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A COMPARATIVE STUDY ON THE ADOPTION OF MODERN SESAME PRODUCTION TECHNOLOGIES BY THE PROJECT FARMERS AND NON-PROJECT FARMERS IN SELECTED AREAS

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Abstract

The main focus of the study was to determine the difference between the Project Farmers (PFs) and Non-Project Farmers (NPFs) in respect of their adoption of modern sesame production technologies. The study also aims at differentiating the PFs and NPFs on the basis of their sixteen selected characteristics in terms of their adoption of modern sesame production technologies. Data were obtained from 60 randomly selected project farmers and 60 randomly selected non-project farmers of the five villages of five districts (Kushtia, Chuadanga, Faridpur, Jashore and Narail) using the interview schedule during 15 September to 25 October, 2014. Five recommended practices were selected to measure the adoption level. Adoption level of PFs and NPFs of five practices such as adoption of improved seed, adoption of recommended dose of fertilizer, adoption of weeding and thinning, adoption of irrigation and adoption of pesticide use were 39.42 & 1.93, 39.12 & 0.60, 38.65 & 23.71, 34.71 & 18.33 and 33.65 & 0.79 with a mean of 37.11 & 9.07 percent, respectively. Considering overall adoption level, the findings revealed that the highest proportion (48.3 percent) of project farmers fell under the low adoption category, 40.0 percent had medium adoption and 11.7 percent had high adoption with an average adoption quotient was 37.11 percent while all (100 percent) of the non-project farmers were low adoption category with an average adoption quotient was 9.07 percent. More than half (51.7 percent) of the project farmers had medium to high adoption category while no non-project farmers were in the medium to high adoption category.

Key Words: Adoption, Sesame, Project farmer, Non-project farmer, Comparative study

Introduction

Oilseeds are an important group of crops which play a significant role in rainfed agriculture of Bangladesh. The major oilseed crops grown in Bangladesh are mustard, sesame, groundnut and linseed. The major contribution of oil comes from mustard (69.9%) followed by sesame (8.9%) and groundnut (invisible oil 7.8%) (BBS, 2016). Sesame is the second largest source of edible oil in Bangladesh next to mustard both in respect of acreage and production. It is one of the world's oldest spice and oilseed crop grown mainly for its seeds that contain approximately 35-50% oil, 20-25% protein, 20% sugar, 6% fibre and many kinds of minerals. Sesame oil is quality edible oil. The oil is tasteless, odourless and also used as hair oil and as a component of cosmetics. The seed is used in making various

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food items like cakes, khaja, biscuits, etc. Dry plants and leaves are used as fuel and oilcakes as cattle feeds and manures. Sesame has also been used as folk medicine. In India and Bangladesh, sesame and its oil have been used traditionally to cure various ailments, such as asthma, in "ayurveda" since ancient times. It is well known that sesame has nutritive, laxative, demulcent, emollient, diuretic and lactagogue properties. The roots, usually unused parts of sesame, contains antifungal compound such as chlorosesamone, hydroxysesamone and 2-3 epoxysesamone (Hasan *et al,* 2000 and 2001). The climate of Bangladesh is more suitable for sesame cultivation. Sesame is cultivated in both kharif-1 and kharif-2 seasons, but two-third sesame is produced in kharif-1 season. High land with sandy loam is best suited for sesame cultivation. In Bangladesh it is grown in almost all districts but grows well in greater Khulna, Faridpur, Pabna, Barisal, Rajshahi, Jashore, Kushtia, Comilla, Dhaka, Rangpur, Sylhet districts. But Bangladesh has been an oilseed deficient country since last few decades. Due to increase of area under cereal crops for meeting the increasing demand of food-stuff, land under oilseed crops has declined and price of oil has gone up. Cultivation of traditional varieties, imbalance use of fertilizers, inability to seed sowing in proper time, non adoption of other production technologies, natural calamities, socio-economic barrier, large yield gap (20-40%), nutrient mining in existing cropping pattern, unavailability of seeds of suitable HYV varieties etc. are the main constraints of maximizing yield of oilseeds. At present, the domestic production of edible oil can only meet about 20% of the country annual demand and rest is imported which cost more than taka 20 billion. The national average yield of sesame is 0.63 t/ha, which are very low compared to potential average yield of 1.4 t/ha of modern varieties. The government of Bangladesh has, therefore, provided priority to the agriculture sector to increase the production of oilseeds by giving subsidy to the farmers on different inputs such as fertilizer, irrigation etc. to achieve self sufficiency in oilseeds. In this perspective, BINA implemented a project entitled, "Yield Maximization of Mustard and Sesame through Improved Package of Production Practices in Some Selected Areas of the Country" in major oilseeds growing areas like Jashore, Faridpur, Chuadanga, Narail, Jhenaidah and Kushtia districts. Proposed activities of adaptation trials, farmers' motivation to adopt improved technologies, their knowledge & skill development and block farming using suitable varieties and addressing the constraints to adopt sesame in sustainable way to maximize the yield of oilseed crops by reducing yield gap and improving cropping pattern are imperative to maximize oilseeds production. The approaches were included Focus Group Discussion, working with Common Interest Group (CIG) Farmers, On-farm Adaptation Trial for variety selection, production package validation and training to upgrade agricultural knowledge of farmers and extension personnel, intervening modern cultivation techniques for increased yield and cropping intensity etc. Main focus was given to include Sesame in T. Aman and Lentil cropping sequence and vertical improvement of sesame yield within the existing pattern through improved package of production practices. Considering the above fact, the researcher undertook a study entitled, "A comparative study on the adoption of modern sesame production technologies by the project farmers and non-project farmers in some selected areas" along with the following objectives- (i) to determine the difference between the project farmers and non-project farmers in respect their adoption of modern sesame production technologies in some selected areas, (ii) to measure the selected factors (independent variables) associated with adoption of improved sesame production technologies, (iii) to find out the degree of relationship of different factors with the adoption of modern sesame production technologies.

Methodology

Study areas and source of data: Considering the sesame growing area the study was conducted in five villages of Kushtia, Chuadanga, Faridpur, Jashore and Narail district. The study aims at comparing PFs and NPFS in terms of their adoption of modern sesame production technologies. Therefore, all the farmers who were under the project and who were out of the project and also cultivated the sesame were considered as population of the study. Two lists of 100 project farmers and 100 non-project farmers of selected villages were prepared with the help of local Sub-Assistant Agriculture Officer (SAAO) of DAE of the concerned area. These two lists were the population of the study. Out of them 60% of the farmers were selected following random sampling method. Thus, 60 PFS and 60 NPFs were the sample of the study.

Variables of the study and their measurement: Age, education, family size, farm size, cropping intensity, family annual income, training exposure, extension media contact, innovativeness, cosmopoliteness, organizational participation, agricultural knowledge on sesame cultivation, credibility of extension agents, risk orientation, suitability of technology and profitability of technology was consisted as the independent variable whereas 'adoption of modern sesame production technologies in some selected areas' was considered as the dependent variable of the study. The selected modern technologies were consisted of recommended package of five practices. The five practices were adoption of improved seed, adoption of recommended rate of fertilizer, adoption of weeding and thinning, adoption of irrigation and adoption of pesticide use were selected to measure the adoption level. It was measured on the basis of the extent of adoption of modern sesame production technologies by the farmers for a period of two years (2013 & 2014). Adoption Index (AI) for modern sesame production technologies in this study was computed by using the following formula of Chattapadhyay (1963) and simplified by Ray (1998). Adoption of modern sesame production technologies was measured for recommended package of five practices. The adoption score was expressed in percentage. The Adoption Index (AI) of sesame grower could range from 0 to 100, where 0 indicate no adoption and 100 indicate highest adoption.

Data collection and statistical analysis: Data was collected from the respondents during Sep 15, to Oct 25, 2014. It was collected by the researcher himself using interview schedule from the farmers of the selected villages. The interview was conducted with the respondents individually in their respective houses. The SPSS (Statistical Package for Social Science) computer package was used to perform data analysis. Descriptive analysis such as mean, range, number and percentage, standard deviation and rank order were used whenever necessary. Pearson's Product Moment Correlation Coefficient (r) was computed to explore the relationships between the dependent and independent variables (Ray and Mondal, 2004).

Findings and Discussion

Adoption of Modern Sesame Production Technologies by the Farmers

Adoption level on technological package of five practices have been computed separately and presented in table 1 and 2. These practices were adoption of improved seed, adoption of recommended rate of fertilizer, adoption of weeding and thinning, adoption of irrigation and adoption of pesticide use.

Table 1. Adoption level of five recommended package of practices for adoption of modern sesame cultivation technologies

Selected technologies	Observed range		Mean		SD	
	PFs	NPFs	PFs	NPFs	PFs	NPFs
Adoption of improved seed	7.26 - 93.07	0 - 32.74	39.42	1.93	22.55	6.53
Adoption of recommended dose of fertilizer	7.26 - 93.07	0 - 17.73	39.12	0.60	22.13	2.81
Adoption of weeding and thinning	7.26 - 88.57	0 - 45.33	38.65	23.71	22.04	11.47
Adoption of irrigation	7.26 - 80.32	0 - 45.33	34.71	18.33	17.30	13.95
Adoption of pesticide use	7.26 - 80.51	0 - 26.84	33.65	0.79	16.03	4.33
Overall adoption	7.26 - 82.37	0 - 21.47	37.11	9.07	19.11	5.04

Measuring unit: Percentage, Possible Range: 0-100, PFs: Project Farmers, NPFs: Non-Project Farmers, SD: Standard Deviation

Table 2. Comparetive adoption categories of PFs and NPFs

Selected technologies	Categories	Farmers (N = 60)			
		PFs		NPFs	
		No.	%	No.	%
Adoption of improved seed	Low (up to 33)	29	48.3	60	100
	Medium (34-66)	22	36.7	0	0
	High (above 66)	9	15.0	0	0
Adoption of recommended dose of fertilizer	Low (up to 33)	29	48.3	60	100
	Medium (34-66)	23	38.3	0	0
	High (above 66)	8	13.3	0	0
Adoption of weeding and thinning	Low (up to 33)	29	48.3	47	78.3
	Medium (34-66)	22	36.7	13	21.7
	High (above 66)	9	15.0	0	0
Adoption of irrigation	Low (up to 33)	31	51.7	49	81.7
	Medium (34-66)	25	41.7	11	18.3
	High (above 66)	4	6.7	0	0
Adoption of pesticide use	Low (up to 33)	32	53.3	60	100
	Medium (34-66)	27	45.0	0	0
	High (above 66)	1	1.7	0	0
Overall adoption	Low (up to 33)	29	48.3	60	100
	Medium (34-66)	24	40.0	0	0
	High (above 66)	7	11.7	0	0

Measuring unit: Percentage, Possible Range: 0-100, PFs: Project Farmers, NPFs: Non-Project Farmers

Comparative discussion on five recommended package of practices

Adoption of improved seed: The adoption of improved seeds of the PFs ranged from 7.26 to 93.07 and of the NPFs ranged from 0 to 32.74 against the possible range of 0 to 100. The average adoption of PFs and NPFs were 39.42 and 1.93 with the standard deviation of 22.55 and 6.53 respectively. Based on the adoption scores the respondents were classified into three categories: "low adoption" (up to 33), "medium adoption" (34 - 66), and "high adoption" (above 66). The distribution of respondents according to their adoption of improved seeds has been shown in Table 1. Data contained in Table 1 revealed that the highest proportion (48.3 percent) of project farmers fell under the low adoption category, while 36.7 percent had medium adoption and 15 percent had high adoption while all the NPFs were felt under low category (100%) of adoption. The majority (85 percent) of the project farmers had medium to high adoption and all (100 percent) the non- project farmers had low adoption.

Adoption of recommended rate of fertilizer: The adoption of recommended rate of fertilizer of the PFs ranged from 7.26 to 93.07 and of the NPFs ranged from 0 to 17.73 against the possible range of 0 to 100. The average adoption of PFs and NPFS were 39.12 and 0.60 with the standard deviation of 22.13 and 2.81 respectively. Based on the adoption scores the respondents were classified into three categories: "low adoption" (up to 33), "medium adoption" (34-66), and "high adoption" (above 66). The distribution of respondents according to their adoption of recommended rate of fertilizer has been shown in Table 1. Data contained in Table 1 revealed that the highest proportion (48.3 percent) of project farmers fell under the low adoption category, while 38.3 percent had medium adoption and 13.3 percent had high adoption while all the NPFs were low category (100%) of adoption. The majority (86.6 percent) of the project farmers had medium to high adoption and all the non- project farmers had low adoption.

Adoption of weeding and thinning: The adoption of irrigation of the PFs ranged from 7.26 - 88.57 and of the NPFs ranged from 0 - 45.33 against the possible range of 0 to 100. The average adoption of PFs and NPFS were 38.65 and 23.71 with the standard deviation of 22.04 and 11.47 respectively. Based on the adoption scores the respondents were classified into three categories: "low adoption" (up to 33), "medium adoption" (34 - 66), and "high adoption" (above 66). The distribution of respondents according to their adoption of irrigation has been shown in Table 1. Data contained in Table 1 revealed that the highest proportion (48.3 percent) of project farmers fell under the low adoption category, 36.7 percent had medium adoption and 15.5 percent had high adoption while majority (78.33 percent) of the NPFs were low adoption category, 21.67 percent had medium with no high adoption category. Half (51.7 %) of the project farmers had medium to high adoption and all the non- project farmers had low to medium adoption.

Adoption of irrigation: The adoption of irrigation of the PFs ranged from 7.26 – 80.32 and of the NPFs ranged from 0 - 45.33 against the possible range of 0 to 100. The average adoption of PFs and NPFS were 34.71 and 18.33 with the standard deviation of 17.30 and 13.95 respectively. Based on the adoption scores the respondents were classified into three categories: "low adoption" (up to 33), "medium adoption" (34 - 66), and "high adoption" (above 66). The distribution of respondents according to their adoption of irrigation has been shown in Table 1. Data contained in Table 1 revealed that the highest proportion (51.7 percent) of project farmers fell under the low adoption category, 41.7 percent had medium adoption and 6.7 percent had high adoption while majority (81.7 percent) of the NPFs were low adoption category, 18.3 percent had medium category with no high adoption category. Half of the project farmers had medium to high adoption and all the non- project farmers had low to medium adoption.

Adoption of pesticide use: The adoption of pesticide use of the PFs ranged from 7.26 - 80.51 and of the NPFs ranged from 0 – 26.84 against the possible range of 0 to 100. The average adoption of PFs and NPFS were 33.65 and 0.79 with the standard deviation of 16.03 and 4.33 respectively. Based on the adoption scores the respondents were classified into three categories: "low adoption" (up to 33), "medium adoption" (34 - 66), and "high adoption" (above 66). The distribution of respondents according to their adoption of pesticide use has been shown in Table 1. Data contained in Table 1 revealed that the highest proportion (53.3 percent) of project farmers fell under the low adoption category, 45.0 percent had medium adoption and 1.7 percent had high adoption category while all the NPFs were low adoption category. Nearly half (46.7 percent) of the project farmers had medium to high adoption while all the non- project farmers had low adoption.

Overall adoption of modern sesame production technologies: The overall modern sesame production technologies of the PFs ranged from 7.26 - 82.51 and of the NPFs ranged from 0 - 21.47 against the possible range of 0 to 100. The average adoption of PFs and NPFS were 37.11 and 9.07 with the standard deviation of 19.11 and 5.04, respectively. Based on the adoption scores the respondents were classified into three categories: "low adoption" (up to 33), "medium adoption" (34 - 66), and "high adoption" (above 66). The distribution of respondents according to their adoption of pesticide use has been shown in Table 1. Data contained in Table 1 revealed that the highest proportion (48.3 percent) of project farmers fell under the low adoption category, 40.0 percent had medium adoption and 11.7 percent had high adoption while all (100 percent) of the NPFs were low adoption category. More than half (51.7 percent) of the project farmers had medium to high adoption category while no non- project farmers were in the medium to high adoption category. For clarity of understanding a bar diagram has been presented in Fig. 1.

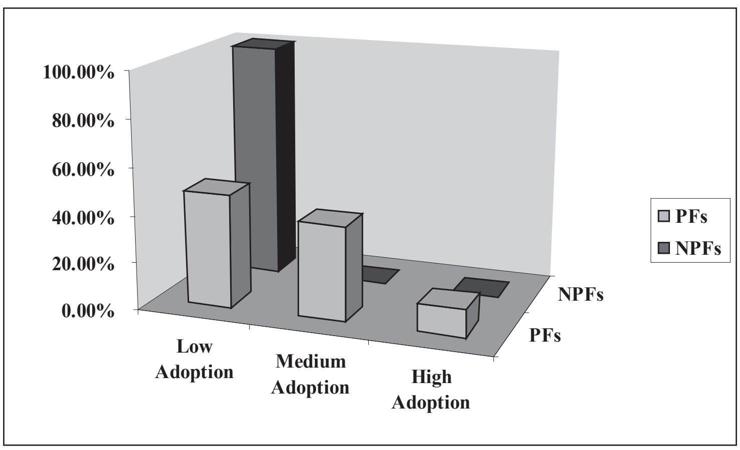

Fig.1. Farmers' adoption of modern sesame production technologies measured according to their extent of adoption.

Relationship between the selected growers's characteristics and other factors and their adoption of modern sesame production technologies

Relationship between the selected characteristics of sesame growers' & other factors and their adoption of modern sesame production technologies were ascertained by the Pearson's product moment coefficient of correlation and the summary of the result has been presented in Table 3. Out of sixteen factors of PFs, thirteen factors namely: education of the farmers, farm size of the farmers, Cropping intensity, family annual income , training exposure of the farmers, extension media contact, innovativeness, cosmopoliteness, agricultural knowledge on sesame cultivation, credibility of extension agents, risk orientation, suitability of technology, profitability of technology had significant and positive relationship with their adoption of modern sesame production technologies and rest of the factors (age, family size of the farmers, organizational participation) shown no significant relationship with their adoption. On the other hand, only three factors of NPFs, namely: farm size, innovativeness and suitability of technology had significant and positive relationship with their adoption and the rest variables shown no significant relationship with their adoption of modern sesame production technologies.

Table 3. Co-efficient of correlation of the selected characteristics of the respondents and their adoption of modern sesame production technologies

Selected characteristics of the farmers and others factors	Co-efficient of correlation ('r')	
	PFs	NPFs
Age	-0.131	-0.082
Education	0.493**	0.075
Family size	-0.191	0.002
Farm size	0.761**	0.375**
Cropping intensity	0.630**	0.083
Family annual income	0.405**	0.075
Training	0.624**	0.028
Extension media contact	0.638**	0.124
Innovativeness	0.281*	0.463
Cosmopoliteness	0.681**	0.247
Organizational participation	0.108	0.158
Knowledge on sesame cultivation	0.599**	0.142
Credibility of the extension agents	0.492**	0.126
Risk orientation	0.457**	0.091
Suitability of the technology	0.660**	0.336
Profitability of the technology	0.655**	0.013

* = Correlation is significant at the 0.05 level (2-tailed); ** = Correlation is significant at the 0.01 level (2-tailed); PFs: Project Farmers, NPFs: Non Project Farmers

Effect of project activities on some indicators related to agricultural development

A total of 16 factors were selected for this study in which some are constant and some are variable. Out of sixteen, seven variables were changed positively and significantly with the influences of project activities. Name of 7 variables with their changing percentage has been listed in Table 4.

Table 4. List of variables positively changed by the project activities

Indicators	Mean		% of mean difference of PFs over NPFs
	NPFs	PFs	
1. Family annual income	219.92	246.05	11.88
2.Training exposure	3.50	8.58	90.67
3. Extension media contact	20.05	30.48	52.02
4. Knowledge on sesame cultivation	26.13	32.90	25.91
5. Credibility of extension agents	21.88	24.93	13.94
6. Risk orientation	21.07	27.08	28.52
7. Profitability of technology	12.88	15.70	21.89

Family Annual Income: The behaviour of a farmer on a new technology may be influenced by his/her income. Farmers with higher income have a tendency to improve their farming behaviours on new innovation in order to increase their income. They also have more contact with various information sources and can invest more money to adopt new innovation. In this study family annual income of the project farmers had a positive and significant relationship with their adoption of modern sesame production technologies. Similar findings were also observed by Hussen (2001), Aurangozeb (2002) and Haque (2005). But in case of non-project farmers, income had no significant relationship with their adoption though their income was not far different (Table 2) from project farmers. Actually project farmers were more motivated than those of non-project farmers in adopting the modern sesame production technologies. For involvement with Project activities annual income of project farmers was increased 11.88 percent over non-project farmers.

Training experiences: Training experiences is an important factor which enhances knowledge and improves skills on various aspects of agricultural technologies of the farmers. Training promoted farmers in a broad spectrum to access in various information sources to gain knowledge, skills and attitude towards new technology. Training program under the project had a great role to increase the adoption. As a result, training received of the project farmers had a highly significant relationship with their adoption of modern sesame production technologies which was not significant in case of non-project farmers. Training experiences of project farmers was increased 90.67 percent over non-project farmers.

Extension media contact: The extension media contact of farmers had a significant relationship with their adoption. The more extension media contact the farmers had, the more was their adoption. The extension contact strengthened the base of their knowledge. When people come contact with various extension personnel, print media, exhibition, demonstration, field day and other motivational programs, it contributes significantly to increase their knowledge, skills and attitude towards adoption In this study extension media contact of the farmers had a positive and highly significant relationship with their adoption of modern sesame production technologies. Hussen (2001), Chowdhury (1997) also found the similar findings. These opportunity was lacking in non-project farmers and therefore, their knowledge, skill and attitude towards adoption did not raise up. So the relationship between extension media contact and their adoption was non-significant. Extension media contact of the project farmers was increased 52.02 percent over non-project farmers.

Agricultural knowledge on sesame cultivation: Agricultural knowledge on sesame cultivation of the project farmers had a positive and highly significant relationship with their adoption of modern Sesame production technologies. Similar findings were observed by Haque (2003) and Haque (2005). This is so as favourable attitude have formed mostly by knowledge, of the respondents therefore, it is quite logical that knowledge played a significant role in the adoption of modern sesame production technologies. Bangladesh Institute of Nuclear Agriculture (BINA) established some demonstration in the study areas on modern sesame production which was very effective to develop knowledge of project farmers on modern sesame production technologies. BINA also conducted some training on this issue from which the farmers became knowledgeable on modern sesame production technologies. Moreover, field day observation, frequent motivational field visit of project personnel and face to face discussion with farmers in their field, regular mobile contact, supplied printed materials etc which also enhanced their knowledge. The non-project farmers were out of these so that they could not get these opportunities and for that way their relationship was not significant. Agricultural knowledge on sesame cultivation of the project farmers was increased 25.91 percent over non-project farmers.

Credibility of extension agents: Credibility of extension agents is an important factor to the farmers in adopting new technologies. The effectiveness of sources in communicating developmental information to the rural people depends on the people's perception of the credibility of the sources. As the extension media contact of non-project farmers was low, their credibility of extension agents was also low. In this study, Credibility of extension agents to the project farmers had a positive and highly significant relationship with their adoption of modern Sesame production technologies but in case of non-project farmers it was non-significant. For involvement of project farmers with project activities, credibility of extension agents was increased 13.94 percent.

Risk Oriented: Higher risk oriented farmers have the ability to combat the risk by using proper ideas and practices and to get involved in various agricultural operations in their fields. As a result a large proportion of project farmers were high risk oriented due to self-confidence, awareness, higher income, large farm size and similar other traits. Due to project activities project farmers achieved to take high risk which made them courageous in respect of adopting modern sesame production technologies. In this study risk orientation of the project farmers had a positive and significant relationship with their adoption of modern sesame production technologies while non-project farmers had no significant relationship. This means that the farmers with higher risk orientation having higher ability to adopt new technologies than those of lower risk orientation. Project activities increased 28.52 percent risk taking capacity of project farmers over non-project farmers.

Profitability of technology: Profitability of technology is a matter of farmers' own perception. The perception about the profitability of technologies is important because a strong incentive and reward for any new act generally motivate the farmers. When they embank on the very high yield and profit given modern sesame varieties and package of practices might served as a strong force to convince the farmers and motivate them to go for these varieties and technologies. The perception level on the profitability of modern sesame cultivation of the project farmers was increased by the various project activities. The non-project farmers were out of these activities and that is way their perception on profitability of technology was comparatively low and their relationship with adoption was not significant. Profitability of technology of the project farmers had a positive and highly significant relationship with their adoption of modern sesame production technologies. It means the technologies with higher profitability had higher adoption of modern sesame production technologies. Pathak and Majumdar (1985) study supports this findings. In this study, perception on profitability of technology of project farmers was increased 21.89 percent over non-project farmers.

Conclusion

The findings of the study indicate that there were significant difference between project farmers and non-project farmers with respect to their adoption of modern sesame production technologies. The highest proportion (48.3 percent) of project farmers fell under the low adoption category, 40.0 percent had medium adoption and 11.7 percent had high adoption with an average adoption quotient was 37.11 while all (100 percent) of the non-project farmers were low adoption category with an average adoption quotient was 9.07. Half (51.7 percent) of the project farmers had medium to high adoption category while no non-project farmers were in the medium to high adoption category. Such facts lead to the conclusion that adoption of the project farmers significantly increased than those of non-project farmers due to different project activities such as demonstration, training on this issue, printed materials, field day observation, frequent motivational field visit of project personnel and face to face discussion with the project farmers in their fields and regular mobile contact. The non-project farmers were out of these so that they could not get these opportunities and for that way their adoption was not encouraging and considerable. The findings of the study demonstrate that the project farmers and non-project farmers varied significantly with the variation of their family size, annual income, training exposure, extension media contact, knowledge on sesame cultivation, credibility of extension agents, risk orientation, profitability of technology and their variation were 11.88%, 90.67%, 52.02%, 25.91%, 13.94%, 28.52% and 21.89%, respectively. These findings lead to conclude that access of project farmers to training as well as other extension methods under project activities, these desirable attributes of the project farmers had significantly increased than those of non-project farmers. Project activities played a pioneer role to increase these desirable traits of the project farmers.

Based on the above findings the following recommendations put forward for maximize production of modern sesame:

- Training exposure and extension media contact of the sesame growers showed high significant and positive relationship with their adoption of modern sesame production technologies. Farmers' level of knowledge should be increased through training, extension contact and other extension methods, in order to develop clear understanding about the use and benefit of technologies.

- Frequent contact with extension media can makes farmers more innovative and cosmopolitan which will ultimately lead to their adoption of modern sesame production technologies. Hence, the concern authorities should take cognizance of these facts and take necessary steps to increase the frequency of extension contact of the farmers and to provide necessary training sessions to the farmers.
- Increased adoption rate of modern sesame production technologies are important for meeting the national demand of edible oil. To achieve higher degrees of adoption of modern sesame production technologies, the farmers' knowledge, attitude and perception have to be increased. Henceforth, DAE and other extension service providing organizations should be given more emphasis to take necessary steps to increase knowledge and perception level of farmers for dissemination and adoption of modern sesame production technologies. For this regard Government and non-government organizations should provide effective training program on modern sesame production packages for the farmers at regular intervals to build their farming skills.
- DAE should strengthened the field level services by the field workers (SAAOs) to give farmers proper information, suggestions and advice regarding adoption of modern sesame production technologies.

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