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Analysing the impact of capacity building process on participatory seed village programme in Purulia district of West Bengal

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ABSTRACT

The study was carried out to investigate the impact of capacity building process on change in knowledge and adoption behaviour towards scientific seed production among farmers (n=120) of Purulia. Capacity building programme through individual, group and mass contact tools improved the knowledge level from low and moderate to moderate (15.8%) and high (82.5%). The symbolic adoption was moderate (50.83%) and did not vary significantly (p=0.05). The actual adoption index of the farmers exposed to group contact tools was the highest and differed significantly (p=0.05) among villages and treatments. The knowledge gain was positively correlated (r = 0.46 and 0.43) with change in area (151.74%) and production (168.51%), respectively. A positive correlation (r = 0.53) was also observed between actual adoption index and changes in the quantity of certified seed production. Conclusively, capacity building through group contact tools significantly improves the knowledge level and helps them adopt scientific seed production technologies.

Keywords **:** Actual adoption, adoption index, knowledge gain, symbolic adoption, village seed production

The present notion of the agricultural sector is buzzing with 'production enhancement in perpetuity with limited area and without associated ecological and/or social harm'. In this outfit higher production is impossible unless we provide sufficient quality seed in right time to our farmers. The paramount effort of various agencies seems insufficient to meet the demand of the country unless farmers produce their own seed at the village level. On the other hand, technology led rainfed agriculture is identified as the key factor of stable staple food production (Patil *et al*., 2015).

Farmers, particularly small farmers generally use seeds of their own field or from other sources that may not always reliable. In contrast the village seed production programme is a tool for challenging the current neo-liberal model of agriculture aiming the farmers' autonomy in seed that reflects the values and strategies for farmers' 'resilience' to the current model.

Seed production is a quite specialized and scientific technology and is not similar to general crop production. During seed production strict attention has to be given to maintain the genetic purity and other quality parameters of the 'seed'. Thus, empowering farmers with capacity building programme through training is, therefore, a prerequisite to pilot a participatory activity under direct supervision and practice by themselves.

Major cereal crops in Purulia district is rice and more than 90 per cent area is occupied under *aman/kharif* rice cultivation in monsoon dependent mono-cropping system. The productivity of rice is 2449 kg ha^{-1} (Anon., 2008). However, the weather condition of Purulia is ideal for paddy seed production. As per the recommendation of the State Farmers' Commission, one of the best options to get more profit is to produce seed in this particular district. But lack of awareness and knowledge about the importance and profitability of seed production is the main impediment for transfer of this technology. There is paucity of works carried out in this very problem under Indian condition. However, works have been reportedly carried regarding adoption behavior of stakeholders in other areas as illustrated by Bagdi (2014), Mooventhan and Philip (2012), Pal *et al.* (2002a,b), Rama Rao *et al.* (2007). These back ground information has showed the way to plan the present demand driven action research with the following hypothesis.

The hypothesis of the present investigation is that the proper measure and strategy of capacity building of the farmers with various techniques, precautions and standards of scientific seed production directly determine the adoption of the technology by them in a participatory mode. The present investigation was, therefore, laid out with the objective (i) to understand the change of the level of knowledge of farmers with the effect of specific capacity building tools, (ii) to understand the implementation pattern of knowledge gained through capacity building programme into actual practice, (iii) to measure the actual adoption of the recommended technologies and (iv) to study the

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impact of the adoption in terms of certified seed production.

MATERIALS AND METHODS

The present study was initiated in 2009 and continued up to 2013 in selected small holder farmers' of five villages under Purulia district of West Bengal. The target group (TG) of 120 numbers farmers who have arable land and not getting enough return was selected purposively from each selected village as sample (Table 1). In the present study, multiple group randomised design (Anandaraja *et al*., 2008) was used. Three different capacity building tools *viz.* (1) individual contact (farm and home visit and office call), (2) group contact (result demonstration, training/group discussion, field days) and (3) mass contact (documentary video show and distribution of extension leaflet) (Bagdi, 2014) were selected as treatments and tested for their relative effectiveness towards (i) knowledge gained, (ii) symbolic adoption, and (iii) actual adoption of the target groups. Each treatment was replicated five times. The base level knowledge was assessed as pre-exposure of treatment for each respondent and there was no need to have separate control group/groups.

Table 1: Selection of location and target groups (TG)

Sl. No.	Village	Block	Sample size(n)	Range of arable land holding (ha)	Range of area under rice (ha)	No. of farmers have past liaison with KVK
1	Arjunjora	Hura	25	0.26 - 1.82	0.26-0.83	11 (44%)
2	Rahamda	Hura	25	0.12 - 1.68	0.12-1.04	09 (36%)
3	Bansra	Purulia-I	25	0.15 – 1.99	0.15-0.76	12 (48%)
4	Bhadsa	Purulia-I	25	0.41 - 1.86	0.41-1.06	10 (40%)
5	Sirkabad	Arsha	20	0.52 – 2.44	0.48-2.10	06 (30%)
		Total	120			

After selecting TG for each treatment, their initial knowledge levels were assessed. Taking into consideration to the scope and objectives of the study a comprehensive vernacular interview schedule was prepared. Data collection was done twice at the time of pre- and post-intervention through personal interview method. A separate study also conducted during post-exposure cultivation season through direct field visit, to identify those farmers who were actually applying the knowledge gained during training into practice. To measure knowledge and adoption behaviour towards seed production technologies the indices and scales developed by Bagdi (2005) and Rama Rao *et al*. (2007), respectively, were used.

The impact of adoption of the seed production technologies, as the indicator of indirect impact of capacity building of TG farmers, was examined by following a "with and without" approach where in the mean values of the key measures such as (i) changes in the quantity of certified seed production, (ii) change in area under seed production, and (iii) change in total seed production. The statistical tools like percentage analysis, paired 't' and/or McNemar tests (Adedokun and Burgess, 2012), analysis of variance (ANOVA) and Tukey's Honest Significant Difference (HSD) test were used to draw a conclusion.

RESULTS AND DISCUSSION

Relative effectiveness of different treatments in terms of knowledge gain

The relative effectiveness of various treatments in changing the knowledge level due to exposure and its impact were assessed and presented in table- 2. It could be seen from table- 2 that all three treatments without interaction had highly significant 't' value indicated all three treatments were effective in terms of knowledge gain, increase in area under seed production, increase in the quantity of certified seed production and decrease in the quantity of seeds rejected by the seed certification agency (NR).

The significance of change caused by each treatment on the farmers' knowledge level was further confirmed by McNemar test and the proportion of farmers who acquired adequate knowledge due to their exposure to the three different treatments is presented in table. 3. The degrees of freedom in McNemar Test is 1, the critical value (χ^2 table value at $p < 0.001$ at $df = 1$) is 10.83, and because calculated values of 29.03, 38.03 and 34.02 for treatment 1 (Individual contact), treatment 2 (group contact) and treatment 3 (mass contact), respectively, exceed the table value, there is a significant difference in the responses after-exposure and before- exposure. The knowledge gain towards scientific seed production technology of rice changed significantly over the exposure to different capacity building tools (Table 3, Fig. 1).

From the result presented in table 2 and 3, it could be observed that all the three selected treatments were equally effective in communicating the information related to scientific seed production technologies of rice and henceforth the hypothesis that there would be no gain in knowledge due to the exposure to treatments was rejected.

It is also inferred from the result (Table 4) that among the three treatments the knowledge gained by group contact and individual contact had significant ($p < 0.05$) difference compared to mass contact method. Hence, the hypothesis that there would be no difference in knowledge gain among the treatments is rejected. However, there was no significant difference among villages and no significant interaction between village and treatment in terms of knowledge gain.

Table 2: Effect of various capacity building tools on behavioural change of TG farmers

Sl. No.	Treatment	Parameter	Before exposure	After exposure	Mean difference	SEm	't'-value
1	Individual contact	Knowledge gain	21.70	74.60	52.90	2.933	18.034**
		Symbolic adoption	14.95	69.15	54.20	2.466	21.984**
		Change in area (ha)	0.29	0.67	0.38	0.029	12.819**
		Change in certified seed production (Q)	8.36	26.01	16.72	1.355	12.338**
		Change in production of seed as NR(Q)	3.08	2.15	-0.9318	0.134	- 6.945**
2	Group Contact	Knowledge gain	21.90	82.00	60.10	2.322	25.056**
		Symbolic adoption	17.50	64.63	47.13	3.101	15.196**
		Change in area (ha)	0.28	0.70	0.41	0.023	18.178**
		Change in certified seed production (Q)	8.28	27.11	18.830	0.943	18.938**
		Change in production of seed as NR	3.05	2.24	-0.8112	0.143	- 5.654**
3	Mass contact	Knowledge gain	25.70	76.80	51.10	2.775	18.412**
		Symbolic adoption	14.28	65.43	51.15	2.493	20.520**
		Change in area (ha)	0.33	0.74	0.40	0.029	13.592**
		Change in certified seed production (Q)	9.57	28.72	19.148	1.329	14.404**
		Change in production of seed as NR	3.53	2.37	-0.1155	0.170	- 6.766**

*Note: **'t' value is significant at p < 0.01*

Table 3: Effect of various capacity building tools on types of changes took place in knowledge level

Changes	Treatments			
	Individual contact	Group contact	Mass contact	Total
Farmer who had adequate knowledge before exposure and lost after exposure.	(0/40)	(0/40)	(0/40)	(0/120)
Farmer who had adequate knowledge before exposure and after exposure.	(2/40)	(0/40)	(1/40)	(3/120)
Farmer who did not posses adequate knowledge before exposure and after exposure.	(7/40)	(0/40)	(3/40)	(10/120)
Farmer who did not posses adequate knowledge before exposure but gained adequate knowledge due to exposure	(31/40)	(40/40)	(36/40)	(107/120)
χ2 value (McNemar Test)	29.03**	38.03**	34.02**	

*Note: ** χ2 value significant at p<0.001*

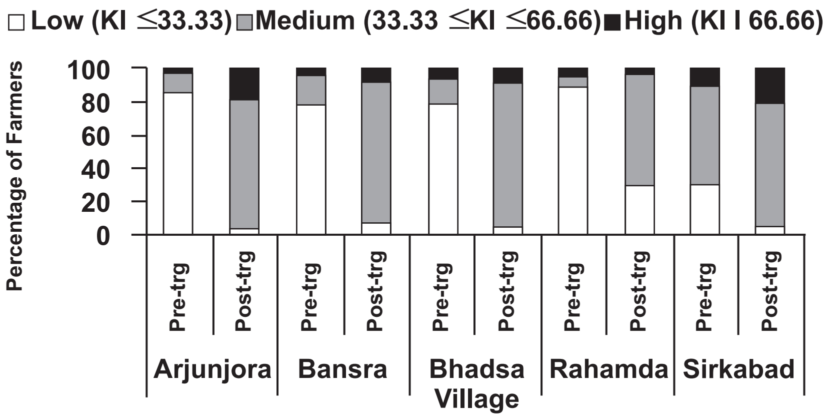

Fig. 1 : Change in knowledge level of different village group exposed to capacsity building programme

Table 4: Relative effectiveness of different treatment on knowledge gain

Treatments	Arjunjora	Rahamda	Bansra	Bhadsa	Sirkabad	Mean
Individual contact	58.22	49.33	50.22	51.56	58.00	**53.47ab**
Group contact	50.00	63.00	64.50	62.50	65.00	**61.00a**
Mass contact	44.50	47.50	51.00	53.00	59.50	**51.10b**
Mean	**50.907**	**53.28**	**55.24**	**55.69**	**60.83**	
Source	**DF**	**SEm(±)**	**CD (0.05)**	**F-Value**	**Sig.**	
Village	**2**	**4.29**	**NS**	**0.94NS**	**0.44**	
Treatment	**4**	**3.04**	**8.52**	**3.60***	**0.03**	
Village x Treatment	**8**	**6.07**	**NS**	**0.71NS**	**0.68**	

Note: Data bearing same alphabet are not significantly different at p<0.05 on the basis Tukey's HSDTest

Relative effectiveness of different treatments in terms of symbolic adoption

The symbolic adoption behaviour of TG farmers was assessed using specific questionnaire with positive responses and presented in table- 5 and average symbolic adoption was 50.83 per cent and there was no significant difference between the three treatments in influencing the symbolic adoption of scientific seed production technologies (data not shown). This might be due to the fact that the knowledge of technology transferred through these treatments inducing the farmers' symbolic adoption evenly. It could then be concluded that all the treatments had convinced the farmers evenly about the subject matter for which they were exposed to. Thus there were no significant association between extension methods and symbolic adoption behaviour of farmers.

Table 5: Positive decision (Symbolic Adoption) taken by TG farmers during investigation

Sl. No.	Questions	No.*	%
1	Roughing of off type plants?	86	71.66
2	Maintain isolation distance?	74	61.66
3	Proper Plant Protection Measure?	97	80.83
4.	Proper stage for harvesting?	76	63.33
5	Weed control?	78	65.00
6	Proper nutrient management?	98	81.66
7.	Appropriate winnowing and cleaning techniques?	75	62.50
8.	Seed Treatment before sowing?	63	52.5
9.	Maintain the optimum plant population?	83	69.16
10	Harvest and thresh your seeds separately from other paddy variety?	94	78.33

*Note: * Total 120 respondents*

Relative effectiveness of different treatments in terms of actual adoption

The actual adoption was estimated as the difference between percentage of twelve different recommended seed production techniques adopted by farmers after exposure to various capacity building programmes and percentage of recommended techniques already practiced by the farmers before exposure. The result of the analysis of variance has been presented in the table- 6. The treatments differed significantly in terms of actual adoption. The highest actual adoption was related to the exposure of farmers to the capacity building through group contact tools and Sirkabad group adopted the highest number of techniques in comparison to other groups while Rahamda group adopted the lowest number of techniques. However, no statistically significant interaction exists among village groups and treatments.

Table 6 : Relative effectiveness of different treatment on actual adoption

Treatment	Arjunjora	Rahamda	Bansra	Bhadsa	Sirkabad	Mean
Individual contact	45.78	37.00	40.67	45.78	42.25	**42.29b**
Group contact	43.13	50.50	56.00	54.75	58.00	**52.48a**
Mass contact	35.63	37.00	49.75	45.00	53.75	**44.23b**
Mean	**41.51**	**41.50**	**48.81**	**48.51**	**51.33**	
Source	**DF**	**SEm(±)**	**CD (0.05)**	**F-Value**	**Sig.**	
Village	**4**	**3.67**	**NS**	**2.17NS**	**p = 0.08**	
Treatment	**2**	**2.60**	**7.28**	**5.27****	**p = 0.01**	
Village × Treatment	**8**	**5.19**	**NS**	**0.874NS**	**p = 0.54**	

Note: Data bearing same alphabet are not significantly different at p<0.05 on the basis of Tukey's HSD test

The relative effectiveness of group contact followed by individual contacts among three different capacity building tools were the most successful to change the knowledge level of the stakeholders, change in symbolic adoption behaviour in terms of positive responses as well as the actual adoption in practice. In contrast to the present findings Pal *et al.* (2002b) reported that mass contact methods were most successful to disseminate and adoption of awareness regarding deworming of livestocks. The most possible explanation is that phenomenon like deworming of farm animal is not a suitable comparison to agronomic seed production of certain crop(s) (rice in the present case) that relied upon series of mostly interdependent actions instead of administration of deworming drugs.

Effect of treatments on per cent change in the certified seed production

There were considerable changes taken place in the quantity of certified seed production due to exposure to all the capacity building tools. The percent increase in the quantity of certified seed production between 2009 and 2013 was highest under capacity building through group contact (262.27%) followed by Individual contact (229.52%) (Table 7) and positively correlated to the Actual Adoption Index (Fig. 2). The village groups also differed significantly in terms of per cent increase in the quantity of certified seed production. The highest increase was observed for Bansra group followed by Rahamda and Sirkabad while lowest percent increase was observed for Arjunjora and Bhadsa group (Table

Table 7 : Relative effectiveness of different treatment on per cent change in the certified seed production

Treatments	Arjunjora	Rahamda	Bansra	Bhadsa	Sirkabad	Mean
Individual contact	142.51	197.51	194.11	119.08	150.24	**229.52ab**
Group contact	132.13	215.45	275.78	138.35	171.30	**262.27a**
Mass contact	103.59	162.89	228.62	124.66	164.94	**224.78b**
Mean	**185.76r**	**269.04pq**	**320.72p**	**187.39r**	**231.38qr**	
Source	**DF**	**SEm(±)**	**CD (0.05)**	**F-Value**	**Sig.**	
Village	**4**	**16.68**	**46.77**	**18.363****	**p = 0.00**	
Treatment	**2**	**11.79**	**33.07**	**3.71***	**p = 0.03**	
Village × Treatment	**8**	**23.59**	**NS**	**1.30NS**	**p = 0.25**	

Note: a-b and p-r sets of alphabet were used to differentiate the main effects of treatments and villages respectively. Data bearing same alphabet are not significantly different at p<0.05 on the basis of Tukey's HSD test.

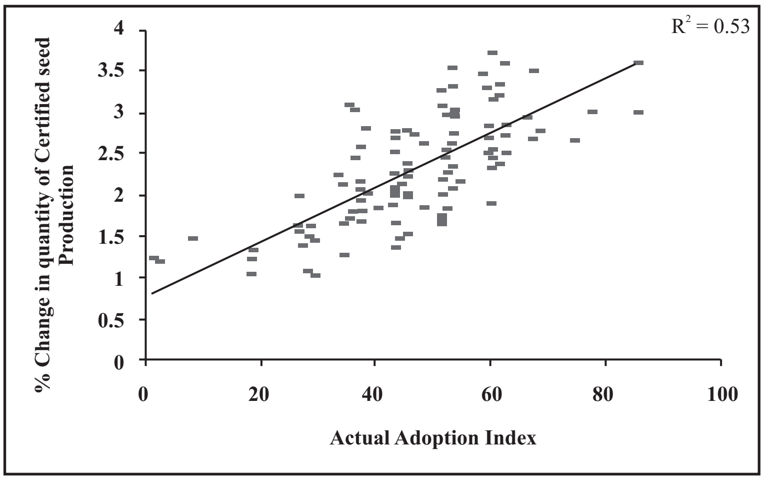

Fig. 2: Relationship between per cent change in certified seed production and actual adoption index

7). Nevertheless, there were no significant interaction was observed among treatments and village groups.

It can then be concluded from the study that the overall impact in terms of adoption behaviour of farmers towards seed production of rice by participatory approach improved significantly due to exposure of farmers to group contact followed by persona contact tools. Therefore, imparting training on subject matter, conducting method demonstration, group discussion and organising field days on successful demonstration to rural farmers could be an important strategy to improve knowledge and adoption of seed production technologies for more profit. Presently, 640 KVKs working in the country have done commendable work in disseminating knowledge and best practices across the country. By this way training on seed production technologies can be replicated through KVKs network of our country for the production of quality certified seeds at affordable price, the major bottleneck of production of crops, through participatory way.

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REFERENCE

Adedokun, O. A. and Burgess, W. D. 2012. Analysis of paired dichotomous data : A gentle introduction to the McNemar Test in SPSS. *J. Multidis. Eval.*, **8**:125-31.

Anandaraja, N., Chandrakandan, K. and Ramasubramaniam, M. . 2008. *Extension of Technologies:From Labs to Farms*. New India Publishing Agency, New Delhi. Pp. 500.

Anonymous. 2008. *District Statistical handbook, Purulia,* Bureau of Applied Economics & Statistics, Govt. of West Bengal.

Bagdi, G. L. 2005. *Measurement Techniques for Farmer's Behaviour towards Soil and Water Conservation Technology, Bull. No. T-51/V-2*, Central Soil and Water Conservation Research and Training Institute, Research Centre, Vasad. pp.12-29.

Bagdi, G. L. 2014. Assessment of effectiveness of extension methods for dissemination of soil and water conservation, *Indian J. Soil Cons.*, **42**: 114-18.

Mooventhan, P. and Philip, H. 2012. Impact of web-education on knowledge and symbolic adoption of farmers – an experimental study. *Indian Res. J. Ext. Edu.*, **12**:43-47.

Pal, S. K., Ghosh, B. B., Goswami, A., Duttagupta, R. and Bhattacharjya, M. K. 2002. Utilization of mass media, personnel cosmopolite and personnel localite sources of information of livestock owners about infertility problems in cow. *J. Interaca.,* **6**:724-27.

Pal, S. K., Ghosh, B. B., Goswami, A., Duttagupta, R. and Bhattacharjya, M. K. 2002. Study of the extent of knowledge of livestock owners about deworming. *J. Interaca.,* **6**:728-31.

Patil, K. K. R., Manjunatha, G. R. and Vishwajith, K. P. 2015. Growth dimensions of Karnataka economy in post liberalization period. *J. Crop Weed,***11**:19-27.

Rama Rao, C.A., Srinivas Rao, M, Srinivas, K. and Ramakrishna, Y. S. 2007. *Adoption and Impact of Integrated Pest Management in Cotton, Groundnut and Pigeonpea,* Research Bulletin/AgEcon/2/2007. Central Research Institute for Dryland Agriculture (ICAR), Hyderabad, pp. 32.