



Factors Affecting Farmers' Attitudes on Hybrid Rice Production in Nay Pyi Taw Area, Myanmar

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Abstract This study focus on changing attitudes of rice farmers towards hybrid rice production from the view of the theory of attitude change. This study aims to determine factors influencing the farmers' attitude to hybrid rice production with regard to farmers' personal characters, technological knowledge and access to extension services. This empirical study was conducted during May to September, 2017, in Nay Pyi Taw council area, Myanmar. Data were gathered ten variables for farmer's personal characters, fifteen variables for the farmers' technological knowledge and twelve variables for extension contacts by using interview schedule from 198 randomly selected rice farmers and were analyzed by using multiple regression models. The study revealed that 64.6% of farmers changed attitudes to hybrid rice production. It was observed that "education", "source of information from government and non government" organizations were positively significant related but "family labor" was negatively significant influence to hybrid rice production. Besides, farmers' technological knowledge such as "seed quality test", "planting density", "irrigation methods" and "pests and diseases control methods" were positively significant related to hybrid rice production. Extension contact as "training" was highly significant related to farmers' attitudes change. However, "field level extension agents", "farmer to farmer extension", "NGO" contacts were negatively significant related to attitude towards hybrid rice production. This study highlighted that most intervention factors were high seed cost, technical knowledge, low rice price, cost of production and machinery problems. Create opportunity to access micro finance and encourage to private sector participation and also market opportunity. Moreover, clear policy implication is needed and change to effective communication with training using practical design and participatory approach manner to farmers' attitudes change in Myanmar.

Keywords attitudes, hybrid rice, influencing factors, rice farmers, Nay Pyi Taw, Myanmar

INTRODUCTION

Rice remains the world's most important food commodity, particularly in Asia, but it is face changing such climate change, degradation of farming areas, decrease water availability, and increase population. In Myanmar, the agriculture sector is the largest contributor to the growth in national economy and contributes at least 24% to GDP, 25% to its export earnings and employs 60% of the labor force and rice is the most important commodity in the agricultural sector, (Ministry of Agriculture, Livestock and Irrigation, 2015). The ultimate goal of the rice sector strategy is a food-secure nation where small holder farmers have tripled their household income,

including income derived from rice and rice based farming, there by enjoying decent standard of living comparable to that of urban dwellers (Ministry of Agriculture, Livestock and Irrigation, 2015).

In Myanmar, total rice growing area was 17.17 million acres, around 1400 million baskets of production and 74.37 baskets of yield per acre in 2016-17 growing season (Rice Division, DOA, 2017). Hybrid rice cultivation was initiated in 2011, monsoon and increased year by year up to 2.1% of total rice growing area shown in Fig.4 and 7.6% for study area Fig.3. Rice production farmers' income could be increased by altering production of hybrid rice which will be the yield of hybrid rice is 15-20% better than the local variety and currently cultivated high yielding variety. Besides it could be successful 200 baskets (potential yield) per acre if it had systematic and proper care and consequently resulting in alleviating of poverty and better living standard of Myanmar farmers (DOA, 2015). Similar with other developing countries, agricultural sector, particularly the rice sector is radically changing in Myanmar. Population is gradually increasing and rice production areas are decreasing due to the so many purpose. Now, climate change situation is start affected to Myanmar rice growing farmers. Therefore, productivity of rice become low and quality is not adequate. As a result of this, there will be serious to food security and decreasing income of rice farmers. Therefore, farmer's attitude that they need to be changed and grow commercial seeds like hybrid rice seeds from inbred rice. Aims of study were: (1) to characterize farmers' attitude towards hybrid rice production with regard to personal factors, technological knowledge and access to extension contacts, (2) to identify the influencing factors of farmers' attitude towards hybrid rice production and also intervention factors.

METHODOLOGY

There was 53,876 rice growing farmers in total representing about 163,678 acres in Nay Pyi Taw area. Out of which 51,597 farmers were inbred rice growing farmers and 2,279 farmers are hybrid rice growing farmers (DOA, 2016). This study was conducted in Nay Pyi Taw council area including Pyinmana, Lewe, Dekkhinathiri, Zabuthiri, Tatkone, Pobbathiri, Zeyarthiri, and Ottarathiri Townships. Secondary data collection gathered from divisional office and township office in Nay Pyi Taw. A total 16 village tracts (two village tracts per each township) were selected to characterize and identify the farmers' attitudes towards hybrid rice production. One hundred and ninety eight farmers were randomly selected based on list of the rice growing farmers from selected village tracts, Fig. 1 (A and B).



Fig. 1 (A) Study area

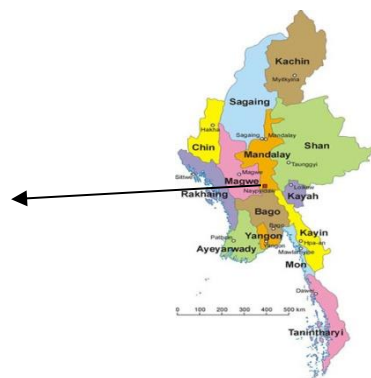


Fig. 1 (B) Map of Myanmar

Attitudes are learned or established predisposition to response (Zimbardo and Leippe, 1991). (Zanna and Rempel, 1988) viewed attitude as having many causes. Attitude is not directly observable, but the action and behaviors to which they contribute may be observed (Bendar and Levie, 1993). There are factors that intervene between attitude and behavior which would cause person's behavior to be inconsistent with his or her attitude (Schafer and John, 1986). These factors

include a person's habits, social norms and expected consequences of behavior. Theoretical framework of attitudes and change to hybrid rice production was formed based on farmers' personal factors which could be influenced to change the adoptive attitudes towards hybrid rice and other novel technologies. Moreover, the differences among rice farmers' beliefs and behavior intend to identify technological knowledge and way of communication with extension personal specifically towards hybrid rice, through intervention factors as shown in Fig. 2.

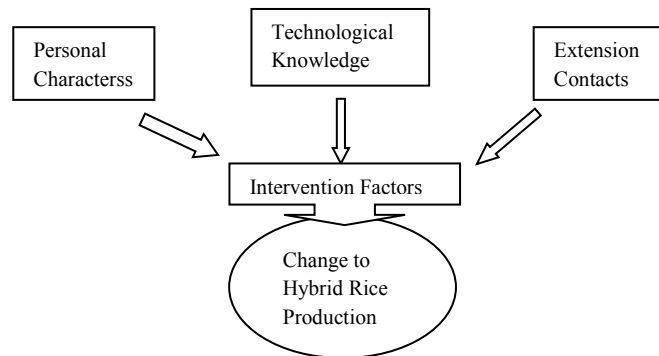


Fig. 2 Conceptual Framework

A total of 37 independent variables having some bearing on the dependent variables were identified for inclusion in the study. Ten variables of the farmer's personal characters; age, gender, marital status, and level of education, family labor, income, membership in organization, availability of credit, source of information including government and non government. Fifteen variables of the farmers' technological knowledge: varietal name, seed quality test, seed rate, sowing method, cover of seeds after sowing, seedling age, seedling per hill, planting density, fertilizer application method, irrigation method, weed control, treatment to get the effective tiller, pests and diseases control, time of water drainage before harvest, harvest time, and twelve variables of extension contacts; individual, group, mass media and farmers to farmers extension, contact with NGOs and input dealers were collected to understand and attitude towards hybrid rice. Interview schedule included open-ended and closed questions which were related to variables mentioned above were prepared and data were analyzed by using multiple regression models with SPSS ver. 16.

RESULTS AND DISCUSSION

Hybrid rice originated from breeding of two different parent types. In the process of hybrid seed production, two different parental strains bred artificially and the new generation is F_1 . This improved vigor is "hybrid vigor" or "heterosis". Hybrid vigor is generally higher in agronomic characteristics, therefore they generally more yield than their parents. Broadly speaking, hybrid rice has two advantages: i) advantage in terms of high yields in comparison to inbred varieties and ii) advantage in term of economic profitability due to higher total sales (more rice to sell) for the almost the same capital investment (Pervez et al, 2016). The study revealed that 64.6% of farmers' attitudes to hybrid rice production and 35.4% of farmers had no attitudes to hybrid rice production. Adopted farmers were really accepted to hybrid rice production and non adopted farmers have given the top reasons as poor grain quality and lower market price for hybrid rice grain and lack of awareness and high cost of seed, the results of study similarly pointed out by (Spielman et al., 2013).

Demographic Characteristics of the Respondents

The findings revealed that 84.4% and 15.6% of the respondents were male farmers and female farmers. The average age of the sample farmers was 45 years in the range maximum 70 and minimum 25 years. An average farm size was 5 acres and majority of farmers have formal education and 13.1% of them possessed Bachelor Degree and Diploma education level and 51.1% of farmers were membership in organizations.

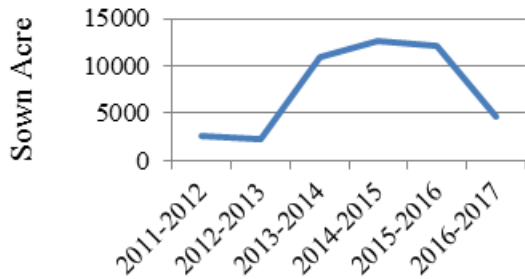


Fig. 3 Hybrid rice growing acre in Nay Pyi Taw

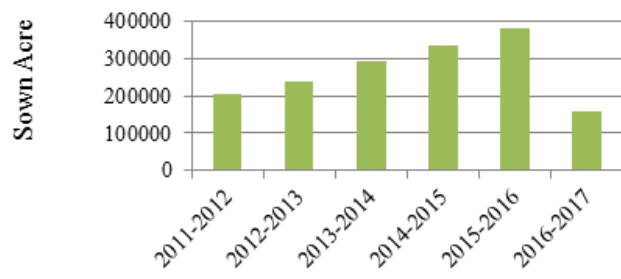


Fig. 4 Hybrid growing acre in Myanmar

Influential Farmers’ Personal Characters to Hybrid Rice Production

This study also revealed that among ten of farmers’ personal characters, “level of education” was highly significant to hybrid rice production. Therefore, more educated the farmer is, the more likely he/she will adopt hybrid rice, possibly because he/she can get more information and understand on hybrid production. This result was consistent with earlier literatures of (Nirmala et al., 2013). The result showed that “source of information from government” was highly significant associated and “source of information from non-government” was also high significant related to hybrid rice production. In this context, DOA was the main information source because technology trickles down to farmers and local NGO supported the awareness by doing the technical training. These findings were (Cavane, 2011) also similarly indicated that source of information supported to learn and raise awareness and particularly public extension to strengthen the farmers’ attitude change. Similarly, Jegede et al., (2007) mentioned in their paper that farmers’ personal characters have some influence on their perception of innovations and their decision to adopt or reject such innovation.

Table 1 Influential farmers’ personal characters to hybrid rice production

Statement	Coefficient	Significant	Expected Coefficient
1. Age	-0.046	0.83	0.955
2. Gender	0.73	0.13	2.074
3. Marital status	-0.527	0.331	0.59
4. Level of education	0.476	0.009***	1.609
5. Family labor	-0.217	0.093**	0.805
6. Income	0.161	0.192	1.174
7. Membership in organization	-0.066	0.845	0.936
8. Credit	0.352	0.556	1.423
9. Source of information from government	1.507	0.004***	4.512
10. Source of information from non-government	1.066	0.065**	2.904

Note *** ** and * indicate statistically significant at (0.001), (0.01) and (0.05) respectively

Moreover, family labor was negatively high significant related toward hybrid rice, it implied that most of family labors were not engaged farming. Furthermore, no significant associated was observed in age, gender, marital status, income, membership organization and credit (Table 1). These findings were similarly pointed out by Ghimire et al., (2015).

Influential Farmers’ Technological Knowledge to Hybrid Rice Production

The findings indicated that farmers responded to technical knowledge as “water utilization method” was highly significant and “planting density” was high significant, while “seed quality test” and “pests and diseases control” was significantly related to attitude of hybrid rice production. On the other hand, farmers could identify the “varietal name”, “seed rate”, “sowing method”, “cover the seed after sowing” and “seedling age”. Moreover, farmers have knowledge regarding as “seedling per hill”, “fertilizer application method”, “weed control”, “time of water drainage before harvest”, “treatment to get effective tillers”, and “harvesting time” (Table 2). As a result, this study pointed out that high-level professional training to get more knowledge on hybrid rice, farmers who involved actively and sufficient technical assistant in the field were important factors in changing adoption behavior. In this regard, (Pervez et al., 2016) showed that Hunan and Zhejiang provinces, in China, farmers participating in rice planting technology training were more involved in rice cultivation and got the higher yield.

Table 2 Influential farmers’ technological knowledge to hybrid rice production

Statement	Coefficient	Significant	Expected Coefficient
1. Varietal name	-0.104	0.8	0.902
2. Seed quality test	0.771	0.064*	2.163
3. Seed rate	0.001	0.998	1.001
4. Sowing method	-0.702	0.265	0.496
5. Cover the seed after sowing	0.661	0.283	1.938
6. Seedling age	-0.118	0.839	0.889
7. Seedling per hill	-0.077	0.86	0.926
8. Planting density	0.863	0.048**	2.37
9. Fertilizer application method	0.261	0.592	1.298
10. Water utilization method	1.551	0.002***	4.716
11. Weed control	0.058	0.896	1.06
12. Time of water drainage before harvest	-0.778	0.124	0.459
13. Treatment to get the effective tillers	-0.054	0.9	0.947
14. Harvest time	-0.028	0.953	0.972
15. Pests and diseases control method	0.726	0.081*	2.067

Note *** ** and * indicate statistically significant at (0.001), (0.01) and (0.05) respectively

Influential Farmers’ Extension Contact to Hybrid Rice Production

The study revealed that the “training” was highly significant related to attitude change of farmers on hybrid rice production. Technical training provided to farmers to get the more knowledge and believed to extension personal and technology introduced by scientists. Similar finding was reported by (Ngoc Chi and Yamada, 2002). Contrary to this, “meeting” was negatively high significant to attitude change, because meeting was not so effectiveness for farmers to access hybrid rice technology. Next, the study indicated that the “farmer to farmer extension” was negatively high significant related to attitude change, even the farmers obtained the technological information from neighboring farmers they did not rely upon neighboring farmers for new technology. Only consulting with neighbor farmers were not enough and they should start a trial and consequently adopt the technology that finding was similarly indicated by (Shah et al., 2014). Besides, farmers rely more on peer and relatives than extension offices (Rashid and Gao, 2016). Moreover, “field level extension agents” who were negatively significant associated to attitude change, extension agents contacted to farmers through extension activities but they have low competencies in transfer of new technology. In particular, extension officers and field extension agents might be farmers to select the right variety and go through recommended procedure were also important to adopt the hybrid rice production as different finding to (Shah et al., 2014). In addition, “NGO” contacts were also negatively significant related to attitude towards hybrid rice production. On the other hand, “demonstration” and “field days” that could not persuaded to farmers

change attitude and also extension officer could not change farmers' attitude towards hybrid rice. "Input dealers" were not clear the technology who were only to sell out their products so they could not change farmers' attitude towards hybrid rice. In further analysis, research showed that there is no significant relationship both "radio" and "television" transmitted by broadcasting of public sector. Therefore, it is suggested that the information and presentation components of the hybrid rice programs need to be developed (Table 3).

Table 3 Influential farmers' extension contacts to hybrid rice production

Statement	Coefficient	Significant	Expected Coefficient
1. Extension officer	-0.513	0.139	0.599
2. Field extension agents	-0.379	0.096*	0.685
3. Meeting	-0.874	0.035**	0.417
4. Training	1.105	0.005***	3.019
5. Demonstration	0.258	0.522	1.294
6. Field day	0.123	0.81	1.131
7. Radio	-0.03	0.891	0.971
8. Television	0.022	0.929	1.022
9. Leaflets/Pamphlets	0.258	0.189	1.295
10. Farmer to farmer extension	-0.542	0.029**	0.581
11. NGO	-0.337	0.055*	0.714
12. Input dealers	-0.098	0.618	0.907

Note *** ** and * indicate statistical significant at (0.001), (0.01) and (0.05) respectively

CONCLUSION

According to the research, most intervention factors on farmers' attitudes were high seed cost, access to knowledge, low rice price in markets, cost of production and machinery to solve labors scarcity problems. This study highlighted that the clear policy implication for enhancement of hybrid rice in Myanmar. Create opportunity to access micro finance and encourage to private sector to do the service providers and also market linkages are urgently needed. Hybrid rice seed Co. Ltds have more intention to quality seed and contract farming with other associated partners and farmers prefer to Public Private Partnership (PPP) approach. To get the key knowledge for farmers, extension organization need to persuade by changing the effective communication with training using practical design and participatory approach manner to farmers' attitudes change, effective and efficient training are needed to understand.

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