

Original Research Article

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## Farmers' Attitudes towards Group Approach on Management of White Grub (*Lepidiota mansueta*)

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### ABSTRACT

White grub species *Lepidiota mansueta* having a biennial life cycle with non-feeding adults is recently occurred as a severe pest of Majuli, the largest river island in the world. Biology of the beetle made it difficult for farmers to manage the pest conventionally. As emergency management of the beetle, scientists of 'All India National Project (AINP) on white grubs and other soil arthropods' under Assam Agricultural University, Jorhat adopted a farmers' group approach considering the large-scale emergence of non-feeder adult beetles for the breeding purpose for a short period. The project formed farmers' group in their project area. The study was conducted to assess member and non-member farmers' attitude toward the group approach on the management of white grub (*L. mansueta*). An attitude scale was constructed for the study which Cronbach's alpha reliability was 0.89. The sample size was 200 which included 100 respondents from farmer's group and 100 respondents from non-group members. The findings revealed that farmers belonged to groups had a more favourable attitude than non-members and independent t- value between the mean of two samples significantly differed at  $p < 0.01$ . Item analysis of the attitude scale scores revealed that group members had significantly high mean score than non-members in most of the items. The findings proposed to give more emphasis to mobilise non-member farmers for forming groups. The study suggested that the group should be involved in different activities for throughout the year for making

#### Keywords

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### Introduction

White grubs, especially from "Melolonthinae" are most destructive and troublesome soil insects in many parts of the world. In India, it was recognised as the pest of national importance in 1975 considering the severity of the damage (Raodeo and Deshpande, 1987).

The pest is becoming more and more severe every year as they are spreading to North East India where they had not been recorded as a pest in the past (Bhattacharyya *et al.*, 2014). One of the economically important species of the pest *L. mansueta* is endemic to Majuli, the world largest river island located on River Brahmaputra and has been emerged as a

significant severe pest of many field crops (Bhattacharyya *et al.*, 2015). The severe multiplication of the larvae is a matter of concern as it causes economic damage and in turn, affects food security and livelihood of farmers. It was reported that white grub had appeared as a severe pest of potato (42-48%), sugarcane (15-20%), green gram (30-35%) and colocasia (35-40%) in Majuli (Bhattacharyya *et al.*, 2015). *L. mansueta* has a biennial life cycle which is the first of its kinds from North East, India. Moreover, this species got the unique distinction of being the first Indian phytophagous white grub species with non-feeding adults (Bhattacharyya *et al.*, 2015). The insect mainly comes out from the soil during the evening for an hour or two during April to May for reproduction after two years of hibernation. Again with the reducing of soil moisture in the crop field, the larvae are going down to the more in-depth soil. Because of such typical biological behaviour, it is not possible for the individual farmer to control the pest immediately at its own and scientists have little technical backstopping for controlling the pest urgently. At present other conventional methods of pest control measures also did not delivered effective result. Considering the vast emergence of the beetles in Majuli, a massive mass campaigning programme was conducted since 2009 for the mass collection and destruction of beetles during April-May of every year under All India National Project (AINP) on white grubs and other soil arthropods conducted by Department of Entomology, Assam Agricultural University. In this alternative method, beetles were trapped by operating light traps in endemic pockets (during pre-mating hours from 6.30-7 pm) and scouting for hand collection (*Pairs in copula* from 7-8.30 pm). These two research efforts yielded essential research outcomes led to the application of the concept of social engineering as community action programme for the adult management of *L. mansueta*.

Through social engineering efforts are made to influence particular attitudes on a large scale to produce desired characteristics in a target population. For that purpose, different farmers' groups were formed in the affected areas by the project scientists. The members were trained on the various aspects of the white grub (*L. mansueta*) so that farmers will come out during adult emergence time for mass collection and destruction. For that purpose farmers, groups were formed under the project. The farmer-group approach plays a valuable role in policy advocacy and in realising economies of scale. One major benefit of working through farmers' group is that farmers support each other to learn and adapt (Akinagbe and Ajayi, 2010). It also reduces the cost of public extension services (Conroy, 2003). When farmers form groups, they can share their resources, ideas, experiences and problems, make extension services more client driven. It provides a forum for extension agents to introduce technologies, reduce public extension cost, disseminate information to a wide spectrum of users and group efforts usually have social approval (Singh, 2013). Christanto (2007) also reported that farmers' group has a positive impact on integrated pest control. For example, Farmers Field School is a successful approach to Integrated Pest Management (Henk van den Berg, 2004 and Ngoc Chi *et al.*, 2004). Farrington (1994) indicated that farmers' groups have the potentials and could play joint roles in agricultural research and extension. Farmers' participation is one important aspect in the success of farmers' groups. Riggio (2013) mentioned that effectiveness of any group depends primarily on the attitude of its members. Past literature discussed details about attitude, so here it is only mentioned on it. In this study, it was assumed that considering the severity of the pest, the farmers of group members and non group members had no differential attitude towards group approach for managing

the pest. The objective of this study was to assess the attitude of the group and non-group members towards group approach to management of white grub (*L. mansueta*) and to compare the view of the items of the attitude between the groups.

## Materials and Methods

The study was based on a cross-sectional survey conducted in the project area of Majuli River Island during January-March, 2014. The river island of Majuli, a district of Assam has situated in the northern part of Jorhat District separated from the mainland by the river Brahmaputra. Location of Majuli is 26°45'N to 27°15'N lat.; 93°45'E to 94°30'E long. According to 2011 census, Majuli River Island has a population of 1, 67,304 numbers.

A multistage sampling procedure was followed for the study. Initially, ten villages both from project area and adjacent non-project area were selected randomly. From the each selected project village, one farmers' group, formed by the project was selected randomly. Thus, ten numbers of farmers' groups were selected from the project villages. Then ten members of each group were selected randomly as respondents. Likewise, from the non-project area, ten villages were selected randomly. From each such selected village, ten farmers were selected randomly. So, the total numbers of respondents were 200.

A five-point Likert type scale was constructed to measure the attitude of farmers' towards a group approach to management of white grub (*Lepidiota mansueta*). Cronbach's-alpha coefficient was commonly used to find out the reliability of Likert type scale (Anastasiadou, 2011; Barman and Kumar, 2012a; and Shiri, 2014). Cronbach's-alpha coefficient of the scale was found as 0.89 which might be considered as highly reliable based on

Nunnally (1978). Farmers' attitudes were categorised into three groups by Interval of Standard Deviation from the Mean as:

Unfavourable attitude:  $< \text{Mean} - \text{SD}$

Favourable attitude: Between  $\text{Mean} - \text{SD}$  and  $\text{Mean} + \text{SD}$

Highly favourable:  $> \text{Mean} + \text{SD}$

Item wise score obtained by each respondent was also calculated out and compared the mean between two samples.

## Results and Discussion

The result related to general characteristics of both group and non-group members are presented in Table 1. The table indicates that the average age of group members was younger ( $M=36.09$ ,  $SD= 8.28$ ) than non-group members ( $M=50.97$ ,  $SD=12.85$ ). Probably younger farmers were more interested in the group approach adopted by the project, so their participation was also more. The average age of the non-group members is supported by Saikia and Barman (2014). In case of group members, 62 per cent respondents had graduate and above level of education. On the other hand, 55 per cent non-group members had education up to high school level. It may be due to the age of the respondents. The average family member in case of group members was ( $M= 6.2$   $SD=1.82$ ) almost similar with non-group members ( $M= 6.14$   $SD=1.94$ ). The mean operational land holding of the group members was also similar ( $M=1.87$ ,  $SD=0.55$ ) to non-group members, it was ( $M=1.92$ ,  $SD=0.55$ ). However, higher levels of operational land holding were also reported in another study in Assam (Saikia and Barman, 2014). In case of 'social participation,' the mean score of group members ( $M=2.17$ ,  $SD=0.53$ ) was higher than non-group members ( $M=1.30$ ,  $SD=0.63$ ).

**Table.1** Selected characteristics of the respondents of both group and non-group members

N=200

Sl. No.	Characteristics	Group members ( $n_1=100$ )		Non group members ( $n_2=100$ )	
		Mean	SD	Mean	SD
1	Age (years)	36.09	8.28	50.97	12.85
2	Family members(nos.)	6.20	1.82	6.14	1.94
3	Land holding (ha)	1.87	0.55	1.92	0.66
4	Social participation(score)	2.17	0.53	1.30	0.63
5	Extension contact(score)	8.40	3.54	7.45	2.50
6	Training exposure on white grub (Nos.)	3.31	1.88	0.67	1.56
7	Education	<b>Frequency</b>	<b>Percentage</b>	<b>Frequency</b>	<b>Percentage</b>
	a) Up to high school	38	38%	55	55%
	b) Above high school	62	62%	45	45%

**Table.2** Distribution of respondents according to their attitude towards group approach to management of white grub

N=200

Category	Score Range	Group members ( $n_1=100$ )		Score Range	Non -group members ( $n_2=100$ )		<i>t</i> value
		Frequency and Percentage	Mean and SD		Frequency and Percentage	Mean and SD	
Unfavourable	<60.2	16 (16%)	M=64.32 SD=4.12	<47.05	21(21%)	M=51.67 SD=4.62	20.45**
Favourable	60.2-68.44	63 (63%)		47.05-56.29	64 (64%)		
Highly favourable	>68.44	21 (21%)		>56.29	15 (15%)		

\*\* p<0.01

**Table.3** Mean item score obtained by the respondents on attitude towards group approach for management of white grub (*L. mansueta*)

N=200

Sl. No.	Statements	Mean (SD)		<i>t</i> -value ( $p<0.05$ )
		Group members ( $n_1=100$ )	Non group member ( $n_2=100$ )	
1	Farmers can do the difficult work like control of white grub through the group.	M=4.35 SD=0.63	M=3.89 SD=0.72	4.810*
2	Dissemination of information and technology is enhanced among farmer through group approach.	M=3.88 SD=0.74	M=3.51 SD=0.93	3.116*

**Table.3** (Continued)

3	Group approach helps to improve the efficiency of the farmer's in controlling white grub.	<i>M=2.92</i> <i>SD=1.11</i>	<i>M=2.39</i> <i>SD=0.98</i>	3.579*
4	The linkage between different development agencies may be strengthened through farmers' groups.	<i>M=3.96</i> <i>SD=0.65</i>	<i>M=3.58</i> <i>SD=0.91</i>	4.601*
5	Gender inequality may exist in group approach.	<i>M=4.28</i> <i>SD=0.65</i>	<i>M=3.74</i> <i>SD=0.80</i>	34.282*
6	Good leadership is essential for the effectiveness of the group to reach the goal.	<i>M=4.2</i> <i>SD=0.88</i>	<i>M=3.71</i> <i>SD=0.97</i>	3.755*
7	All farmers may not get benefits by managing white grub through the group.	<i>M=3.41</i> <i>SD=0.87</i>	<i>M=3.17</i> <i>SD=1.00</i>	1.819*
8	The confidence level of the farmers may increase through group approach to control white grub.	<i>M=3.34</i> <i>SD=1.37</i>	<i>M=2.25</i> <i>SD=0.97</i>	6.334*
9	Farmers can develop skill quickly by working in groups.	<i>M=3.91</i> <i>SD=0.83</i>	<i>M=3.51</i> <i>SD=0.97</i>	3.097*
10	Social interaction between different age group may increase in group work.	<i>M=3.83</i> <i>SD=0.83</i>	<i>M=2.9</i> <i>SD=1.24</i>	6.251*
11	Hardly any solutions are coming from group activity.	<i>M=2.27</i> <i>SD=0.78</i>	<i>M=2.18</i> <i>SD=0.77</i>	0.823
12	Farmers may find challenging to work together in groups with the different age group.	<i>M=4.29</i> <i>SD=0.56</i>	<i>M=3.74</i> <i>SD=0.77</i>	5.774*
13	Farmers get the opportunity to share their experiences in the group.	<i>M=4.16</i> <i>SD=0.68</i>	<i>M=3.57</i> <i>SD=0.77</i>	5.758*
14	Only those people are involved in the group who has some other vested interest.	<i>M=2.23</i> <i>SD=1.15</i>	<i>M=1.99</i> <i>SD=1.00</i>	1.572
15	Women farmers might not get chance to involve working on group approach.	<i>M=4.16</i> <i>SD=0.05</i>	<i>M=3.55</i> <i>SD=0.88</i>	5.583*
16	Farmers learn to cooperate with each other through group activities	<i>M=4.16</i> <i>SD=0.55</i>	<i>M=3.84</i> <i>SD=0.75</i>	3.456*
17	The willingness of farmers to help each other is essential in a group activity.	<i>M=4.12</i> <i>SD=0.48</i>	<i>M=3.84</i> <i>SD=0.49</i>	4.108*
18	Individual performance is more important than the overall achievement of the group.	<i>M=3.85</i> <i>SD=0.77</i>	<i>M=3.29</i> <i>SD=1.09</i>	4.208*
19	Arrangements of inputs for white grub management are accessible through the group.	<i>M=4.28</i> <i>SD=0.51</i>	<i>M=4.09</i> <i>SD=0.29</i>	3.226*
20	A farmer can get more information related to white grub in the group.	<i>M=3.66</i> <i>SD=1.09</i>	<i>M=3.09</i> <i>SD=1.13</i>	3.626*
21	The formal relation is necessary for cooperation in the group.	<i>M=2.78</i> <i>SD=1.03</i>	<i>M=2.14</i> <i>SD=0.97</i>	3.940*
22	Small and marginal farmers may not receive the benefits of the group.	<i>M=3.8</i> <i>SD=0.88</i>	<i>M=2.97</i> <i>SD=0.77</i>	7.110*
23	Individual development can happen through group endeavour.	<i>M=3.25</i> <i>SD=1.14</i>	<i>M=1.57</i> <i>SD=0.54</i>	13.330*
24	The resource-poor farmers can pool their resources in the group to control white grub.	<i>M=3.2</i> <i>SD=1.14</i>	<i>M=3.14</i> <i>SD=1.25</i>	0.337

A higher score in case of group members was obvious because the group members had at least one member of the project's group. The mean score in case of 'extension contact' for group members ( $M=8.40$ ,  $SD=3.54$ ) was also higher than the non-group members ( $M=7.45$ ,  $SD=2.50$ ). It might be due to the frequent intervention of the project staffs. The mean score of training exposure on white grub in case of group members ( $M=3.31$ ,  $SD=1.88$ ) was higher than non-group members ( $M=0.67$ ,  $SD=0.156$ ). The difference might be due to more importance was given to project group members. So non-members should also equally be treated in the project.

Table 2 revealed that majority of group and non- group members had a favourable attitude towards group approach for management of white grub. It was found that group members ( $M=64.32$ ,  $SD=4.12$ ) had high attitude score than the non-members ( $M=51.67$ ,  $SD=4.67$ ),  $t=20.45$ ,  $p<.01$ ). The findings related to item wise comparison of attitude score of the scale are presented in Table 3. It was found that in case of 21 statements, group members had a significantly high mean score over non-group members. The mean value of group members ( $M=4.35$ ,  $SD=0.63$ ) indicated that white grub could be managed by forming group approach which is not possible individually. So non-members farmers should be mobilised at large scale for the formation of the group by following proper extension procedures. In item analysis, the group members expressed about the existence of gender equality in the group ( $M=4.28$ ,  $SD=0.65$ ). If more and more female will join the group, gender equality in the society is also achieved quickly. Group members also opined that for group performance good leadership is important. The willingness of members was essential to achieve group goal as felt by the members. That might be a reason the members opined that group performance depends on some individual's performance. So uninterested

members should not be enrolled in a group or group should not be formed by the project. The extension personnel should be trained on group formation and group dynamic process to improve the situation (Barman and Kumar, 2012b).

Taken together the findings of the study showed that group members have a more favourable attitude than non-group members in the management of white grub (*Lepidiota mansueta*). It might be due to the frequent project intervention. The results showed that group members were convinced about the group approach to control white grub. The findings were contrary to the initial assumption of the study which considered no deferential attitude between the groups. However, given the small sample size, the findings of the study are not generalizable beyond the study sample and applied with caution. The study indicated that majority of the respondents from project's group had a favourable attitude towards group approach for management of white grub. The item analysis of the attitude scale also reflected a significant difference in most of the cases between members and non-members. So benefits of the forming group should be explained among the non-members so that they will also influence to form group voluntarily. If the group are formed only for the mass collection of adult white grubs then for a remaining period of the year it will be in a dormant state. Under such situation, the group may not sustain for the more extended period. Therefore the group activities should be expanded beyond management of white grub, but to agricultural development throughout the year.

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## References

- Akinagbe, O.M. and Ajayi, A.R. 2010. Challenges of farmer-led extension approaches in Nigeria. *World J. Agric. Sci.*, 6 (4): 353-359
- Anastasiadou, S.D. 2011. Reliability and validity testing of a new scale for measuring attitudes toward learning statistics with technology. *Acta Didactica Napocensia*, 4(1) [http://dppd.ubbcluj.ro/adn/article\\_4\\_1\\_1.pdf](http://dppd.ubbcluj.ro/adn/article_4_1_1.pdf)
- Barman, U. and Kumar, B. 2012a. Knowledge level of extension personnel under ATMA regarding their facilitation skills. *Agric. Sci. Digest*, 32(2): 145:148
- Barman, U. and Kumar, B. 2012b. Attitude of extension personnel towards facilitation under Agricultural Technology Management Agencies of Uttarakhand, India. *Agric. Sci. Digest*, 32 (4) 351 – 353
- Bhattacharyya, B., Pujari, D., Bhuyan, U., Handique, G., Baruah, A.A.L.H., Dutta, S.K. and Tanaka, S. 2015. Seasonal life cycle and biology of *Lepidiota mansueta* (Coleoptera: Scarabaeidae): a serious root-feeding pest in India. *Appl. Entomol. Zool.*, <https://doi.org/10.1007/s13355-015-0349-4>
- Bhattacharyya, B., Sharma, A.K., Gawande, S.P. and Sreedevi, K. 2014. Occurrence of *Lepidiota sp.* (Coleoptera: Scarabaeidae) in western Assam. *Current Biotica*, 8(2): 195-196
- Christanto, H. 2007. Integrated pest control for empowering women farmers. *LEISA MAGAZINE*. 23(4), December 2007, <https://www.scribd.com/document/299226691/LEISA-23-04>
- Conroy, C., 2003. New directions for Nigeria's basic agricultural services. A discussion paper for Basic Agricultural Service (BAS). Natural Resources Institute, University of Greenwich, United Kingdom, 1: 61.
- Farrington, J. 1994. Public Sector Agricultural Extension: Is there life after structural adjustment. *Natural Resources Perspectives*. No 2. ODI, London, pp. 4-7.
- Henk van den Berg.2004. Prepared for the Global IPM Facility IPM Farmer Field Schools: A synthesis of 25 impact evaluations, Wageningen University, Prepared for the Global IPM Facility
- Nunnally, J.C. 1978. *Psychometric theory*. New York: McGraw-Hill.
- Raodeo, A.K. and Deshpande, S.V. 1987. White grubs and their management. *Research Bulletin, Marathwada Agricultural University, Parbhani (India)*, 11, 77 p.
- Riggio, R.E.2013. Cutting-edge leadership characteristics of good work team members. <https://www.psychologytoday.com/blog/cutting-edge-leadership/201301/characteristics-good-work-team-members>
- Saikia, S. and Barman, U. 2014. Measuring perceptions of recommended technologies of sali rice by farmers of Assam, *Intl. J. Agril. Sc.*, 10(1)
- Shiri, N., Faghiri, M., Pirmoradi, A. and Agahi, H. 2014. Attitudes of agricultural extension workers towards organic farming in Iran. *J. Organic Systems*, 9(1), 5-15 [www.organic-systems.org/journal/91/9102.pdf](http://www.organic-systems.org/journal/91/9102.pdf)
- Singh, R.P.2013. Group led extension: an effective means for promotion of INM, IPM and IDM technologies. <http://www.slideshare.net/rpratap11/group-led-extension-2013>
- Truong Thi Ngoc Chi, Hossain, M., and FlorPalis.2004. Impact of Integrated Pest Management- Farmer Field School (IPM- FFS) on farmers' insect pest management belief, attitude and practices (KAP) in Vietnam. *Omonrice*, 12: 109-119.

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