

Chapter VI

Relationships between paddy yield and level of adoption

Rice production practices were introduced by the Department of Agriculture with the aim of sustainable production increase. In the preceding two chapters socio-economic and institutional factors associated with different adoption levels were examined. This chapter focuses on how paddy yield is related with different adoption levels in three rice production practices.

6.1. Annual Yield and Land Preparation and Planting practice

Basic statistics of annual paddy yield of three adoption categories with regard to LPP are summarized in Table 6.1. It shows that non adopted farmers have the lowest average yield while partial adopters have slightly higher yield over adopters in LPP. But partial adopters have highest standard deviation while non adopters have lowest standard deviation.

Table 6.1: Basic statistics of annual paddy yield (t/ha) and adoption level in LPP.

Level of adoption	Number	Mean	SD	SE
Not adopted	87	9.28	1.547	0.166
Partially adopted	40	11.55	1.793	0.283
Adopted	53	11.25	1.621	0.223
Total	180	10.36	1.932	0.144

Median yield is smallest for the adopted category and it is more or less same for other two categories (Figure 6.1). The length of the box, a measure of yield variation, is smallest in non adopted category and highest in partial adopted category. Therefore when annual paddy yield is concerned adopted category shows more stability than partial adopters. However, the non adopted group has quite a few values identified as outliers, meaning that they are more than 1.5 box lengths from the end of the box.

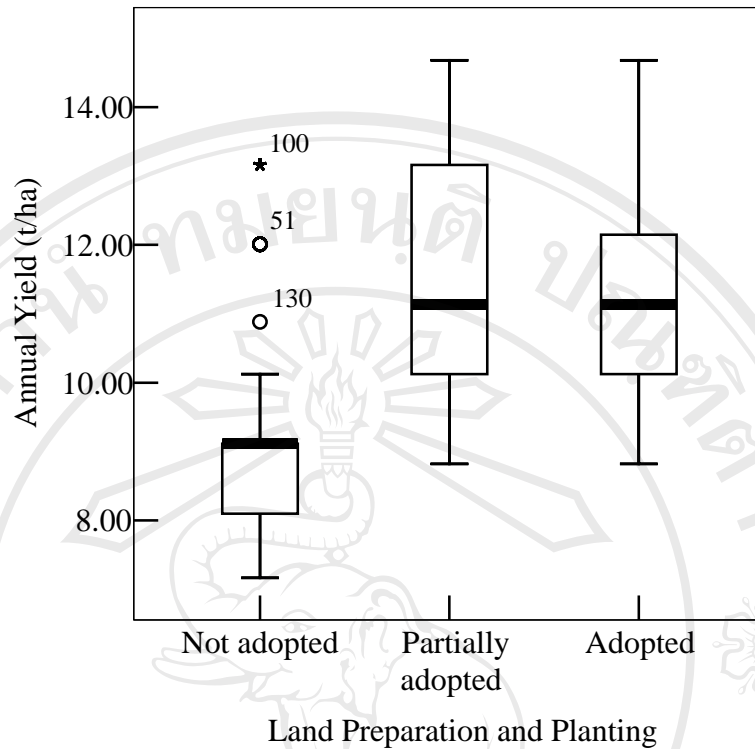


Figure 6.1: Box plot of annual paddy yield of adoption categories in LPP.

Two way ANOVA results for annual paddy yield shows that the annual yields are different among the adoption categories in LPP (Table 6.2). Therefore structure of the differences should be further explored to learn more about the differences. Hence mean differences of annual yield of three adoption categories are compared each other and results are shown in Table 6.3. The differences between pairs of means are in the column labeled *Mean Difference (I-J)*. The columns to the left of the group labels indicate which group is *I* and which group is *J*. It shows that non adopters' mean annual paddy yield is significantly different from adopters' and partial adopters' yield at < 0.001 significance level. However there is no significant yield difference between adopters and partial adopters.

Table 6.2: Two way ANOVA results for annual paddy yield (t/ha) across adoption categories in LPP.

	Sum of Squares	df	Mean Square	F	P-value
Between categories	200.66	2	100.33	37.96	< 0.001
Within categories	467.81	177	2.64		
Total	668.47	179			

Table 6.3: Multiple Comparison of mean annual yield among adoption categories of LPP.

Adopted Category		Mean Difference (I-J)	SE	P-value
(I)	(J)			
Not adopted	Partially adopted	-2.274**	0.328	< 0.001
	Adopted	-1.972**	0.278	< 0.001
Partially adopted	Not adopted	2.274**	0.328	< 0.001
	Adopted	0.301	0.360	0.789
Adopted	Not adopted	1.972**	0.278	< 0.001
	Partially adopted	-0.301	0.360	0.789

**The mean difference is significant at the .05 level.

6.2. Annual yield and soil improvement method practice

It shows that average yield is increasing with increasing level of adoption in SIM. But partial adopters have highest standard deviation while adopters have lowest standard deviation (Table 6.2).

Table 6.4: Descriptive statistics of annual paddy yield (t/ha) and adoption level in SIM.

Level of adoption	Number	Mean	SD	SE
Not adopted	103	10.13	1.941	0.191
Partially adopted	46	10.49	2.053	0.303
Adopted	31	10.95	1.607	0.289
Total	180	10.36	1.932	0.144

Median yield is smallest for the adopted category and it is more or less same for other two categories (Figure 6.2). Yield variation is smallest in adopted category. Therefore when annual paddy yield is concerned adopted category shows more stability than non adopters and partial adopters. However, adopted group has two values identified as outliers, meaning that they are more than 1.5 box lengths from the end of the box.

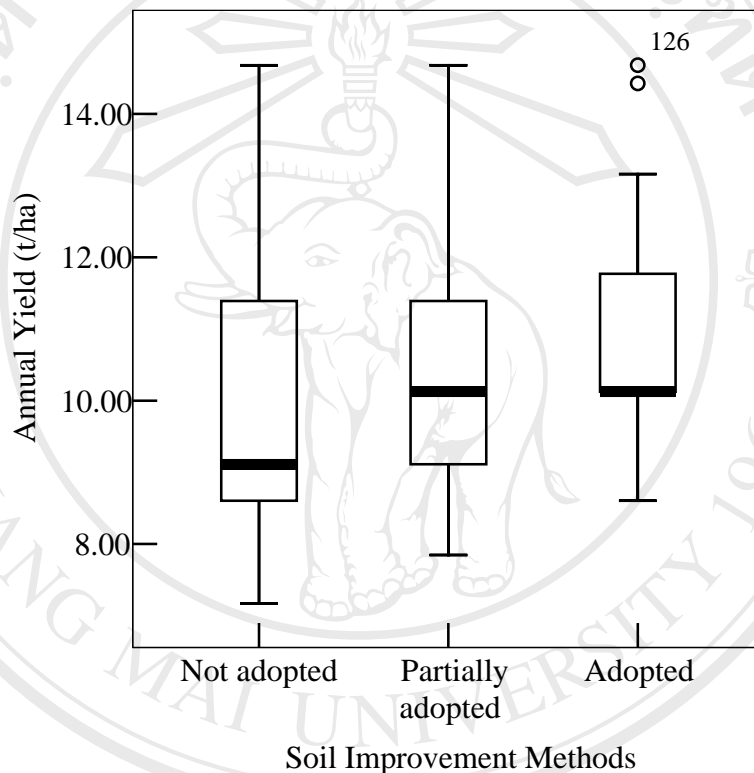


Figure 6.2: Box plot of annual paddy yield of adoption categories in SIM.

Two way ANOVA results for annual paddy yield shows that the significance level is slightly over 0.01 in LPP (Table 6.5). However comparison of mean differences of annual yield of three adoption categories is indicated that only two groups are significantly different from each other. Mean annual paddy yield of not adopted group is significantly different from yield of adopted group at < 0.1 significance level (Table 6.6). However there is no significant yield difference between non adopters and partial adopters or partial adopters and adopters.

Table 6.5: Two way ANOVA results for annual paddy yield (t/ha) across adoption categories in SIM.

	Sum of Squares	df	Mean Square	F	P-value
Between categories	17.08	2	8.54	2.32	0.101
Within categories	651.39	177	3.68		
Total	668.47	179			

Table 6.6: Multiple Comparison of mean annual yield among adoption categories of SIM.

Adopted Category		Mean Difference (I-J)	SE	P-value
(I)	(J)			
Not adopted	Partially adopted	-0.361	0.358	0.681
	Adopted	-0.821*	0.346	0.062
Partially adopted	Not adopted	0.361	0.358	0.681
	Adopted	-0.461	0.418	0.618
Adopted	Not adopted	0.821*	0.346	0.062
	Partially adopted	0.461	0.418	0.618

*The mean difference is significant at the 0.1 level.

6.2. Annual Yield and Use of Agrochemical practice

Basic statistics of annual paddy yield of three adoption categories with regard to UAC are summarized in Table 6.7. It shows that average paddy yield is increasing with increasing level of adoption in UAC. Standard deviation is also increasing with increasing yield among categories.

Table 6.7: Descriptive statistics of annual paddy yield (t/ha) and adoption level in UAC.

Level of adoption	Number	Mean	SD	SE
Not adopted	72	9.08	1.407	0.166
Partially adopted	53	10.89	1.693	0.233
Adopted	55	11.52	1.789	0.241
Total	180	10.36	1.932	0.144

Median paddy yield is increasing with the increasing level of adoption (Figure 6.3). The length of the box, a measure of yield variation, is smallest in non adopted category and highest in partial adopted category. Therefore when annual paddy yield is concerned partial adopted category shows lowest stability. However, the non adopted group has quite a few values identified as outliers, meaning that they are more than 1.5 box lengths from the end of the box.

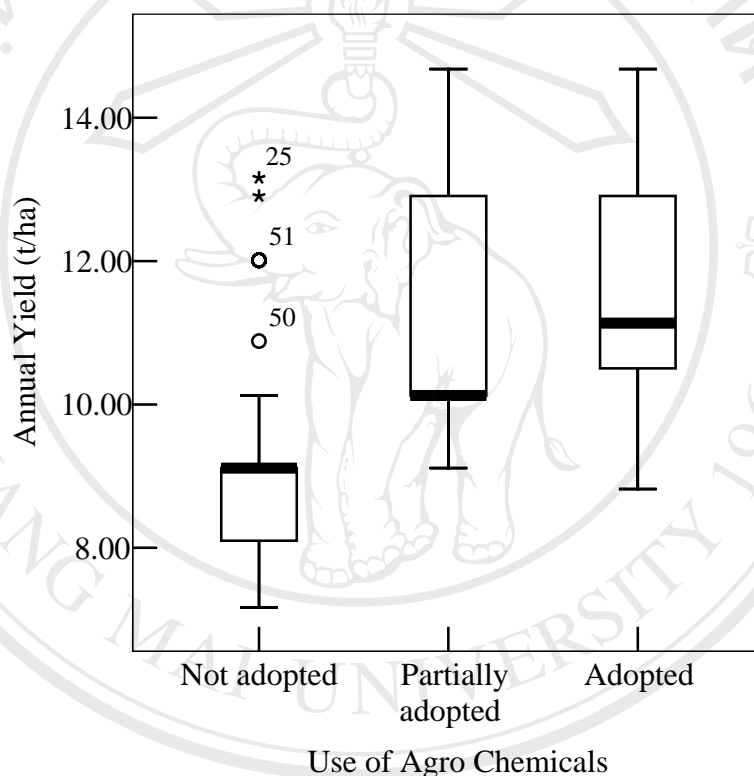


Figure 6.3: Box plot of annual paddy yield of adoption categories in UAC.

Two way ANOVA results for annual paddy yield shows that the annual yields are different in adoption categories in LPP (Table 6.8). Therefore mean differences of annual yield of three adoption categories are compared and results are shown in Table 6.9. It indicates that non adopters' mean annual paddy yield is significantly different from adopters' and partial adopters' yield at < 0.001 significance level. However there is no significant yield difference between adopters and partial adopters.

Table 6.8: Two way ANOVA results for annual paddy yield (t/ha) across adoption categories in UAC.

	Sum of Squares	df	Mean Square	F	P-value
Between categories	206.10	2	103.05	39.45	< 0.001
Within categories	462.37	177	2.61		
Total	668.47	179			

Table 6.9: Multiple Comparison of mean annual yield among adoption categories of UAC.

Adopted Category		Mean Difference (I-J)	SE	P-value
(I)	(J)			
Not adopted	Partially adopted	-1.808	0.286	< 0.001
	Adopted	-2.435	0.293	< 0.001
Partially adopted	Not adopted	1.808	0.286	< 0.001
	Adopted	-0.627	0.335	0.180
Adopted	Not adopted	2.435	0.293	< 0.001
	Partially adopted	0.627	0.335	0.180

**The mean difference is significant at the .05 level.