Bridging Research and Extension Gaps of Rice Yield in Kurnool District of Andhra Pradesh

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Abstract

Rice is the staple food for the Indian population and plays an important role in the national economy of the country. However, the yield level of rice at the farmers' level and in Front Line Demonstrations is not on par with potential yield. There are research and extension gaps which need to be bridged to increase rice production and productivity, to improve the efficiency of land and labor use, reduce production costs and increase food security. The objectives of this study were to assess the research and extension gaps in cultivating rice through need based technological interventions, and to prioritize these interventions. A total of five technological interventions were purposively selected to ascertain research and extension gaps. The results reveal that both research and extension gaps are still prevalent with reference to the selected technological interventions. It is high time that farmers adopt the interventions on a scientific scale to minimize the gap to the extent possible.

Introduction

Rice is the staple food for the Indian population. This crop plays an important role in the national economy of the country, yet many rice cultivating farmers live below the poverty line. Most resource-poor farmers are forced to use their limited resources to produce adequate food for their family, leading to the degradation and reduction in potential of these resources (Dat Van Tran). In order to achieve national food security, high yielding varieties have been produced to increase rice production to reach self-sufficiency. However, the yield level at the farmers' level and in the Front Line Demonstrations (FLDs) conducted in the farmers' fields is not on par with potential yield of the rice

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variety. The gap between potential yield and yield realized in FLDs refers to the Research gap and the yield gap between FLDs and due to farmers' practice refers to the Extension gap. Earlier studies conducted in India in general and in Andhra Pradesh in particular have highlighted the existence of both research and extension gaps with reference to rice (Piara Singh et al). Various factors cause exploitable yield gaps such as, physical, biological, socio-economic, and institutional constraints, which can be effectively improved through participatory research, extension and Government attention. These gaps can be conveniently classified into agronomic gaps, socio-economic gaps, institutional gaps, and mixed gaps according to the nature of constraints in realizing the true benefits of technological interventions. Bridging these gaps is essential not only to increase rice production and productivity, but also to improve the efficiency of land and labor use, reduce production costs, and increase food security. It is essential that, the narrowing of both research and extension gaps is not static, but dynamic considering the influence of technological interventions in boosting rice yields at FLDs level and at farmers' level and also with the improvement of the yield potential of rice varieties. This calls for integrated and holistic approaches, to address these two gaps through appropriate policy interventions, understanding of farmers' actual constraints to higher yields of rice, deploying new proven technologies for raising rice production and adequate institutional support to farmers.

With this background, the researchers aimed at this in-depth study with the following specific objectives:

1. To assess both research and extension gaps in cultivating rice through executing need based technological interventions.
2. To prioritize the technological interventions that minimize both research and extension gaps in cultivating rice.

Materials and Methods

In view of the crucial significance of rice crop in the Scarce Rainfall Zone (SRZ), the same was considered for this in-depth study in assessing both research and extension gaps in rice cultivation. The earlier research studies conducted in the Scarce Rainfall Zone revealed worrisome findings with reference to monocropping of rice, stagnated yields, increased susceptibility to pests and diseases, escalation in the cost of cultivation of crops, exhausted potential of

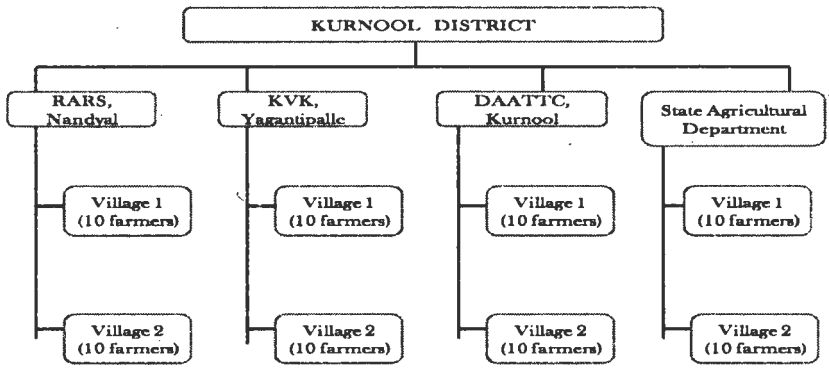
existing varieties etc. Further, innumerable extension gaps have been witnessed in association with these research gaps and both these gaps put together adversely influence the economic prospects of rice cultivation in the Scarce Rainfall Zone. In view of this, the researchers have made an attempt to assess both research and extension gaps and plan relevant research and extension strategies, so as to make rice cultivation a viable perspective in SRZ.

To ensure this, the data were collected from different institutions viz. Regional Agricultural Research Station (RARS), Nandyal; District Agricultural Advisory and Transfer of Technology Centres (DAATTC), Kurnool; Krishi Vigyan Kendras (KVKs), Yagantipalle; and State Agricultural Department, regarding the FLDs (technological interventions) conducted in the farmers' fields practicing rice cultivation. The data so collected were triangulated with the sample farmers to ensure their reliability. A total of five technological interventions (Table 1), which are commonly executed by all these institutions were purposively selected to ascertain both research and extension gaps. Two villages and 10 farmers from each village were randomly selected with reference to each governmental agency in executing the selected technological interventions. Thus four governmental agencies, 8 villages 80 farmers and five technological interventions form the sample base for this study (Figure 1). Primary information forms the data base and the data were collected on various parameters like cost of cultivation, FLD yield data, yields recorded at farmers' fields, market prices of rice etc., for the period 2001-02 to 2010-11. The study was conducted in the year 2012-13.

Table 1. Selected Technological Interventions

Priority area identified	Technological intervention
1. Production technology of rice	SRI technology vis-à-vis Transplanting technology
2. Mechanization in rice cultivation	Mechanized operations vis-à-vis Manual operations
3. Fertilizer management in rice cultivation	Integrated Nutrient Management vis-à-vis Inorganic fertilizer application
4. Weed management in rice cultivation	Application of weedicides vis-à-vis Manual labour
5. Pesticides management in rice cultivation	Integrated Pest Management vis-à-vis Chemical pesticides application

Figure 1: Methodology followed for selecting sample farmers in Kurnool district



Results and Discussion

To ascertain the gaps in the adoption of selected technological interventions at the farmers level, the yields obtained by the farmers (of their own practices) are compared both with the potential yield of the crop and the yields realized from the FLDs conduced in the farmers fields. It is a known fact that, the potential yield of the variety under any type of technological intervention cannot be realized at the farmers' level and even at the FLDs conducted by the scientific community at the field level. This variation might be due to changes in the agro-climatic conditions, differences in managerial abilities across the farmers, farm infrastructural facilities available at different locations, soil heterogeneity etc.

However, the review of past studies in India in general, and in Andhra Pradesh in particular, revealed a disappointing picture regarding the wide disparity in yields of rice with reference to FLDs and farmers' practices, when compared to the potential yield of the selected variety. With this back ground, this study was attempted, to analyze both research and extension gaps in executing different technological interventions in cultivating rice in Kurnool district of Andhra Pradesh and the same are shown through Tables 2 to 6.

a. Technological Intervention I - Production Technology of rice

In spite of several recommendations and suggestions given by the scientific community with reference to the adoption of SRI technology of rice instead of transplanted technology especially in water scarcity areas of Kurnool district, the farmers are still going for transplanted technology. Informal discussions held with farmers revealed that, they are preferring transplanted technology, as they

are more acquainted with the technology and it is less labour intensive as compared to SRI technology. The farmers of the head reach of KC Canal and Telugu Ganga Project opined that, they enjoy adequate irrigation facilities and hence, they prefer transplanted technology. However, this poses a threat to the tail end farmers with limited water supply and thereby, they suffer from low and stagnated yields under transplanted technology.

Keeping these aspects in view, the DAATTC, Kurnool, RARS, Nandyal, Line Department of Agriculture etc., have suggested that the farming community especially at the tail end of canal commands can go for SRI technology of rice, as it facilitates the farmers with the following advantages viz., demands less irrigation water; sustains soil health, as SRI technology lays more emphasis on organic nutrition as compared to inorganic chemical fertilizers; though SRI technology demands more labour usage, the rise in labour costs will get outweighed by the drastic increase in yield; and both physical and economic efficiency of irrigation water usage in SRI technology is considerably higher over transplanted technology.

To promote SRI technology among the farmers, the scientific community in the district conducted several FLDs in the farmers' fields, as these demonstrations reflect the true picture about the SRI technology in the practical environment and help to convince the farmers about the advantages (as discussed above) of the SRI technology over transplanted technology. A close perusal of Table 2 reveals a disappointing picture, as both research gap and extension gap are found significantly high. It is also evident from the table that, though the cost of cultivation in FLDs (SRI technology of rice) is considerably higher than farmer's practice (Transplanted technology), the drastic increase in the yields of rice in SRI technology has boosted the net returns over transplanted technology. However, there exists a significant research gap even in the adoption of SRI technology (FLDs) and this is due to the impurity of seed, biological constraints such as weeds, pest and disease infestation, problematic soils etc. As expected, the extension gap is more than the research gap and this is because socio-economic constraints of farmers (like inadequate credit availability, spurious inputs available in the market etc.) are added to the above constraints.

b. Technological intervention II – Mechanization in rice cultivation

With drastic increase in the labour costs, shortage of agricultural labour, noticing the importance of cost effective production of agricultural commodities etc., the Government stressed the promotion of farm mechanization among the farming community. It is to be noted that, besides the above advantages, farm mechanization also ensures timeliness of agricultural operations. Considering the meritorious aspects, the scientific community working in RARS, Nandyal DAATTC, Kurnool have executed a number of FLDs in the farmers fields highlighting the importance of farm mechanization viz., mechanical transplanter, drum, seeder, puddlers, thresher, marker, cono weeder, harvester, power sprayer, winnower etc., in rice cultivation.

Despite the execution of these FLDs in the farmers' fields, there is a significant research gap (Table 3). This result is far below the expectations or promises of farm mechanization. Of course, this research gap cannot be attributed due to the inefficiency of machinery usage, but due to sub-divided and fragmented land holding of the farmers. Thus, the full exploitation of machinery usage efficiency is not realized in FLDs. This was further exaggerated in terms of extension gap at the farmers' level. Besides subdivided and fragmented land holdings at the farmers level, other factors like lack of awareness among the farmers regarding the importance of mechanization and the higher demand for custom-hiring of machinery (due to acute labour shortage) led to the delay in the performance of farm operations in time which has contributed for short fall in yield at the farmers' level which resulted in widening of the extension gap.

It is essential to note that, though farmers employ machinery (usually on custom hiring basis), they could not exploit the mechanization in terms of cost reduction due to factors viz., drastic increase in demand for custom hiring of machinery; increase in hiring costs of machinery and availability of machinery not being scale neutral i.e., the purchase of machinery is affordable only by the large farmers.

c. Technological intervention III – Fertilizer management in rice cultivation: Balanced nutrition in rice cultivation is gaining more significance, as it directly influences the output of rice and thereby, food security needs of the mounting population. It is disheartening to note that, in spite of several

Table 2. Technological Intervention I – Production Technology of Rice

Year	Potential yield (t/ha)	Yield (t/ha)		Cost of cultivation (Rs/ha)		Gross returns (Rs/ha)		Net returns (Rs/ha)		Increase in net returns over FP (Rs/ha)	Research Gap* (t/ha)	Extension Gap** (t/ha)	Technology Index	Extension Gap (%)
		FLD	FP	FLD	FP	FLD	FP	FLD	FP					
2001-02	11.231	9.494	5.946	21186.31	18106.73	57926.41	36278.75	36740.10	18172.02	18568.08	1.737	3.548	15.466	37.371
2002-03	11.231	9.578	5.891	24252.63	21086.12	58873.67	36210.56	34621.04	15124.44	19496.59	1.653	3.687	14.718	38.494
2003-04	11.231	9.457	5.954	28861.27	25146.56	59631.68	37543.30	30770.41	12426.74	18343.67	1.774	3.503	15.796	37.041
2004-05	11.231	9.599	5.977	32166.45	28952.64	61660.52	38394.10	29494.07	9441.46	20052.61	1.632	3.622	14.531	37.733
2005-06	11.231	9.515	5.901	35002.57	31529.49	62037.23	38474.17	27034.66	6944.68	20089.98	1.716	3.614	15.279	37.982
2006-07	11.231	9.455	5.899	41951.94	37720.67	70120.93	43748.64	28168.99	6027.97	22141.02	1.776	3.556	15.813	37.610
2007-08	11.231	9.543	5.907	44111.28	41098.43	83658.52	51783.60	39547.24	10685.17	28862.07	1.688	3.636	15.030	38.101
2008-09	11.231	9.425	5.919	45912.86	41958.87	97186.55	61034.18	51273.69	19075.31	32198.37	1.806	3.506	16.080	37.199
2009-10	11.231	9.485	5.913	47211.67	45092.69	108245.29	67480.69	61033.62	22388.00	38645.61	1.746	3.572	15.546	37.659
2010-11	11.231	9.536	5.923	51980.89	47363.47	114314.61	71008.09	62333.72	23639.62	38694.10	1.695	3.613	15.092	37.888
AVG	11.231	9.509	5.923	37263.79	33802.57	77365.54	48195.11	40101.75	14392.54	25709.21	1.722	3.586	15.335	37.708

Note: * Research gap – Potential yield - Yield obtained in FLD

** Extension gap – Yield obtained in FLD - Yield obtained by FP

Table 3: Technological Intervention II – Mechanization in Rice Cultivation

Year	Potential yield (t/ha)	Yield (t/ha)		Cost of cultivation (Rs/ha)		Gross returns (Rs/ha)		Net returns (Rs/ha)		Increase in net returns over FP (Rs/ha)	Research Gap* (t/ha)	Extension Gap** (t/ha)	Technology Index	Extension Gap (%)
		FLD	FP	FLD	FP	FLD	FP	FLD	FP					
2001-02	11.231	9.515	5.556	16008.79	17106.59	58054.54	33899.21	42045.75	16792.62	25253.12	1.716	3.959	15.279	41.608
2002-03	11.231	9.613	5.712	19052.36	20086.86	59088.80	35110.99	40036.44	15023.43	25013.01	1.618	3.901	14.407	40.580
2003-04	11.231	9.595	5.644	22686.10	23946.21	60501.85	35588.58	37815.75	11642.37	26173.38	1.636	3.951	14.567	41.178
2004-05	11.231	9.636	5.734	24872.52	26961.46	61898.20	36833.15	37025.68	9871.69	27153.98	1.595	3.902	14.202	40.494
2005-06	11.231	9.645	5.711	28652.84	30092.12	62884.82	37235.28	34231.98	7143.26	27088.72	1.586	3.934	14.122	40.788
2006-07	11.231	9.565	5.649	33481.95	35207.77	70936.72	41894.57	37454.77	6686.80	30767.97	1.666	3.916	14.834	40.941
2007-08	11.231	9.602	5.683	38006.63	39989.89	84701.73	49819.91	46695.10	9830.02	36865.08	1.569	3.979	13.970	41.182
2008-09	11.231	9.635	5.699	41093.56	42958.62	99351.98	58765.64	58258.42	15807.02	42451.40	1.596	3.936	14.211	40.851
2009-10	11.231	9.545	5.591	43211.24	45192.13	108990.02	63805.95	65718.78	18613.82	47104.97	1.686	3.954	15.012	41.425
2010-11	11.231	9.635	5.719	46052.58	47996.63	115501.39	68557.60	69448.81	20620.97	48827.84	1.596	3.916	14.211	40.643
AVEG	11.231	9.605	5.670	31811.86	32947.83	78185.00	46151.03	46873.15	13203.20	33669.95	1.626	3.935	14.481	40.969

Note: * Research gap = Potential yield - Yield obtained in FLD

** Extension gap = Yield obtained in FLD - Yield obtained by FP

recommendations offered by the scientific community and agriculture personnel, the farmers are still going for higher doses of fertilizer application, without addressing the soil test results. Considering these demerits, the scientific community in the district has organized FLDs in the farmers fields highlighting the importance of Integrated Nutrient Management (INM). The FLDs were conducted incorporating sustainable methods of nutrient applications such as chemical fertilizers, bio-fertilizers, organic manures etc., based on the results of soil testing.

However, the extension gap at the farmers' level with reference to this technological introversion is significantly high, highlighting the indiscriminate use of chemical fertilizers by the farmers in their fields (Table 4). The informal discussions with the sample farmers and the same when triangulated with the scientific community revealed interesting aspects that, the sample farmers are completely aware about the scientific recommendations of fertilizers application. However, the farmers are still going for indiscriminate use of chemical fertilizers, especially urea fertilizer by closely observing the neighboring farmers' practices. The sample farmers sem to be having a false impression that, they may get lesser yields compared to the neighbouring farmers, as they are going for higher doses of N- fertilizer application. However, this view was proved wrong, as evident by the insignificant research gap.

d. Technological Intervention - IV Weed management in rice cultivation

Weed management in rice is found to be crucial considering two important aspects viz. weeds compete for plant nutrients along with the main crop and thereby, there is wastage of resources at farmers' level and drastic increase in the labour cost for weeding operations. In view of these, the scientific community in the district have executed FLDs highlighting the comparative picture between weeding by herbicides and weeding by human labour. The results have shown that, the extension gap at farmers' level is much higher (Table 5), as the farmers are still going for manual weeding only, even at higher labour costs. This is because, though farmers are aware of benefits of herbicides, they are not adopting the same in the context of spurious chemicals flooded in the market which may affect the main crop growth. The farmers further expressed that, due to acute labour shortage, they could not perform the weeding operations in time.

Table 4: Technological Intervention III – Fertilizer Management in Rice Cultivation

Year	Potential yield (t/ha)	Yield (t/ha)		Cost of cultivation (Rs/ha)		Gross returns (Rs/ha)		Net returns (Rs/ha)		Increase in net returns over FP (Rs ha)	Research Gap* (t/ha)	Extension Gap** (t/ha)	Technology Index	Extension Gap (%)
		FLD	FP	FLD	FP	FLD	FP	FLD	FP					
2001-02	11.231	9.352	5.553	17634.36	18213.69	57060.01	33880.91	39425.45	15667.22	23758	1.879	3.799	16.730	40.622
2002-03	11.231	9.456	5.612	20213.63	21198.36	58123.76	34495.62	37910.13	13297.26	24613	1.775	3.844	15.804	40.651
2003-04	11.231	9.407	5.556	24113.46	25226.21	59316.40	35033.69	35202.94	9807.48	25395	1.824	3.851	16.241	40.938
2004-05	11.231	9.346	5.631	27956.38	29063.86	60035.34	36171.52	32078.96	7107.66	24971	1.885	3.715	16.784	39.750
2005-06	11.231	9.359	5.612	30478.43	31638.41	61020.12	36589.90	30546.69	4951.49	25595	1.872	3.747	16.668	40.036
2006-07	11.231	9.408	5.549	36565.27	37839.17	69772.36	41152.91	33207.09	3313.77	29893	1.823	3.859	16.232	41.018
2007-08	11.231	9.379	5.635	40003.17	41139.77	82220.82	49399.11	42217.65	8209.34	34008	1.852	3.744	16.490	39.919
2008-09	11.231	9.404	5.509	40950.21	42067.31	96970.00	56806.44	56019.79	14739.13	41281	1.827	3.895	16.267	41.419
2009-10	11.231	9.356	5.487	44028.96	45185.63	106778.10	62619.07	62744.14	17433.44	45311	1.875	3.869	16.695	41.353
2010-11	11.231	9.406	5.618	45998.81	47478.26	112756.21	67346.84	66757.40	19868.58	46889	1.825	3.788	16.250	40.272
AVEG	11.231	9.387	5.576	39793.79	33910.07	76404.81	45349.60	43611.03	11439.54	32171.49	1.844	3.811	16.416	40.598

Note: * Research gap = Potential yield - Yield obtained in FLD

** Extension gap = Yield obtained in FLD - Yield obtained by FP

Table 5: Technological Intervention IV – Weed Management in Rice Cultivation

Year	Potential yield (t/ha)	Yield (t/ha)		Cost of cultivation (Rs/ha)		Gross returns (Rs/ha)		Net returns (Rs/ha)		Increase in net returns over FP (Rs/ha)	Research Gap* (t/ha)	Extension Gap** (t/ha)	Technology Index	Extension Gap (%)
		FLD	FP	FLD	FP	FLD	FP	FLD	FP					
2001-02	11.231	9.384	5.635	16728.61	18913.87	57255.26	34381.22	40526.65	15467.35	25059.30	1.847	3.749	16.446	39.951
2002-03	11.231	9.499	5.614	18998.27	21086.56	58388.07	34507.91	39389.80	13421.35	25968.45	1.732	3.885	15.422	40.899
2003-04	11.231	9.435	5.654	22367.51	24516.21	59492.96	35651.64	37125.45	11135.43	25990.02	1.796	3.781	15.991	40.074
2004-05	11.231	9.346	5.524	26713.25	28952.76	60035.34	35484.19	33322.09	6531.43	26790.66	1.885	3.822	16.784	40.895
2005-06	11.231	9.415	5.566	29036.47	31529.34	61385.24	36289.99	32348.77	4760.65	27588.12	1.816	3.849	16.170	40.882
2006-07	11.231	9.405	5.724	33306.38	35534.53	69750.11	42450.79	36443.73	6916.26	29527.48	1.826	3.681	16.259	39.139
2007-08	11.231	9.112	5.656	37956.93	40098.12	82510.11	49583.21	44553.18	9485.09	35068.09	1.819	3.756	16.196	39.907
2008-09	11.231	9.452	5.489	38999.86	41058.27	97164.96	56600.21	58465.10	15541.94	42923.16	1.779	3.963	15.840	41.928
2009-10	11.231	9.403	5.681	40867.23	43092.67	107309.48	64833.05	66442.25	21740.38	44701.87	1.828	3.722	16.276	39.583
2010-11	11.231	9.414	5.729	44154.19	46363.91	112852.11	68677.48	68697.92	22313.57	46384.36	1.817	3.685	16.178	39.144
AVEG	11.231	9.417	5.627	30912.87	33114.62	70644.36	45845.97	45731.49	12731.34	33000.15	1.815	3.789	16.156	40.240

Note: * Research gap = Potential yield - Yield obtained in FLD

** Extension gap = Yield obtained in FLD - Yield obtained by FP

All these factors have led to the escalating of labour costs coupled with the drastic fall in yields thereby, a significant increase in the extension gap.

e. Technological intervention V - Pest Management in rice cultivation

Pest management on agricultural crops is gaining more significance with the stipulation of Sanitary and Phyto-Sanitary (SPS) standards for agricultural commodities to get traded in the international market. In view of this, the scientific community has been recommending the farmers to go for IPM technology in rice cultivation. This is because, the IPM technology will ensure less amount of pesticide residue in the produce. Hence, FLDs are conducted in the farmers' fields to disseminate this technology. However, at the farmers' level, the extension gap is higher (Table 6) due to the following reasons:

- The farmers are spraying chemical pesticides indiscriminately and this is adversely influencing the economics of crop production in two ways viz., affecting the quality of produce with high pesticidal residues and there is decline in net returns,
- The farmers generally presume that, biological methods of pest control are less effective and hence, they resort only to application of chemical pesticides that too at indiscriminate level,
- Though farmers are applying chemical pesticides, as pest control is not as effective as expected due to spurious pesticides flooding the market
- The crop varieties cultivated by the farmers are highly susceptible to the local pests and diseases. However, the farmers still prefer to cultivate these varieties only, on account of meritorious features like high yields, good quality of the grain, remunerative prices in the market etc. However, the low research gap with reference to this technological intervention is a heartening aspect and this will encourage the farmers to enjoy the real benefits offered by IPM technology in rice.

A close review of the above five technological interventions reveals that, the extension gap at the farmers' level is significantly high and is sending alarming signals to the scientific community to move the things in the right direction by guiding the farmers towards the adoption of these interventions on a scientific scale. This is because, India enjoys trade advantage with reference to rice in the international market and in this context, it is essential to go for cost effective

Table 6: Technological Intervention V – Pest Management in Rice Cultivation

Year	Potential yield (t/ha)	Yield (t/ha)		Cost of cultivation (Rs/ha)		Gross returns (Rs/ha)		Net returns (Rs/ha)		Increase in net returns over FP (Rs/ha)	Research Gap* (t/ha)	Extension Gap** (t/ha)	Technology Index	Extension Gap (%)
		FLD	FP	FLD	FP	FLD	FP	FLD	FP					
2001-02	11.231	9.398	5.846	16228.62	18106.76	57340.68	35668.61	41112.06	17562.25	23549.81	1.833	3.552	16.321	37.795
2002-03	11.231	9.506	5.881	18963.89	21086.54	58431.10	36149.10	39467.21	15062.56	24404.66	1.725	3.625	15.359	38.134
2003-04	11.231	9.605	5.954	22897.28	25116.87	60564.90	37543.30	37667.62	12426.43	25241.19	1.626	3.651	14.478	38.011
2004-05	11.231	9.496	5.932	26798.76	28952.17	60998.89	38105.03	34200.13	9152.86	25047.26	1.735	3.564	15.448	37.532
2005-06	11.231	9.315	5.889	29492.49	31529.43	60733.24	38905.93	31240.75	6866.50	24374.25	1.916	3.426	17.060	36.779
2006-07	11.231	9.408	5.992	35627.65	37720.81	69772.36	44438.35	34144.71	6717.54	27427.17	1.823	3.416	16.232	36.310
2007-08	11.231	9.392	6.003	38893.83	41098.11	82334.78	52625.18	43440.95	11527.07	31913.88	1.839	3.389	16.374	36.084
2008-09	11.231	9.587	5.889	39785.97	41938.39	98857.02	60724.84	59071.05	18766.45	40304.61	1.644	3.698	14.638	38.573
2009-10	11.231	9.402	6.008	42963.29	45092.57	107298.07	68564.86	64334.78	23472.29	40862.49	1.829	3.394	16.285	36.099
2010-11	11.231	9.398	6.012	45114.51	47363.76	112680.31	72069.99	67545.80	24706.23	42839.57	1.833	3.386	16.321	36.029
AVEG	11.231	9.451	5.941	31676.63	33802.50	76809.13	48128.52	45222.51	14626.02	30596.49	1.780	3.510	15.852	37.135

Note: * Research gap = Potential yield - Yield obtained in FLD

** Extension gap = Yield obtained in FLD - Yield obtained by FP

production of rice, where the above discussed technological interventions serve this objective. To study the relative importance of the above five selected technological interventions, the average values pertaining to both research and extension gaps and also in terms of percentage have been worked out and all the sample farmers were asked to prioritize these interventions.

The findings reveal that, the research gaps are high with reference to fertilizer and weed management. In terms of extension gap, it is highest with reference to farm mechanization followed by fertilizer management. This is expected in the sense that, all the farmers cannot afford to purchase their own machinery and as discussed earlier, there are serious problems with reference to the custom hiring of machinery due to shortage of labour in the villages, thereby demand for custom hiring of machinery is high. However, the informal discussions held with the sample farmers pertaining to ranking of technological interventions indicated that, pest management intervention deserves special mention from the farmers in view of the frequent occurrence of pest and diseases problems in the study area. Further, the farmers opined that, Integrated Pest Management (IPM) should be popularized among the farming community, in view of the sale of spurious chemical pesticides in the market. Next to pest management intervention, farmers ranked fertilizer management and production technology as prioritized interventions in view of indiscriminate use of chemical fertilizers and preferred going for SRI technology of rice in the water deficit tail end canal areas respectively.

Conclusion

The above discussion reveals that, both research and extension gaps are still prevalent with reference to the selected technological interventions, though the scientific community and other stakeholders have been actively involved in disseminating the importance of these interventions to the farmers. It is high time now for the farmers to adopt these interventions on a scientific scale to minimize the extension gap to the extent possible. The enabling environment in the State of Andhra Pradesh is encouraging for the farmers in providing them the requisite interventions in crop production with relevant policy instruments in the form of subsidized inputs, free power, credit at concessional rates of interest, constructing irrigation projects etc.

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