Study on the Relevance of Post Graduate Research to the Needs of Farmers in State Agricultural Universities of Southern India

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ABSTRACT

The present study was conducted to find out the relevance of Post Graduate Research conducted in State Agricultural Universities to the needs of farmers of respective states. Relevance was observed between the research being conducted and the farmer preferences in all the research areas in Agriculture. However, relevance was more in TNAU when compared to ANGRAU and PJTSAU. Resource management as an important research area was recognised by the farmers of Tamilnadu and Soil and Water pollution and Soil health management are recognised as important areas by the farmers of Telangana and Tamilnadu when compared to farmers of Andhra Pradesh. Studies on nutrient management were given top priority by the farmers of AP and Tamilnadu while water management is prioritised in Telangana and accordingly research is being conducted. Management of insect pests and diseases was recognised as top priority area by the farmers of the three states and accordingly research is being conducted. Farmers have not recognised the importance of post harvest pest and disease management in all the three states while the importance of biological control of insect pests and diseases was more felt by the farmers of Tamilnadu compared to AP and Telangana. Studies on pesticide resistance were more demanded by the farmers of AP than other two states. Studies on stress management were recognised as top priority by the farmers of Telangana and Tamilnadu while research studies are more towards genetic deviance in ANGRAU, PJTSAU and character association and selection studies were more in TNAU. The importance of crop growth models were recognised by the farmers of Tamilnadu only. The farmers of AP and Telangana have given highest importance to diffusion and adoption studies while impact studies were prioritised by farmers of Tamilnadu and accordingly research is being planned except in AP where production economics occupied top place. In all the universities studies on agricultural finance and credit were given almost equal importance while studies crop insurance was given least importance in ANGRAU. The results recommended to plan necessary strategies for considering the farmers needs as top most priority in selection of PG research topic for the students and accordingly the teachers experience in the subject and innovativeness should also be integrated.

Key words: *State Agricultural Universities; Relevance; Post Graduate Research; Farmers preference;*

To improve agricultural production appropriate technology is necessary. Appropriate technology is defined as the latest scientific and technological development that has been adjusted to suit the local conditions to the highest possible degree (*FAO, 1996*). It is known that State Agricultural Universities (SAU) are involved in developing many technologies through research and Post Graduate Research is one such platform which is noticeable. In all the SAUs in the country the existing Post Graduate system includes course work for two semesters followed by research work for two semesters and at Doctoral level course work for two semesters followed by research work for four semesters. Accordingly, a lot of data is being generated at the SAUs from the research work conducted by the students. Studies should be conducted to find out whether the outcome generated through PG research is meeting the needs of farmers directly or

indirectly. This will happen only with careful planning and designing of Post Graduate research works. *Sandra et al. (1989)* noted that the goal of agricultural research is the development of stable technologies; the production system changes becomes the most limiting and new technology must be developed or adjusted to suit farmers needs. Keeping this in view it is felt that a study should be conducted to know the relevance of Post Graduate Research in southern State Agricultural Universities (SAU's) and farmers needs of respective three states i.e. Andhra Pradesh, Telangana and Tamilnadu.

METHODOLOGY

The study was conducted in Andhra Pradesh, Telangana and Tamilnadu and the Agricultural colleges offering Post Graduate courses in all the respective State Agricultural Universities i.e., Acharya N.G.Ranga Agricultural University (ANGRAU), Professor Jayashankar Telangana State Agricultural University (PJTSAU) and Tamilnadu Agricultural University (TNAU) were selected for analysing the PG Research.

Post Graduate research work conducted during the period 2011-16 were collected department wise from the Colleges of three selected State Agricultural Universities. The data was tabulated research area wise and compared with the preferred areas of research by the farmers in the State of Andhra Pradesh, Telangana and Tamilnadu. Farmers preferences were collected from a randomly selected sample of 500 farmers in A.P, 300 farmers in Tamilnadu and 200 farmers in Telangana. The data collected were correlated with the major areas of research in the respective agricultural universities of the state to compare the farmers' preference and PG research conducted in the three states. The categorisation made for PG research conducted into Crop production, Crop protection, Crop improvement and Social sciences and analysed with farmer preferences which are given in Table 1 to 4.

Rank correlation analysis was done to find out the relevance between the farmer preferences and research conducted in State Agricultural Universities.

RESULTS AND DISCUSSION

Analysis of farmer preferences and research conducted in Crop production : The farmers of Andhra Pradesh have given more preference to research on nutrient management of crops (19.27%) followed by weed management (17.03%), integrated crop management (13.96%), soil biology and fertility management (12.29%) and cropping &farming systems (10.05%) while least preference was given to studies on climate resilient agriculture (0.27%) and remote sensing (0.27%). None of the farmers have demanded for research on resource management which clearly indicates the need to educate farmers on the importance of this subject. Equal importance was given by farmers of Andhra Pradesh for soil health management and soil & water pollution studies (1.11%). In crop production, water management (14.84%) was given top priority by the farmers of Telangana state followed by soil biology and fertility management (13.53%), integrated crop management (13.10%), nutrient management (10.91%) and cropping and farming systems (9.17%). In case of the farmers of Tamilnadu similar trend to that of Andhra Pradesh was observed were studies on nutrient management were more preferred followed by soil biology, weed management, integrated crop management and water management. This clearly shows that studies on water management is highly important for the farmers of Telangana while nutrient management is highly important for farmers of Andhra Pradesh and Tamilnadu. The importance of resource management was more recognised by the farmers of Tamilnadu (5.88%) when compared with the farmers of other two states. Studies on soil and water pollution and soil health management are recognised as important areas by the farmers of Telangana (7.86%, 6.11%) and Tamilnadu (8.14%, 6.78%), when compared to farmers of Andhra Pradesh (1.11%, 1.11%) (Table 1).

The comparisons of Post Graduate research in three universities were presented in Table 1. Top priority was given to research on nutrient management (23.43%) followed by weed management (15.62%) and soil biology and fertility management (10.93%) in ANGRAU and in accordance with the farmers preference. However, the importance given to integrated crop management is very low (4.68%) even though the farmer preference was high (13.98%). Recognising the importance of resource management and soil health management research is being conducted in ANGRAU. Enough research is being conducted on performance of cultivars in ANGRAU (7.29%) even though farmers reference is very low (3.63%) which is not needed since these studies will be conducted while releasing the

Table 1. Analysis of farmer preferences (FP) and PG research (PG) conducted in Crop production

Research areas	Universities					
	ANGRAU		PJTSAU		TNAU	
	FP (n=359)	PG(n=194)	FP (n=229)	PG(n =120)	FP (n=221)	PG(n =105)
Integrated crop management	50(13.96)	9(4.68)	30(13.10)	8(6.66)	14(6.33)	8(7.61)
Nutrient management	69(19.27)	45(23.43)	25(10.91)	20 (16.66)	26 (11.76)	14 (13.33)
Weed management	61(17.03)	30(15.62)	18(7.86)	13 (10.83)	19(8.59)	9(8.57)
Water management	21(5.86)	10(5.20)	34(14.84)	22 (18.33)	22(9.95)	8(7.61)
Organic agriculture	32(8.93)	8(4.16)	15(6.55)	6(5)	16(7.23)	7(6.66)
Cropping and farming systems	36(10.05)	11(5.72)	21(9.17)	7(5.83)	17(7.69)	10(9.52)
Performance of cultivars	13(3.63)	14(7.29)	9(3.93)	4(3.33)	9(4.07)	2(1.90)
Studies on climate resilient agriculture	1(0.27)	2(1.04)	1(0.43)	2(1.66)	4(1.80)	3 (2.85)
Soil survey and classification	16(4.46)	17(8.85)	7(3.05)	3(2.5)	9(4.07)	2(1.90)
Soil health management	4(1.11)	15(7.81)	18(7.86)	5(4.16)	18(8.14)	8(7.61)
Soil biology and fertility management	44(12.29)	21(10.93)	31(13.53)	17 (14.16)	28(12.66)	15 (14.28)
Resource management	0(0)	10(5.20)	2(0.87)	9(7.5)	13(5.88)	07 (6.66)
Remote sensing & GIS	1(0.27)	1(0.52)	4(1.74)	1(0.83)	6(2.71)	05(4.76)
Soil & water pollution studies	4(1.11)	1(0.52)	14(6.11)	3(2.5)	15(6.78)	07(6.66)
Others (Soil transformation, Soil delineation etc)	07(1.95)	00 (0.00)	0(0.00)	00(0.00)	05(2.26)	00 (0.00)
r value	0.628		0.796		0.860	

Table 2. Analysis of farmer preferences and PG research conducted in Crop protection.

Research areas	ANGRAU		PJTSAU		TNAU	
	FP(n=313)	PG(n=129)	FP(n=173)	PG(n=72)	FP(n=255)	PG(n=95)
Management Studies of insect pests and diseases	130(41.53)	51(39.84)	70(40.23)	24(32.00)	86(33.72)	38 (40.00)
Taxonomic studies of insect pests	8(2.55)	2(1.56)	5(2.87)	3(4.00)	15(5.88)	9(9.47)
Pesticide resistance	39 (12.46)	14 (10.93)	17(9.77)	10 (13.33)	23(9.01)	6(6.31)
Studies on isolation/ characterization of insect pests and diseases	27(8.63)	19(14.84)	30(17.24)	16(21.33)	52(20.39)	19(20.00)
Biological control of insect pests and diseases	10(3.19)	13 (10.15)	6(3.44)	3(4.00)	14(5.49)	5(5.26)
Insect and disease development factors	31(9.90)	12(9.38)	27(15.52)	14(18.67)	26(10.19)	14(14.74)
Grain Storage pests and their management	13(4.15)	4(3.12)	4(2.29)	0(0.00)	5(1.96)	2(2.10)
Post-harvest technologies to minimize the yield losses by insect pests	00(0.00)	1(0.78)	2(1.14)	0(0.00)	2(0.78)	0(0.00)
Disease causing organisms	25(7.98)	13 (10.15)	12(6.89)	2(2.66)	22(8.62)	2(2.10)
Others (interaction among biotic pathogens, compatibility studies etc)	30(9.58)	0(0.00)	0(0.00)	0(0.00)	10(3.92)	0(0.00)
r value	0.533		0.915		0.890	

varieties. In PJTSAU top priority in research is given to water management (18.33%) followed by nutrient management (16.66%) and is in accidence with the farmer requirement. Enough research on soil biology (13.53%) and weed management (10.83%) is being conducted in PJTSAU and is in accordance with farmers demand while more concentration has to be given for research on integrated crop management. Adequate importance was given to resource management and soil health management by the researchers of PJTSAU but research should be more focussed on soil and water pollution studies. *Alex et al. (2010)* also expressed that the University Research Policy, Strategy and Organisation should reach the clients by publishing the research results.

Table 3. Analysis of farmer preferences and PG research conducted in Crop improvement

Research areas	ANGRAU		PJTSAU		TNAU	
	FP(n=225)	PG(n=116)	FP(n=174)	PG(n=68)	FP(n=256)	PG(n=111)
Genetic Deviance	50(22.22)	34(29.31)	20 (11.49)	15(22.05)	29(11.32)	15(14.15)
Heterosis & Combining Ability	30(13.33)	20(17.24)	13(7.47)	8(11.76)	25(9.76)	10(9.43)
Stability Analysis	22(9.77)	9(7.75)	16(9.19)	5(7.35)	21(8.20)	9(8.49)
Path Analysis	1(0.44)	0(0.00)	10(5.74)	0(0.00)	2(0.78)	0(0.00)
Character association & Selection studies	25(11.11)	13(11.20)	25(14.36)	11(16.17)	35(13.67)	17(16.03)
Bio techno/ Genetically modified crops	0(0.00)	0(0.00)	11(6.32)	4(5.88)	12(4.68)	8(7.54)
Characterization of genotypes	15(6.66)	13(11.20)	16(9.19)	10(14.70)	19(7.42)	11(10.37)
Crop growth models	0(0.00)	0(0.00)	0(0.00)	1(1.47)	6(2.34)	7(1.88)
Plant growth regulators	0(0.00)	5(4.31)	4(2.29)	2(2.94)	10(3.90)	7(6.60)
Stress management	32(14.22)	13(11.20)	28(16.09)	5(7.35)	40(15.62)	15(14.15)
Nutritional studies	35(15.55)	9(7.75)	21(12.06)	7(10.29)	33(12.89)	9(8.49)
Seed physiology	8(3.55)	0(0.00)	7(4.02)	0(0.00)	9(3.51)	3(2.83)
Others (genetic variability, detection, mapping and gene pyramiding studies etc)	7(3.11)	0(0.00)	3(1.72)	0(0.00)	15(5.85)	0(0.00)
r value	0.730		0.774		0.835	

Table 4.Analysis of farmer preferences and PG research conducted in social sciences

Research areas	ANGRAU		PJTSAU		TNAU	
	FP(n=183)	PG(n=108)	FP(n=145)	PG(n=71)	FP(n=228)	PG(n=76)
Diffusion & adoption studies	20(11.29)	13(12.03)	21(14.48)	15(21.12)	21(9.21)	12(15.78)
Entrepreneurship	18(10.16)	10(9.25)	07(4.82)	03(4.22)	08(3.50)	05(6.57)
Developmental programmes	10(5.64)	9(8.33)	11(7.58)	06(8.45)	26(11.40)	04(5.26)
Organizational studies (Training Needs)	36(20.33)	3(2.77)	12(8.27)	03(4.22)	12(5.26)	01(1.31)
Impact studies	13(7.34)	8(7.40)	15(10.34)	09(12.67)	37(16.22)	15(19.73)
ICT's	05(2.82)	3(2.77)	09(6.20)	01(1.40)	17(7.45)	02(2.63)
Indigenous Technical Knowledge	02(1.12)	1(0.92)	03(2.06)	01(1.40)	04(1.75)	01(1.31)
Agricultural Policies	06(3.38)	5(4.62)	04(2.75)	02(2.81)	08(3.50)	05(6.57)
Agricultural marketing	15(8.47)	6(5.55)	07(4.82)	03(4.22)	09(3.94)	03(3.94)
Crop Insurance	04(2.25)	2(1.85)	10(6.89)	03(4.22)	11(4.82)	04(5.26)
Agricultural finance & credit	14(7.90)	12(11.11)	12(8.27)	09(12.67)	18(7.89)	08(10.52)
Production econ. & farm management	20(11.29)	27(25.00)	14(9.65)	09(12.67)	23(10.08)	10(13.15)
Impact assessment & evaluation studies	09(5.08)	09(8.33)	09(6.20)	07(9.85)	16(7.01)	06(7.89)
Others (Psychological studies, studies on rural devel., econ. modeling etc)	11(6.21)	00(0.00)	11(7.59)	00(0.00)	18(7.89)	00(0.00)
r value	0.608		0.696		0.529	

In TNAU PG Research top priority was given to soil biology and fertility management (14.28%) followed by nutrient management (13.33%) and was in close relevance to farmers needs. Enough importance was given for research on weed management (8.57%), water management (7.61%) and resource management (6.66%). Importance given to research on soil and water pollution studies and farmers preference was high in TNAU when compared to other two states. Studies on performance of cultivars are low in TNAU when compared to other two states even though farmer preference is high. Comparison between three universities in crop production research and farmer preference clearly indicated that nutrient management was given top priority in Andhra Pradesh, water management in Telangana and soil biology and fertility management in Tamilnadu. This has given inference that the needs of the farmers depend upon the

resources available and constraints in those states. Among the three states, relevance was high between farmer preference and PG research conducted which means that the PG research is being planned as per the requirement of farmers in Tamilnadu followed by Telangana and Andhra Pradesh.

Analysis of farmer preferences and research conducted in Crop protection: The results pertaining to the crop protection of three states were compared in Table 2. The results indicated that the farmers of three states i.e. Andhra Pradesh, Telangana and Tamilnadu have highest preference towards research on Management of pests and diseases (41.53%, 40.23%, and 33.72% respectively). The farmers of AP have given second priority to insecticide resistance (12.46%), insect and disease development factors (9.90%) and the least preference was given to studies on taxonomy of insects and diseases (2.55%). None of the farmers have demanded research on post harvest technologies for the management of insects and diseases in Andhra Pradesh while it was least in Telangana (1.14%) and Tamilnadu (0.78%). Second priority was given for insect and disease development factors (15.52%) by the farmers of Telangana while for isolation and characterization of insects and diseases (20.39%) by the farmers of Tamilnadu. Biological control of insect pests and diseases is more preferred by the farmers of Tamilnadu when compared to that of AP and Telangana, however research is being conducted more in AP (10.15%) than in Telangana (4.00%) and Tamilnadu (5.26%). It is also observed that studies on pesticide resistance are more demanded by the farmers of AP (12.46%) than Tamilnadu (9.01%) and Telangana (9.77%) while PG research was relatively more concentrated in Telangana (13.33%) followed by AP (10.93%) and Tamilnadu (9.01%). Importance of insect and disease development factors were more recognised by the farmers of Telangana (15.52%) and accordingly research is also being more concentrated (18.67%). The study conducted in crop protection has revealed that relevance was high between farmer preference and PG research conducted in PJTSAU followed by TNAU and ANGRAU.

Analysis of farmer preferences and PG research conducted in crop improvement: The data pertaining to the area of crop improvement were presented in |Table 3. The farmers of AP has preferred research to be conducted on genetic deviance (22.22%) followed by nutritional studies (15.55%), stress management studies (14.22%) and studies on heterosis and combining ability (13.33%). Farmers of Telangana and Tamilnadu has preferred studies on stress management as top priority (16.09%, 15.62%) followed by character association and selection studies (14.36%, 13.67%), nutritional studies (12.06%, 12.89%) and studies on genetic deviance (11.49%, 11.32%). Farmers of Tamilnadu have recognised the importance of studies on crop growth models (2.34%) while importance was not recognised by the farmers of other two states. The importance of plant growth regulators were recognised by the farmers of Telangana and Tamilnadu but not by farmers of AP.

The PG researchers of ANGRAU and PJTSAU have given top priority for research on genetic deviance (29.31%, 22.05%) while for character association and selection studies in TNAU (16.03%). Studies on characterization of genotypes were almost equally recognised by the farmers of all the three states. Research on heterosis and combining ability has occupied second place according to the importance given by the researchers in ANGRAU (17.24%) while fourth place in PJTSAU (11.76%) and fifth in TNAU (9.43%) (Table 3). Importance of studies on seed physiology was recognised by the researchers of TNAU but not by ANGRAU and PJTSAU. Studies on stress management was given equal importance as like genetic deviance and occupied second place in TNAU (14.15%) but not in ANGRAU and PJTSAU. Studies on crop growth models is being conducted in PJTSAU and TNAU but not in ANGRAU while on plant growth regulators relatively more research is being conducted in TNAU (6.60%) followed by ANGRAU (4.31%) and PJTSAU (2.94%). The correlation coefficients clearly indicated that relevance was observed in all the three universities between farmer preference and PG research but relatively more in TNAU when compared with ANGRAU and PJTSAU.

Analysis of farmer preference and PG research conducted in Social sciences: The data pertaining to the comparison between farmer preference and PG research conducted were presented in Table 4. The data indicate that the farmers of AP has demanded for organisational studies as top priority (20.33%) followed

by diffusion and adoption studies (11.29%) and production economics &farm management studies (11.29%) while least preference was given to studies on Indigenous Technical Knowledge (ITK's) (1.12%). The farmers of Telangana preferred research on diffusion and adoption studies (14.48%) as top priority while farmers of Tamilnadu preferred research on impact studies (16.22%) as top priority. Studies on developmental programs was given second priority by the farmers of Tamilnadu (11.40%) followed by production economics and farm management (10.08%). Study on ICTs also preferred by the farmers of the three states to an extent of 2.80 per cent to 7.45 per cent. Research studies indicated that Production economics and farm management in ANGRAU has occupied first place (25.00%) while in PJTSAU diffusion and adoption studies (21.12%) and impact studies in TNAU (19.73%). Diffusion and adoption studies occupied second place in ANGRAU (12.03%) followed by agricultural finance and credit (11.11%) and entrepreneurship (9.25%). In PJTSAU agricultural finance and credit and production economics and farm management were given equal importance and occupied second place (12.67% each) followed by impact assessment and evaluation studies (9.85%). IN TNAU, diffusion and adoption studies occupied second place (115.78%) followed by production economics and farm management (13.15%). In all the universities studies on agricultural finance and credit were given almost equal importance while studies crop insurance was given least importance in ANGRAU (1.85%) compared with PJTSAU (4.22%) and TNAU (5.26%).

CONCLUSION

The study indicated that the PG Research conducted in all the three state agricultural universities was on par with the needs and preferences of the farming community. There was not much variation in the three universities with respect to Farmers preferences and PG Research conducted. This indicates that utmost care was taken by the researchers to conduct research as per the preferences of the farmers which are very much needed in the present agricultural scenario. However, certain areas preferred by farmers are not adequately researched in all the three universities which need careful planning for the future.

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