



Farmers' Perception of Fertilizer Management Practices for Cotton Production in Magway Region of Myanmar

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Received 27 January 2018 Accepted 25 October 2018 (*Corresponding Author)

Abstract Cotton production is one of the main agricultural activities in the dry zone of Myanmar. Understanding the farmers' fertilizer management practices for cotton production was important to develop appropriate technology in order to increase cotton yield and quality. The main objective of the study was to evaluate the farmers' fertilizer management practices on cotton production in Magway Region. The survey was conducted in eight villages from four districts; Magway, Minbu, Pakokku and Thayet during May to June 2017. Totally 160 farmers from survey region were chosen by simple random sampling method and individually interviewed with structured questionnaires. Data were analyzed by using descriptive methods. Most of the farmers generally applied the urea fertilizer (65.6%), NPK-compound fertilizer (93.13%) and foliar fertilizers (82%) as well as farmyard manure (97.5%) in this study area. Most of the farmers interested combine application of compound and foliar fertilizer more than single nutrient fertilizer application. According to the results from the study, the cotton yields were directly related with fertilizer application practices. So, lower crop yield and less profit in cotton production were found due to inadequate amount of fertilizer applied by respondent farmers. Farmers were needed to improve the perception of fertilizer management practices in cotton production for increasing crop yield and household incomes. Farmers' agricultural knowledge is an immensely valuable resource that provides farmer-to-farmer training or local technology transfer. Therefore, the extension staffs should be upgraded the awareness of farmers for increasing seed cotton yield and agricultural knowledge on cotton production.

Keywords nutrient management, foliar fertilizer, chemical fertilizer, cotton

INTRODUCTION

Cotton is a principal fiber crop in Myanmar. Cotton lint quantity and quality depended upon availability of nutrients and weather conditions of cultivated site. Most of the cotton grows farmers sown during monsoon and post monsoon within June – July and August –September. Harvesting practices were on October - November and December – January. Fertilizer application was an important factor in profitable cotton production in Myanmar. The main activities of cotton cultivation and production were found in Sagaing, Mandalay, Magway and Bago divisions. About 52 percent of total cotton sown area was occupied in Magway Region (DoA, 2016). The target

yield of seed cotton was 1600 kilograms per hectare (MCSE 2012). Modern agriculture provides improved technology, breeding and using most viable hybrid seed. Then optimum use of fertilizer has made waste saving in agricultural production (Nyein, 2000). Urea, triple super phosphate and muriate of potash containing major nutrients N, P and K, respectively, were mainly used for cotton production at the recommended major rate ranging from 62 - 62 - 62 kg ha⁻¹ for fertile soil to 124 - 62 - 62 kg ha⁻¹ for poor soil depending on soil type and availability of irrigation water in Myanmar. Pye Tin (2006) reported that although only 50 percent of cotton area applied fertilizers, an average of 30 to 40 percent practiced the recommended rate for cotton production. This result pointed out that the inadequate and imbalance fertilizers application in cotton productivity.

OBJECTIVE

The objective of this study is to evaluate the farmers' fertilizer management practices on cotton production in Magway Region.

METHODOLOGY

The survey was conducted in eight villages from four districts such as Magway, Minbu, Pakokku and Thayet during May to June 2017. Totally 160 famers from survey region were chosen by simple random sampling method and interviewed individually with structured questionnaires. Descriptive statistics of demographic characteristics such as age, education level, farm size, fertilizer application practices on their cotton production fields were recorded. These data were analyzed by using SPSS (Version 16).

RESULTS AND DISCUSSION

Mayway Region situates approximately between north latitude 18° 50' to 22° 47' and east longitude 93° 47' to 95° 55'. These location is the second largest among Myanmar's seven divisions, with an area of 44,820 square kilometer (17,306 sq. mi).The demographic characteristics of the sample respondents showed that the majority of cotton farmers were male (97.5%) whereas female was only (2.5%). This indicate that women participation in cotton cultivation is low while they participate more in harvesting and post-harvest activities such as processing and marketing of farm product. Sixty one percent of total respondents were 41-60 years old. The educational level of the farmers was primary education (72%) and middle education (18%) in survey areas (Table 1).

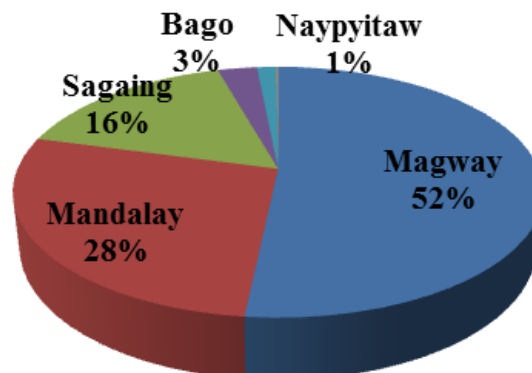


Fig. 1 Cotton cultivated areas in the Myanmar 2015-2016 (DoA, 2016)

Among the sample respondents, 95% of them cultivated cotton in which *Gossypium hirsutum* cultivated farmers were (85.63%), *G. arboreum* cotton farmers were (13.75%) and two varieties cultivated farmers were (4.37%). Ninety four percent of the cotton farmers applied fertilizer. Among them, 88.67% of the farmers practiced only basal application and a few percentages

(11.33%) were used at seedling stage. Forty four percent of the farmers applied only one time at flowering stage and (6.67%) applied two times at squaring and flowering stage (Table 2). In the study area, urea, compound fertilizer, farm yard manure and foliar fertilizer were applied by 65.6%, 93.13%, 97.5% and 82% of the sample respondents respectively (Fig. 2). Sixty five percent of the sample farmers commonly followed mono cropping (cotton) and 30% practiced intercropping with sesame, pulse, and pigeon pea.

Table 1 The demographic characteristics of the sample respondents in survey area

Item	Characters	Frequency	Percent of Respondents
Gender	Male	156	97.5
	Female	4	2.5
Age (years)	20-40	21	13.0
	41-60	96	61.0
	61 <	41	26.0
Education Level	Primary	116	72.0
	Middle	29	18.0
	High	9	6.0
	Graduate	6	4.0

Source; Survey data

Table 2 The cotton production and input application management in farmers' practices

No	Distribution categories	Used practices		Unused practices	
		frequency	Percent of respondents	frequency	Percent of respondents
1	Cotton cultivation	152	95.00	8	5.00
	<i>G. hirsutum</i> variety cultivated	137	85.63		
	<i>G. arboreum</i> variety cultivated	22	13.75		
	Two varieties cultivated	7	4.37		
2	Fertilizer using	150	93.75	10	6.25
	Basal application	133	88.67		
	DAE application	17	11.33		
	Side dress once time	66	44.00		
	Side dress two time	10	6.67		
3	Urea using	105	65.60	55	34.40
4	Compound fertilizer using	149	93.13	11	6.87
5	Foliar fertilizer using	131	82.00	29	18.00
6	F.Y.M using	156	97.50	4	2.50
7	Cropping pattern				
	Mono cropping	104	65.00	56	35.00
	Inter cropping	48	30.00	112	70.00

Farmers' Perception of Fertilizer Management Practices

Total cotton cultivated area possessed by sample respondents were ranging from 1.05 to 2.23 ha and 1.87% of the respondents occupied above 4.86 ha. Urea (62-124 kg ha⁻¹) and 15:15:15 compound fertilizer (124-248 kg ha⁻¹) was mostly used by respondents. In Table 4, it was observed that compound fertilizer usage (92.5%) with the rate of 18.52 to 248 kg ha⁻¹ and unused (7.5%). Although the recommend rate of 15:15:15 compound fertilizer for cotton was 248 kg ha⁻¹ (MCSE 2012), most of the fields applied the rate less than 248 kg ha⁻¹. Foliar fertilizer spraying frequency was 1-7 for the whole crop season and mostly applied 3 times. The foliar fertilizers commonly used were cotton special (11.45%), Armo 1 and 2 (23.66%), Comet plus (27.48%) and golden lion products (10.69%). Farmyard manure (5 - 7 tons ha⁻¹) was mainly used by 46.87% of the respondent farmers.

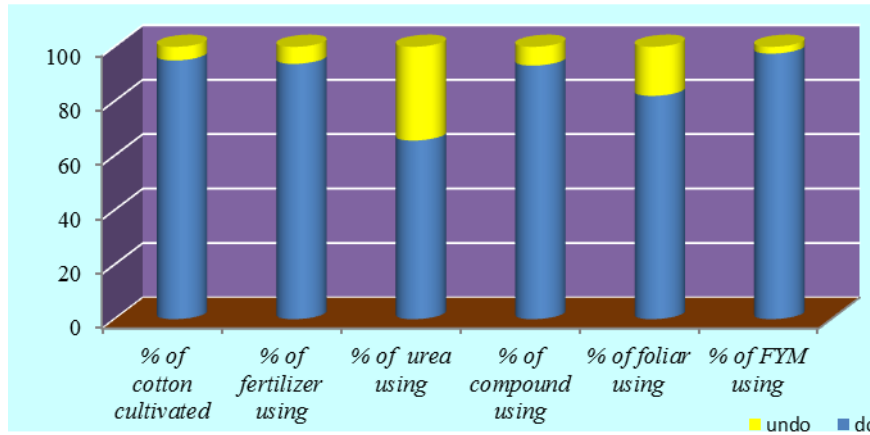


Fig. 2 Farmer’s perception of fertilizers management practices in the study region

Table 3 Distribution of respondents by fertilizer management practices [n = 160]

No	Features	Categories	frequency	Respondents %
1	Cotton cultivated area (ha)	0.2 - 1	52	32.50
		1.1 -2.2	73	45.63
		2.4-4.8	24	15.00
		4.8 - above	3	1.87
2	Urea application (kg ha ⁻¹)	Below 62	25	15.60
		62 -124	76	47.60
		124 - 248	3	1.90
		248 above	1	0.10
3	Compound application(kg ha ⁻¹)	Below 62	22	13.75
		62 - 124	111	69.38
		124 -248	13	8.12
4	Foliar application (time)	1 st	1	0.60
		2 nd	24	15.00
		3 rd	51	31.90
		4 th	42	26.30
		5 th	10	6.30
		6 th	1	0.60
		7 th	2	1.30
5	F.Y.M application (ton ha ⁻¹)	Below 1.5	41	25.63
		2 - 3	75	46.87
		3.5 – 4.5	20	12.50
		5 and above	24	15.00
6	Farmers’ owned area (ha)	0.4-2.0	30	18.75
		2.4-4.0	63	39.37
		4.4-6.0	34	21.25
		6.4-8.0	13	8.13
		8.5-10.0	6	3.75
		10.5-12.0	8	5.00
	12.5 & above	6	3.75	

Source: Survey data

Descriptive Statistics Information of Farmers’ Perception in Survey Area

The mean value of the age of respondent farmers was 53 years. Farmers’ individually owned area was range from 0.6 ha to 16.19 ha. The ranges of total cotton cultivated farm size were 0.2 ha to 7.3 ha and the mean farm size was 1.59 ha. The mean value of urea usage was 55.58 kg ha⁻¹ in cotton crop production in study areas. Some of the sample farmers applied as recommended rate

whereas some of them used less than it. Moreover, the mean value of compound fertilizer was 92.63 kg ha⁻¹ (Table 4.).

The mean seed cotton yield was 1280 kg ha⁻¹ while national target yield was 1600 kg ha⁻¹. Therefore, farmers' actual yield was less than that of target yield. Perhaps, it might be due to the application of fertilizer less than recommended rate. The proportion of farmers' income to price of seed cotton revealed that 2010 kyats per kilogram. The mean value of farmers' income was 2,152,215 kyats. Depending on cultivated area, cotton variety, seed cotton yield, and price of seed cotton in the survey areas, farmers' income was ranging between 1,782,335 kyats and 2,522,096 kyats.

Table 4 Descriptive Statistics information of farmers' perception in survey area (N =160)

Characters	Minimum	Maximum	Mean	Std. Deviation
Age (years)	30.00	79.00	53.27	10.933
Education level	1.00	4.00	1.39	0.761
Total ownership area (ha)	0.60	16.19	4.95	8.106
Cotton cultivated area (ha)	0.20	7.29	1.59	3.049
Urea (kg ha ⁻¹)	3.71	370.50	55.58	0.482
Compound (kg ha ⁻¹)	18.53	248.00	92.63	0.463
Foliar (spraying frequency)	1.00	7.00	2.75	1.590
Farm yard manure (ton ha ⁻¹)	2.47	14.82	6.66	2.677
Seed cotton yields (kg ha ⁻¹)	161.34	3226.81	1280.88	210.263
Seed cotton's Price (Kyats kg ⁻¹)	1306.40	2939.40	2010.63	328.602

Source: Survey data

CONCLUSION

As the study area was situated in dry zone, farmers willing to grow cotton than other crops during dry season. Most of the respondent farmers cultivated *G. hirsutum* variety and cotton sole cropping pattern in the study area of Magway Region. The results indicated that combine application of organic and inorganic fertilizers response to higher cotton yield especially cultivating *G. hirsutum*. If weather is favorable, the farmers realized that fertilizer application could increase crop yields. Results of this survey provided some valuable and applicable ideas for further fertilizer applied research. Cotton is very sensitive to fertilizer management practices. For this reason, farmers should apply fertilizers carefully and precisely. Only a few respondent aware fertilizer application management and effective application of fertilizer in crop production. It is required not only to reduce crop yield losses but also cotton quality should be improved. Therefore, fertilizers application management practices should be systematically trained to farmers in cotton production.

ACKNOWLEDGEMENTS

I wish to express my appreciation to Ministry of Agriculture, Livestock and Irrigation, Director, Department of Industrial Crops Development, and Department of Agriculture for their support in my study. I would like to thank to Magway, Minbu, Pakokku, and Thayet District municipality Agricultural Manager and staff as well as to all the farmers who participated in this interview. A Lot of thank to the Magway Division Manager and staff who kindness and careful in this study survey's journey transportation. I wish to express my mostly thank to my supervisor committee their kindness and good suggestion for way of education.

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