganic fertilizer has been going down. This is an issue which should attract attention from the research planners. The fact that increasing exhortation by the planners towards dry farming and towards sustainable agriculture (implying greater use of organic fertilizer/manure) has not had sizeable effect in

terms of individual choices and research problems indicates a need for planned action.

Generally the scientists would advocate absolute freedom in terms of what problem they should decide to allocate to their students. It is also understandable that the students would like to have absolute freedom in this regard. However, given the shift in national priorities and considerable subsidies that government provides for higher education, the case for influencing the choices of post-graduate research problems cannot be dismissed only on account of individual freedom. What methods should be chosen to generate the right type of solution is a matter which can be separately looked into. The point we would like the planners to notice is that the evidence on temporal distribution of problem-wise theses research does not indicate a very strong correspondence between the planners' expectations and students' choices.

Distribution Over Regions (Table 2)

Since there were theses which concerned more than one region or more than one problem, multiple count was inevitable. There were only 51/1128 theses concerning drought prone areas although 249/1128 (i.e. about 22%) concerned rainfed regions. The theses dealing with problem of irrigated area (partly or completely) were about 56 per cent of the total.

If we exclude the cost of cultivation and fertilizer response studies the intercropping and spacing were the two most important

aspects of agronomic trials in dry regions.

Commodity Coverage in Agronomy (Table 3)

The share of cereals in agronomic theses was about 30 per cent. The millets, oil seeds and pulses each had about 18 per cent share.

The paradox was that while majority of the area under all the three crops i.e., millets, pulses and oilseeds is in dry regions, the proportion of theses pursued in each case was one-third or less in such regions. The managers of research system should not wonder why break-through in dry farming research is proving to be so difficult.

Analytical Techniques (Table 4)

From the limited data available in abstracts, majority of the theses were based on simple means and percentages. Unless there is something basically flawed in the data i.e., the manner of reporting of abstracts, this trend appears very awkward. We presume that the category 14 (where abstracts include means and percentages but method of analysis is not specified) includes many other methods.

Agricultural Economics, Extension and Sociology (Table 5)

Out of 329 theses reported in the Journal, 32.90 per cent pertained to dry regions. Out of these, the so-called 'inferior millets' were studied in only three theses and problems of oilseeds, pulses, fodder, forestry, migration etc. in none at all.

There were only four theses on livestock.

While in general, the problems of dry regions have received greater attention by the social scientists compared to the natural scientists, the allocation of research resources amongst different problems is obviously highly unbalanced. Under such a context, the ex-ante role for social sciences can be hardly emphasised .

The acts of omission are as much important as the acts of commission. The planners should take this feedback with due seriousness. Mere exhortations would not help unless some processes are set into motion in each university to look at the trends in post-graduate research so that future scientists can be enabled to match their individual career prospects and social concerns appropriately. The institution-wise list of theses (Table 6) indicates that maximum attention to the problem of drought-prone regions was given in Karnataka as a proportion of total theses. This was true not only for social sciences but also for subjects like Agronomy (Table 7), the share of theses on rainfed research in this case was around 27%).

Majority of the students in social sciences gave importance to the problems of credit, working of extension system in general, followed by adoption of technology, agricultural administration, cash, food crops etc. The problems of livestock and related aspects were considered by only 3.29 per cent students.

Social scientists have earned enough bad name by concentrating on what went wrong where and why. It is time they collaborated with biological scientists to understand farmers' (particularly the poorer ones) problems and look into the role values of scientists play in shaping research agenda. It should also be emphasized that farmers with limited information about what scientsists are capable of delivering can not always demand what they should . The responsibilty of biological scientists can not be reduced for producing knowledge which farmers never demanded . It is here that the social scientists can play a meaningful role by working out trade off analysis .anticipating various implications of alternative research agenda .

Plant Breeding, Genetics and Cytogenetics

It was difficult to identify the proportion of research work done directly on the problems of rainfed regions from the information available in abstracts. That is the reason why more than fifty per cent theses remained/unclassified on this account (Table 8).

However, if we look at the enterprise or commodity, we notice that millets (10.33%), oil seeds (16.11%), fodder (1.23%) got far lesser attention than other enterprises. The share of cereals was 28 per cent and that of pulses (though aimed at irrigated regions) 26.44 per cent.

The theses research in natural sciences needs far more rigorous analysis than is presented here.

AGRICULTURAL EXTENSION [1]

The Directory of Extension Research prepared at IARI includes titles from 24 universities and colleges.

Yearwise, Regionwise Distribution of Theses

The distribution of extension theses studied from the directory shows that the share of rainfed and drought prone regions was only 9.1 per cent as against 27.3 per cent for partially or fully irrigated regions .Over the years the proportion of theses for rainfed regions has slightly increased but that of drought prone areas has remained more or less same (Table 9).

Cropwise, regionwise distribution (Table 10)

Out of 900 theses titles, the nature of crop or commodity could not be identified from the titles in 572 cases. However, out of 113 theses for which this information was partially available there were only 17 theses dealing with dry region crops (15%) and obviously the bias towards cereals and cash crop was quite evident.

On the basis of regionwise distribution 28.3 per cent theses were pursued in well endowed irrigated/IADP districts.

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1. In addition to the theses abstracts reported in HAU Journal, we also analysed the abstracts compiled by Jhamtani and Y.P. Singh (1972-78) in the form of Directory of degree research in extension at IARI, New Delhi. We are grateful to the authors for permitting us to do this analysis.

Another about 47 per cent were pursued in partially irrigated regions.

Only about 11 per cent were pursued in drought-prone areas and another 14 per cent in rainfed areas. It might appear that the distribution is proportionate to the population (as per 1971 census 12% population of the country was residing in drought-prone areas comprising 20% of the geographical area of the country area). However, given the fact that ecological heterogeneity is much higher in rainfed and drought prone areas, one will have to do far more number of studies to be able to understand various dimensions of the problems compared to the well endowed regions (where a smaller sample might generate reliable estimate).

Distribution of extension theses as per the problem/level of development or input use. (Table 9).

Using CMIE data[2] we divided the districts of study chosen in different theses on the basis of NPK consumption. There were five groups including the one where the NPK consumption could not be specified either because district was not known or the data on consumption was not available. Out of 26 theses on study of various developmental programmes only three dealt with Drought Prone Area Programme (DPAP).

As regards the problems, maximum theses were quite understandably dealing with problem related to transfer of technology . Out of these theses majority were on adoption behaviour followed

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2. Districtwise statistics 1980: Centre for Monitoring Indian Economy, CMIE, Bombay.

by about 40 per cent on study of farmers' practices and diffusion of innovation amongst different classes .The theses on dryland technology transfer were only three out of 900.Likewise, the study on various aspects of land management were also negligible. The studies on inputs might wrongly appear to be very low (14 out of 900). Large number of studies on adoption bahaviour and farmers innovations also included the study of inputs either as a technology or as constraint to adoption.

Yearwise Problem Focus of Extension Thesis (Table - II)

The purpose of this analysis was to see whether over the years there has been any change in the pattern of problem definition. Since cell size was very small in most of the cases except on technology transfer no significant inference can be drawn except that there has not been any conspicuous problem shift during 1972-78 as apparent from theses titles (despite the fact that period of 1972 and 1974 was a period of widespread drought). Extension scientists in the country did not consider that phenomena worth studying in any particular sense. It is quite intriguing that out of 900 theses there were only two theses which dealt with the issues involving scientists. Certainly, the research planners in the country must look at this finding carefully lest the process of technology generation by scientists becomes a black box with excessive concentration focused at the user level. This also signifies a predominant bias in the extension research to define the problems with the farmers assuming technologies to be valid, relevant and beyond question. Undoubtedly, the early success of Green Revolution impressed the extension scientists so

much with the obsolete model (in predictive sense) of 'Diffusion of Innovation' that they have underplayed the study of the supply side considerably.[3]

Subject and Yearwise Distribution of Theses (Table 12)

One of the significant finding from this distribution is that proportion of home science, health, nutrition related theses has gone down in the post-1975 period. Either establishment of independent colleges of home science outside agricultural universities may have led to this pattern or there are some other reasons responsible for decline. Strangely enough the theses on developmental organizations, agricultural administration and livestock have also been extremely disproportionate with the nature of problems. Within livestock there was no theses reported on problems of sheep, goat, camel, etc. It seemed that livestock was generally interpreted in terms of only cattle or dairy animals. Given all the limitations of the sample our hunch is that the study of browsers does not attract many students because neither the planners nor the scientists seemed to have much empathy for the problems of shepherds living predominantly in stress prone ecologies. Also, there may be limited employment opportunities for scientist with expertise in such problems.

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3. Most studies reported since, on Scientific Creativity and Productivity (e.g., P.M. Sandhya, Managerial Styles and Research Productivity, 1985, IARI, New Delhi, Ph.D thesis) are guided by Dr. Y.P. Singh at IARI. NARM, Hyderabad has also initiated some very relevant studies in recent past for example by Balaguru, Raman and others.

Region-wise Distribution of Theses (Table 13)

The point made above gets further reinforced when we note that out of 36 theses in drought prone areas as many as 29 were on agricultural problems and only two dealt with the problems of dairy management. In the rainfed regions the pattern was similar. Isn't it a paradox that while the proportion of population dependent upon livestock as a major source of sustenance is far higher in rainfed and drought prone regions, the number of theses on these aspects are concentrated in partially or well endowed irrigated regions. This is not surprising when one looks at the bias in the livestock research itself. The implication is that research planners should use precise indicators to ensure that not only more research is done in dry regions, but also research is done on more important issues. Otherwise merely more money for dry region related research will end up in replicating research on same or similar problems which are studied in irrigated regions.

Whether IADP Bias Continues?

When we analysed the distribution of theses on the basis of NPK use as well as extent of pumpset use as an index of irrigation) we noticed a very dominant tendency for research to be concentrated in high input intensive regions (Table 14). This analysis was done by looking at the characteristics of districts in which studies were done using CMIE data.

If we assume that most students do field research in their home districts, we could hypothesize that majority of the students in Extension discipline came from better endowed regions.

Summing Up

It should not be surprising to note that both the supply of skills and perceptions of demand of Dry farmers do not match. There is a need thus to (a) redesign the degree granting system, (b) provide more explicit incentives to students for doing research on problems of dry regions, (c) make it obligatory on the part of universities and research institutes to give considerable weightage to such students who have worked on entirely rainfed commodities while selecting scientists for dryfarming positions, (d) reduce emphasis on just the adoption studies in Extension Science and increase attention towards discontinuance and socio-ecological studies as well as study of indigenous technologies and innovations , (e) study problems of livestock particularly browsers because rearers of browsers are some of the poorest people, (f) appoint review teams in each university to look at the post-graduate research problems, (g) also attend to the supply side problems i.e., the process of doing research, scientific creativity, public administration and management of research and (h) study the dynamics and designs of research on -station with on-farm research. The problems of hand tools, conjunctive use of organic and inorganic fertilizers, farmers' decision making etc., with specific reference to risky ecologies need considerably more attention. The instrumental view of science (as characterized by the choice of method first, and problem later) needs to be discounted. That is precisely the difference between training technologists and educating scientists.

Table - .1 Problem-wise Distribution of Thesis in Agronomy (1973-83)

		Year														
		1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	Total
R.No.4	Fertilizer - Organic	0	0	0	1	0	3	1	0	2	0	0	1	0	0	8
R.No.5	Fertilizer - Inorganic	0	0	1	24	11	14	13	3	8	3	8	15	2	0	102
R.No.6	Fertilizer both	0	0	0	0	1	0	2	0	4	0	1	3	0	0	11
R.No.7	Insecticides	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
R.No.8	Weed control	0	0	0	6	3	2	3	1	5	6	8	3	2	0	39
R.No.9	Water stress	0	0	1	3	1	0	3	0	2	4	3	7	0	0	24
R.No.10	Irrigation	0	0	0	6	8	4	3	2	4	6	7	3	0	0	43
R.No.11	Varietal trial	0	0	1	8	3	1	4	5	1	4	1	1	0	0	29
R.No.12	Spacing	0	0	0	3	3	2	1	1	2	3	4	2	1	0	22
R.No.15	Agronomic Trial	0	0	0	0	0	0	0	1	0	2	4	1	1	0	9
R.No.16	Inter cropping	0	0	3	8	8	3	6	2	7	0	10	10	3	0	60
R.No.17	Crop rotation	0	0	1	0	0	0	0	2	2	1	0	1	0	0	7
R.No.19	Physiology	0	0	0	0	0	0	0	0	1	0	2	0	1	0	4
R.No.22	Antitranspirent	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
R.No.23	Horticulture Pruning	0	0	0	1	0	0	0	0	1	0	0	1	0	0	3
R.No.24	Salinity	0	0	0	0	0	0	0	0	0	1	1	1	0	0	3
R.No.25	Genetics	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
R.No.36	Hydroponics	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
R.No.39	Wind Break	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
R.No.40	Not Specified	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
R.No.41	TOTAL	0	0	8	60	38	30	36	18	40	38	49	49	10	0	376

Table - 2 Problem and Region-wise Distribution of Thesis (with multiple counting) in Agronomy (1973-83)

		Region Code					
		1	2	3	4	5	Tota
R. 1	Lost of cultivation	85	92	23	146	105	45
R. 2	Cost effectiveness	1	5	1	4	1	1
R. 4	Fertilizer - Organic	3	4	0	6	1	1
R. 5	Fertilizer - Inorganic	32	50	7	72	36	19
R. 6	Fertilizer Both	5	4	3	11	5	2
R. 7	Insecticides	1	0	0	0	1	
R. 8	Weed control	16	12	5	17	14	6
R. 9	Water stress	2	13	1	17	4	3
R.10	Irrigation	2	2	2	21	29	5
R.11	Varietal trial	14	14	1	21	8	5
R.12	Spacing	4	20	2	18	19	6
R.13	Tillage	0	0	0	1	0	1
R.15	Agronomic Trial	3	0	1	3	4	11
R.16	Inter cropping	13	24	4	39	16	9
R.17	Crop rotation	1	3	2	2	1	9
R.18	Soil	0	0	0	1	0	1
R.19	Physiology	3	2	2	5	3	15
R.22	Antitranspirant	0	0	0	1	0	1
R.23	Horticulture Pruning	2	0	0	0	1	3
R.24	Salinity	0	2	0	2	0	4
R.25	Cosmetics	1	0	0	0	0	1
R.33	Quality-Breeding	0	0	0	0	1	1
R.37	Post Harvest-storage	0	1	0	0	0	1
R.38	Hydroponics	1	0	0	0	0	1
R.39	Wind Break	0	1	0	0	0	1
R.40	Not specified	0	0	0	0	1	1
R.41	TOTAL	189	249	51	387	252	1128

Legend

1 = Not specified
2 = Dry
3 = Drought Prone
4 = Partially Irrigated
5 = Irrigated

Table - 3 Enterprise and Region-wise Distribution of Thesis in Agronomy (1973-83)

		Region Code					
		1	2	3	4	5	Tota
R.No. 1	Millets	10	13	3	25	16	6
R.No. 2	Oilseeds	5	19	2	16	19	6
R.No. 4	Oilseeds mixed with cereal and pulse	1	1	0	1	1	
R.No. 5	Oilseed mixed with pulse	1	0	0	0	0	
R.No. 6	Pulses	12	16	4	25	4	6
R.No. 7	Cereals	20	20	2	30	33	11
R.No. 8	Cash crops - Plantation crops	0	0	0	1	0	1
R.No. 9	Cash crops - others	5	5	0	4	8	2
R.No.10	Fruits	2	8	0	0	0	2
R.No.11	Vegetables	1	3	1	5	1	11
R.No.22	Eucalyptus/Forestry	0	0	1	1	0	2
R.No.26	Aromatic gram	2	0	0	0	0	2
R.No.27	Rats	0	1	0	0	0	1
R.No.28	Grass/Fodder	4	2	2	7	2	17
R.No.29	Not specified	0	1	2	4	0	7
R.No.30	TOTAL	63	83	17	129	84	376

Legend

1 = Not specified
2 = Dry
3 = Drought Prone
4 = Partially Irrigated
5 = Irrigated

Table - 4 Analytical Technic-wise Distribution of Thesis in Agronomy (1973-83)

		Year														
		1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	Total
R.No. 1	Not specified	0	0	7	47	33	29	30	13	25	22	28	35	8	0	277
R.No. 6	Correlation	0	0	0	1	2	0	2	0	2	1	4	1	0	0	13
R.No. 7	Anova	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
R.No.13	Simple Means and Percentage	0	0	0	2	0	0	0	1	7	5	2	5	0	0	22
R.No.14	Means and Percentages, though not specified	0	0	1	7	3	1	4	3	5	9	15	7	2	0	57
R.No.15	Path Analysis	0	0	0	0	0	0	0	1	0	1	0	0	0	0	2
R.No.16	Curve fitting (quadratic and higher order)	0	0	0	3	0	0	0	0	0	0	0	1	0	0	4
R.No.21	TOTAL	0	0	8	60	38	30	36	18	40	38	49	49	10	0	376

Table 5 : Enterprise and Region wise Distribution of Thesis in Agriculture Economics, Sociology and Extension (1973-83)

	Enterprise	Region					Total
	Social Sciences	1	2	3	4	5	
R. No. 1	Cash crops	10	4	4	2	3	23
R. No. 2	Food crops - superior	5	3	8	3	3	22
R. No. 3	Food crops - inferior	2	0	3	2	0	7
R. No. 4	Oil seeds	0	0	0	1	0	1
R. No. 5	Pulses in mixed crop	0	0	0	0	1	1
R. No. 6	Fodder	1	0	0	0	0	1
R. No. 7	General cropping pattern	4	2	0	0	0	6
R. No. 8	Horticulture - vegetables	2	1	5	8	2	18
R. No. 9	Horticulture - fruits	1	0	0	3	1	5
R. No. 10	Livestock	1	2	2	3	1	9
R. No. 11	Forestry	1	0	0	0	0	1
R. No. 12	Fishery	0	0	0	0	1	1
R. No. 13	Silk	0	0	0	1	0	1
R. No. 15	Agri Processing & Marketing	2	0	0	2	3	7
R. No. 16	Multi-Enterprise Studies	1	0	1	1	1	4
R. No. 17	Chemical (Inputs)	1	0	1	1	1	4
R. No. 18	Irrigation (Inputs)	2	1	1	6	0	10
R. No. 19	Credit (Inputs)	8	2	9	11	5	35
R. No. 20	Mechanisation (Inputs)	1	3	1	1	0	6
R. No. 21	Agri. Administration	15	0	3	4	3	25
R. No. 22	Research System & Scientists	1	0	1	1	0	3
R. No. 23	Extension System	16	2	6	9	1	34
R. No. 24	Farmer's adoption	3	3	11	10	2	29
R. No. 25	Women	4	0	2	5	2	13
R. No. 26	Development/Social change	1	3	2	2	2	10
R. No. 27	Migration	0	0	0	1	0	1
R. No. 28	Rural Youth & Children	1	0	4	3	0	8
R. No. 29	Technology	4	3	3	9	0	19
R. No. 30	Dry farming	1	4	1	0	0	6
R. No. 31	Taxation on Agri.	1	0	0	0	0	1
R. No. 32	Prices/Terms of Trade	1	0	0	0	0	1
R. No. 33	Soil	0	1	0	0	0	1
R. No. 34	Not specified	6	1	2	7	0	16
R. No.100	Total	96	35	70	96	32	329

Legend

1 = Not specified
2 = Rainfed/Dry
3 = DPAP
4 = Partially Irrigated
5 = Well endowed Irrigated/I

Table - 6 Institute and Region-wise Distribution of Thesis in Agriculture Economics, Sociology and Extension (1973-83)

	Institute or University	Region Code					
		1	2	3	4	5	Total
R.No. 1	Haryana Agricultural University, Hisser, Haryana	26	8	7	27	9	77
R.No. 2	Mahatma Phule Krishi Vidyapeeth, Rahuri, Ahmednagar, Maharashtra	2	0	5	2	1	10
R.No. 3	Punjab Agricultural University, Ludhiana, Punjab	12	1	0	1	7	21
R.No. 4	University of Agricultural Sciences, Bangalore, Karnataka	27	9	22	43	5	106
R.No. 5	College of Agriculture, Hebbal, Bangalore, Karnataka	18	3	34	8	8	71
R.No. 6	College of Agriculture, Dharwar, Karnataka	2	0	0	6	0	6
R.No. 7	Jawaharlal Nehru Krushi Viswa Vidyalaya, Jabalpur, M.P.	5	9	1	1	1	17
R.No. 8	University of Udaipur, Udaipur, Rajasthan	4	0	0	1	0	5
R.No. 9	G.B.Pant University of Agriculture & Technology, Pantnagar, U.P.	0	0	0	1	0	1
R.No.10	H.P.Krishi Viswa Vidyalaya Palampur, Kangra, H.P.	0	0	0	6	0	6
R.No.11	Bidhani Chandra Krishi Viswa Vidyalaya, Kalyani, Nadi, W.B.	0	1	0	0	0	1
R.No.12	Punjab Krishi Vidyapeeth, Akola, Maharashtra	0	4	1	0	0	5
R.No.13	National Dairy Res. Institute, Karnal, Haryana	0	0	0	0	1	1
R.No.14	TOTAL	96	35	70	96	32	329

Legend

1 = Not specified
2 = Rainfed/Dry
3 = DPAP
4 = Partially Irrigated
5 = Well endowed Irrigated/IADP

Table 7 : Institute & Region wise Distribution of Thesis in Agronomy (1973-83)

		Region					
		1	2	3	4	5	Total
R. No. 1	HAU, Hissar, Haryana	10	7	1	44	4	66
R. No. 2	M. Phule Krishi Vidyapeeth, Rahuri, Maharashtra	1	2	0	2	1	6
R. No. 3	National Dairy Research Institute, Karnal, Haryana	16	0	0	0	0	16
R. No. 4	Bihar Agriculture College, Sabour, Bihar	0	0	0	0	2	2
R. No. 5	Bidhan Chandra KVV. Kalyani, Nadi, West Bengal	1	1	0	1	1	4
R. No. 6	College of Agri., Vishwa Bharati, Shantiniketan, Birbhum, West Bengal	0	0	0	0	1	1
R. No. 7	College of Agriculture, Dharwar, Karnatka	0	6	15	3	22	46
R. No. 8	Agri. College & Research Institute, Madurai, Tamil Nadu	0	0	0	3	0	3
R. No. 9	Himachal Pradesh Agril. University, Plampur	0	9	0	23	1	33
R. No. 10	Punjabrao Krishi Vidyapeeth, Akola, M.S.	5	7	0	1	1	14
R. No. 11	College of Agril., Solan, H.P.	0	0	0	3	0	3
R. No. 12	S.V.Agril. College, Tirupati, A.P.	7	11	0	15	33	66
R. No. 13	Agril. College, Kanke, Ranchi, Bihar	0	5	0	0	0	5
R. No. 14	University of Agril. Sciences, Bangalore, Karnataka	10	13	0	23	13	59
R. No. 15	Jawaharlal Nehru KVV, Jabalpur, MP.	4	12	0	5	3	24
R. No. 16	College of Agriculture, Rewa, MP	0	8	0	0	0	8
R. No. 17	Punjab Agricultural University, Ludhiana	8	0	0	1	0	9
R. No. 18	College of Agriculture, Gwalior, MP	0	1	0	2	0	3
R. No. 19	College of Agriculture, Raipur, MP	0	1	0	0	0	1
R. No. 25	A.P. Agril. University, Hyderabad	0	0	0	0	1	1
R. No. 26	SKN College of Agriculture, Jobnar, Rajasthan	0	0	1	1	0	2
R. No. 27	Tamil Nadu Agril. University, Coimbatore	0	0	0	1	0	1
R. No. 29	G.B. Pant University, Pantnagar, UP	0	0	0	0	1	1
R. No. 31	Marathwada Agril. University, Parabhani, M.S.	1	0	0	0	0	1
R. No. 32	Gujarat Agril. University, Ahmedabad	0	0	0	1	0	1
R. No. 33	Total	63	83	17	129	84	376

Legend

1 = Not specified
2 = Dry
3 = Drought Prone
4 = Partially Irrigated
5 = Irrigated

Table 8 : Enterprise and Region wise Distribution of Theses in Plant Breeding, Cytogenetics & Genetics (1973-83)

		Region					
		1	2	3	4	5	Total
R. No. 1	Millets (2,3,9,81,10,30)	15	4	1	5	0	25
R. No. 2	Oilseeds (29,31,33,34,35,78)	32	0	1	6	0	39
R. No. 6	Pulses (18,19,20,21,22,23,24,25, 26,27,28,11)	44	3	1	15	1	64
R. No. 7	Cereals (4,5,6,7,8)	47	4	0	15	2	68
R. No. 9	Cash crops - others (16,17,46,49, 52,87,89)	14	2	2	7	2	27
R. No. 11	Vegetables (42,43,44,45,47,48 51,79)	3	0	0	2	1	6
R. No. 24	Drosophila Malanogaster (84)	0	0	0	1	0	1
R. No. 25	Yeast (80)	5	0	0	0	0	5
R. No. 27	Rats (83)	0	0	0	1	0	1
R. No. 28	Grass/Fodder (15)	2	0	0	1	0	3
R. No. 29	Not specified (1)	2	0	0	1	0	3
R. No. 30	Total	164	13	5	54	6	242

Legend

1 = Not specified
2 = Dry
3 = Drought prone
4 = Partially Irrigated
5 = Irrigated

TABLE NO. 9.

Regional wise Distribution of Extension Thesis (1972 - 78)

Region	1972	1973	1974	1975	1976	1977	1978	Total	Percentage.
Unspecified	23	82	106	87	93	106	75	576	63.6
Rainfed	1	4	4	6	9	8	14	46	5.1
Draought Prone Areas	0	3	6	8	7	5	7	36	4.0
Partially Irrigated	2	24	29	32	24	15	27	153	17.0
Well Endowed Irrigated/IADP	3	14	13	18	23	9	13	93	10.3
Total	29	127	158	151	156	143	136	900	100.0

TABLE NO. 10

Crop and Regionwise distribution of Extension Thesis (1972 - 1978)

Crop.	Unspecified	Rainfed	Drought Prone Areas	Partially Irrigated.	Well Endowed Irri./ IADP	Total
1. Dry Crops						
a. Bajra	1	0	1	1	1	4
b. Barley	1	0	0	0	0	1
c. Jowar	3	2	2	1	0	8
d. Oil seeds	1	0	0	0	0	1
e. Pulses	1	0	0	0	0	1
f. Oil seeds & Pulses	0	0	0	1	0	1
g. Ragi	1	0	0	0	0	1
Sub Total	8	2	3	3	1	17
2. Irrigated Crops						
a. Cereals	23	5	3	14	18	63
b. Cash crops	14	5	3	10	1	33
Sub Total	37	10	6	24	19	96
3. Not specified	527	34	27	126	73	787
Grand Total	572	46	36	153	93	900

TABLE NO. 11

Year-wise Problem Focus of Extension Thesis (1972-78)

Problem	1972	1973	1974	1975	1976	1977	1978	Total
1. Development Programme								
a. IADP	1	2	1	0	1	1	0	6
b. SFDA	0	1	3	2	2	4	1	13
c. CADP	0	0	1	0	2	1	0	4
d. DPAD	0	0	0	0	0	3	0	3
Sub Total	1	3	4	2	5	9	1	26
2. Technology Transfer								
a. Adoption behaviour	5	14	21	18	25	12	15	110
b. Farmers' Innovation & Farm Practices	4	12	15	9	10	10	13	73
c. Transfer of Technology & T&V.	0	1	1	0	0	0	2	4
d. Modern Rice Technology	0	0	0	0	0	1	0	1
Sub Total	**9**	**27**	**37**	**27**	**35**	**23**	**32**	**190**
3. Mechanisation	0	1	1	0	2	0	0	4
4. Irrigation	0	0	2	1	0	1	0	4
5. Dry Farming	0	0	0	0	2	0	1	3
6. Credit	0	6	4	7	7	6	9	39
7. Plant Protection	1	2	2	0	2	1	1	9
8. Land Management								
a. Soil Reclamation/ Conservation	0	0	0	0	1	0	2	3
b. Land ceiling	0	1	0	0	0	0	0	1
c. Land consolidation	0	1	1	0	1	0	0	3
d. Land distribution	0	0	0	0	0	1	0	1
e. Soil & Water analysis	0	0	0	2	1	0	0	3
Sub Total	0	2	1	2	3	1	2	11
9. Farm Inputs								
a. Inputs	0	0	1	0	0	0	0	1
b. Fertilizer	0	0	2	3	3	0	3	13
Sub Total	0	0	3	3	3	0	3	14
10. Farmers' Training/ Demonstration	3	5	16	9	5	4	8	50
11. Scientists	0	0	0	0	1	0	1	2
12. Non-Specified	13	77	76	93	81	86	71	499
13. Others	2	4	9	7	10	12	5	49
Grand Total	29	127	158	151	156	143	136	900

TABLE NO. 12

Subject-wise distribution of Extension Thesis (1972 - 1978)

Subject	1972	1973	1974	1975	1976	1977	1978	Total
1. Not related to agriculture	9	16	28	21	19	22	21	136
2. Agriculture	19	80	107	93	107	94	92	592
3. Poultry	0	0	3	2	1	0	1	7
4. Dairy	0	4	3	8	10	8	6	39
5. Piggery	0	0	0	0	0	0	1	1
6. General Animal Husbandry	0	0	0	1	1	1	1	4
7. Gobar gas plants	0	0	0	0	1	0	1	2
8. Home Science, Health Nutrition and family Planning	0	11	10	9	3	4	3	40
9. Developmental Organizations	0	1	0	3	0	1	0	5
10. Agricultural Administration	1	1	1	6	3	3	0	15
11. Education	0	3	0	2	3	3	3	14
12. Training for Officers	0	5	1	2	4	3	3	18
13. Rural Youth	0	4	4	3	3	4	4	22
14. Others	0	2	1	1	1	0	0	5
TOTAL	29	127	158	151	156	143	136	900

TABLE NO. 13

Subject and Regionwise distribution of Extension Thesis 1972-78)

Subject	Unspecified	Rainfed	Drought Prone Areas	Partially Irrigated	Well Endowed Irri./ IADP	Total
1. Not related to Agriculture	94	9	3	18	12	136
2. Agriculture	360	32	29	112	59	592
3. Poultry	4	0	0	1	2	7
4. Dairy	18	2	2	6	11	39
5. Piggery	1	0	0	0	0	1
6. General Animal Husbandry	1	0	0	2	1	4
7. Gobar Gas Plants	2	0	0	0	0	2
8. Home Science, Health Nutrition and Family Planning	30	1	0	7	2	40
9. Developmental Organizations	5	0	0	0	0	5
10. Agricultural Administration	11	2	1	0	1	15
11. Education	11	0	1	0	2	14
12. Training for Officers	16	0	0	2	0	18
13. Rural Youth	18	0	0	2	2	22
14. Others	1	0	0	3	1	5
Total	572	46	36	153	93	900

TABLE NO. 19

Distribution of Extension Thesis
Input Intensity wise

Extent of Pumpset (No.)	Extent of PK Consumption (kgs.)					Total
	Unspecified	≤ 20	20-50	50-90	> 90	
0	585	0	0	1	0	586
≤ 6000	2	40	21	3	0	66
6000 - 12000	0	8	84	7	3	102
12000 - 25000	6	9	16	27	2	60
> 25000	0	5	35	35	11	86
Total	593	62	156	73	16	900