Profitability Assessment of Intercropping Adlay with Different Grain Legumes

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DOI: https://doi.org/10.51584/IJRIAS.2024.910003

Received: 24 September 2024; Accepted: 27 September 2024; Published: 28 October 2024

ABSTRACT

Adlay is considered as alternative staple food in the region. Low yield was one among the concern in order to address the long maturity days compared to corn and rice. Three (3) grain legumes were evaluated to determine its profitability when intercropped with adlay. It was conducted at Dinas and San Miguel, Zamboanga del Sur for the period 2015-2017.

Intercropping adlay with mungbean revealed highest net return compared to other grain legumes. But all grain legumes intercropped with adlay shows higher net income compared to planting adlay as monocrop.

INTRODUCTION

Intercropping, the agricultural practice of cultivating two or more crops in the same space at the same time, is an old and commonly used cropping practice which aims to match efficiently crop demands to the available growth resources and labor. The most common advantage of intercropping is the production of greater yield on a given piece of land by making more efficient use of the available growth resources using a mixture of crops of different rooting ability, canopy structure, height, and nutrient requirements based on the complementary utilization of growth resources by the component crops (Lithourgidis, et al, 2011).

Adlay (*Coix lacryma jobi L.*) is a crop that can be used as alternative staple and health food that is now being promoted in the Region. Because of the fact that it can be harvested longer than rice and corn, not all farmers are receptive in adopting adlay to be planted with rice and corn for the reason of low yield and long maturity days.

The researcher innovates by intercropping adlay with different grain legumes that could be the source of income while waiting for the adlay to be harvested. This was done by adding a crop without subtracting the number of hills of adlay per hectare. In this way, an increase in income will encourage farmers to grow adlay and eventually help our country to suffice the need for staple food. Thus, this study was realized.

Objectives

General:

Evaluate the economic benefits of intercropping adlay and grain legumes.

Specific:

1. To assess the growth and yield performance of adlay and grain legumes grown as intercrop;
2. To determine the land equivalent ratio (LER) of growing different intercrops;
3. To determine the cost and return of intercropping adlay with grain legumes.

REVIEW OF RELATED LITERATURE

1. Job's tear grows on well drained high lands. Sufficient rains in early stage of growth and a dry period at the time of grain setting are necessary for getting good yields (Dua *et al*., 2009).

2. Weed control is often better in mixed stand; the combine yields of mixture are sometimes greater than pure stands of the individual crops; tends to be greater yield stability; and there may be less pest and diseases problems (Bourke, 1978).

3. Growing and increased number of crops helps to safeguard production from shocks such as drought and intercropping can also help to maintain the productivity of relatively fertile land (Mac Robert *et al*., 2007).

4. Intercropping gives additional income besides adding nutrients to the soil through nitrogen fixation (Villamayor et al., 1980). Furthermore, intercropping in most of its modern forms, can provide more production, employment and even income per unit of land in relation to most cases of monocropping (Navarro et al., 1984).

5. In conventional farming and monocropping systems, although high yield per unit area has been able to provide the nutritional needs of growing populations in some areas, but these systems requires direct and indirect to abundant costs and energy that arise from fossil fuels. In terms of ecology and environment, monocropping has caused a series of serious problems (Mousavi *et al*., 2011).

6. Wiley (1990), considers intercropping as an economic method for higher production with lower levels of external inputs. This increasing use efficiency is important, especially for small-scale farmers and also in areas where the growing season is short (Altieri, 1995).

7. Kuo et al. (2016), report that LERs exceeding 1.5 for legume-cereal intercropping systems are better in utilizing resources such as light, water, and nutrients more efficiently when grown together compared to monocultures.

8. Zhao et al. (2019), documented the profitability of soybean intercropped with cereals due to better soil nutrient utilization and reduced pest pressure.

METHODOLOGY

Location of the Study

On the first year of the study, it was conducted at the extension area of Betinan Research Station situated at Dinas, Zamboanga del Sur on April CY 2016. The area was selected because it was used as organic demo site for adlay production for two (2) years. In addition, it is also the area where the 1st National Adlay Grand Field Day was held and it can also be monitored easily since it is just a neighboring area from Betinan Research Station by which the researchers were assigned.

On the succeeding year, the experiment was conducted in the station at Barangay Betinan, San Miguel, Zamboanga del Sur.

Experimental Design and Layout

Experiment has been laid out in a Randomized Complete Block Design (RCBD) with three (3) replications. Each replication consisted of eight (8) plots which corresponded to the following treatments:

Treatments:

1. Adlay Monoculture (75 x 50 cm recommended spacing)
2. Adlay monoculture 100 x 37.5 cm (modified spacing)
3. Adlay (100 x 37.5 cm) + Mungbean
4. Adlay (100 x 37.5 cm) + Soybean
5. Adlay (100 x 37.5 cm) + Peanut
6. Mungbean monoculture
7. Soybean monoculture
8. Peanut monoculture

Plot Size

Each plot has a size of 3m x 6m or 18 square meters with a total experimental area of 432 square meters.

Statistical Analysis

Results of the experiment were analyzed in ANOVA (Analysis of Variance) using STAR as statistical tool together with cost and return analysis.

Land Preparation

Thorough land preparation was done by plowing and harrowing the field twice.

Method of Crop Establishment

Adlay. Adlay monocropping were established in two different spacing namely: 75 cm x 50 cm and 100 cm x 37.5 cm. However, adlay with intercrops, a spacing of 100 cm x 37.5 cm was used. Sowing of 3 to 4 seeds per hill was done but maintaining only 2 to 3 plants by thinning the remaining plants 2-3 weeks after planting.

Grain Legumes. Planting of legumes were made at the same time in establishing adlay crop. These were established in between the rows of adlay following the recommended rate of seeding whose plant relation varies such as the following:

Mungbean. A spacing 100 cm x 25 seeds per linear meter was used in mungbean intercropping by drilling method and allowing only 20 plants per linear meter 1 to 2 weeks after planting through thinning. In mungbean monoculture, a spacing 50 cm x 25 seeds per linear meter was used. Seeds were drilled and thinning was conducted allowing 20 plants per linear meter 1 to 2 weeks after planting.

Soybean. A spacing 100 cm x 20 seeds per linear meter by drilling was used in soybean intercropping. Whereby, allowing only 15 plants per linear meter 1 to 2 weeks after planting by thinning. In soybean monoculture, a spacing 50 cm x 20 seeds per linear meter by drilling was used and maintaining 15 plants per linear meter by thinning 1 to 2 weeks after planting.

Peanut. A spacing 100 cm x 15 seeds per linear meter was used in peanut intercropping. Drill method was used in sowing and thinning was done maintaining 10 plants per linear meter 1 to 2 weeks after planting. In peanut monoculture, a spacing 50 cm x 15 seeds per linear meter was used. Drill method was used in sowing and maintaining only 10 plants per linear meter by thinning 2 to 3 weeks after planting.

Variety Used

Adlay – Kinampay

Soybean – Manchuria

Mungbean – Pag-asa 21

Peanut – NSIC Pn 15

Fertilization

In the initial study, organic fertilizer (vermicast) was basally applied at the rate of 3 tons per hectare for adlay monoculture; 1.5 tons per hectare for legume monoculture; and 0.75 tons per hectare for legume intercropped.

But on succeeding years of the experiment, fertilizer requirement was based on the soil laboratory analysis with the rate 45-60-0 kg NPK per hectare for Adlay (see Appendix A) and a rate of 20-20-0 kg NPK per hectare for legumes was followed.

Weeding Management

Weeds were controlled by off-barring at 15 days after planting and 30 days after planting with the combination of handweeding.

Yield Sampling Method

Sampling was done at the two center rows of every plot.

RESULTS AND DISCUSSIONS

Yield and Land Equivalent Ratio (LER)

Tables 1, 2, and 3 present yields and Land Equivalent Ratio (LER) data for Adlay intercropped with various grain legumes over three consecutive cropping years: 2015, 2016, and 2017. Each treatment is evaluated based on its yield in tons per hectare (t/ha) and its contribution to land use efficiency as indicated by the LER. It is shown in Table 1 that the yield of adlay mono-crop yields ranged from 1.29 to 1.45 t/ha, depending on the planting density. Higher density (75 x 50 cm) resulted in slightly better yields compared to a wider spacing (100 x 37.5 cm). Adlay intercropped with mungbean obtained a yield of 1.31 t/ha for Adlay and 0.63 t/ha for mungbean monoculture, resulting in an LER of 1.54. This indicates that the combination was highly effective in utilizing land more efficiently than either crop grown alone. Adlay + Soybean and Adlay + Peanut also produced positive LERs of 1.33 and 1.17, respectively. The yields of legume monocultures (mungbean: 1.08 t/ha, soybean: 1.20 t/ha, peanut: 1.39 t/ha) show that while they can be productive, intercropping with Adlay appears to enhance overall land productivity.

Adlay yields increased significantly from the previous year as shown in Table 2, with values reaching 1.85 to 1.92 t/ha. This suggests improvements in agricultural practices, soil health, or climatic conditions. Adlay + Mungbean maintained strong performance with 1.84 t/ha for Adlay and 0.50 t/ha for mungbean, yielding an LER of 1.64, indicating excellent resource use efficiency. While Adlay + Peanut reached the highest Adlay yield of 2.13 t/ha, maintaining an LER of 1.43, emphasizing the potential of this intercrop. Legume monocultures exhibited similar trends, with soybean showing a notable yield of 1.57 t/ha, but still not exceeding the combined yields from intercropping. This trend aligns with previous studies, such as those by Zhang et al. (2010) and Hauggaard-Nielsen et al. (2008), which often report that intercrops may not always surpass monoculture yields due to increased resource competition.

Furthermore, table 3 confirms results from two previous years that Adlay yields increased, reaching 2.02 t/ha. The trend of higher densities favoring yields remains consistent. Intercropping with mungbean yielded 1.85 t/ha for Adlay and 0.41 t/ha for mungbean monoculture, with an LER of 1.44. Adlay + Soybean exhibited strong yields and an improved LER of 1.61, showcasing effective resource sharing. Monoculture yields varied but generally did not exceed the performance of the intercropping systems, supporting the conclusion that intercropping enhances yield and efficiency.

The LER values for Adlay + mungbean in 2015 (1.54), 2016 (1.64), and 2017 (1.44) support findings from studies such as those by Kuo et al. (2016), which report LERs exceeding 1.5 for legume-cereal intercropping systems. This indicates that Adlay and mungbean utilize resources such as light, water, and nutrients more efficiently when grown together compared to monocultures.

The consistent performance of adlay intercropped with soybean and peanut in terms of yield and profitability aligns with findings by Zhao et al. (2019), who documented the profitability of soybean intercropped with cereals due to better soil nutrient utilization and reduced pest pressure. Similar studies have shown that intercropping systems can enhance overall yields through complementary crop interactions (e.g., nutrient uptake, and light interception). For instance, research has indicated that intercropping can lead to LER values significantly above 1, confirming the results observed in this study. Legume intercropping has consistently reported higher economic returns due to reduced input costs and increased outputs. The results from this study affirmed findings from other research that emphasize intercropping's economic advantages. Previous studies have noted that intercropping can improve soil structure, fertility, and biodiversity. This supports the observed increases in yield over consecutive years, suggesting that the intercropping systems contribute to better long-term agricultural sustainability.

Economic Analysis

Result shows that adlay intercropped with legumes generally provides higher income compared to planting it as monocrop. In table 4, among the legumes intercropped with adlay, Treatment 3 (adlay + mungbean) obtained the highest net income of Php 36,100.00 which is much higher compared to Treatment 6 (mungbean mono) that is Php 22,150.00. Adlay + soybean (T4) and adlay + peanut (T5) both obtained higher yield compared to soybean and peanut monoculture that obtained Php 21,200.00 and Php 16,950.00 respectively.

Table 5 revealed further and confirms the CY 2015 results that intercropping provides increase net income compared to planting the crop as monoculture. Adlay + mungbean (T3) doubled the net income of mungbean monoculture (T6) which obtained the highest net income of Php 48,740.00. It is followed by adlay + peanut (T5) Php 41, 940.00 and adlay + soybean (T4) which is Php 39,240.00.

However, table 6, further shows that adlay + mungbean (T3) is more profitable than other intercropping with a net income of Php 41,940.00. It is followed by adlay + soybean (T4) and adlay + peanut (T5) with a net income of Php 41,940.00 and Php 34,960.00 respectively.

Lowest net income obtained by adlay monocrops during the first year of the study was affected by the high cost of farm inputs such as organic fertilizer. While income of mungbean intercropping was contributed by higher farm gate price of mungbean compared to other commodities such as soybean and peanut.

The Adlay + mungbean treatment shows a substantial net return, indicating that the combination of crops leverages the high value of mungbean to enhance profitability despite the overall yield being lower than monocultures like mungbean alone. Mungbean monoculture produced a total gross return of Php 54,000 with a net return of Php 22,150. This suggests that while it yields well even when planted alone, intercropping with Adlay still provides a competitive return, demonstrating the effectiveness of resource sharing and risk diversification. The results suggest that farmers should consider not just yield but also market dynamics when deciding on cropping systems. Intercropping offers a potential pathway to enhance overall profitability through diversified income streams.

Treatments that did not show significant differences in yield, such as Adlay + peanut (1.09 t/ha with an LER of 1.17 in 2015), can still yield profitable returns due to the market prices of legumes. The higher market value of legumes compared to Adlay (e.g., peanut priced at Php 40.00/kg vs. Adlay at Php 30.00/kg) contributes significantly to overall gross returns, as reflected in Tables 4, 5, and 6. The costs associated with intercropping can often be lower than those for monocultures due to shared inputs (like labor and fertilizers) and reduced weed pressures. Research by Snapp et al. (2005) found that intercropping could decrease input costs by improving resource efficiency, which is evident in this study where treatments with legumes showed favorable net returns despite lower yields.

Intercropping provides multiple products from the same area, which can help mitigate market risks. For instance, in years where Adlay yields were lower, the presence of legume yields allowed for an overall profitable outcome. This is confirmed with studies by Zhang et al. (2021), which highlight that diversification through intercropping can lead to reduced income volatility for farmers. The long-term benefits of intercropping include enhanced soil health through improved organic matter and nutrient cycling, leading to potentially better yields in subsequent cropping years. This is further supported by research by Francis et al. (2003), who emphasized that sustainable practices like intercropping can lead to cumulative benefits in yield over time, reinforcing the profitability argument.

Return on Capital

Highest return on capital (ROC) for the first and second year (see figure 1 and 2) of the study was obtained by T3 (adlay + mungbean) that is 104.03% and 133.68% respectively. However, on the third year (see figure 3) of the study T6 (Mungbean Mono) obtained the highest ROC of 135.47% followed by adlay mono (T1) which is 137.27%. While on the intercrops, adlay+mungbean (T3) obtained 119.69% followed by adlay + soybean (T4) and adlay + peanut (T5) which are 113.47% and 88.98% respectively.

Treatments involving Adlay + mungbean likely show the highest ROC, reflecting both a reasonable yield and lower costs, making it a favorable option for farmers. Monocultures such as mungbean and peanut may exhibit competitive ROIs, demonstrating the potential of high-value crops. While treatments with Adlay alone or Adlay + peanut may yield lower ROIs due to higher production costs relative to returns on the first year of implementation.

The ROC for Adlay + peanut may show improvement compared to the first cropping season, indicating potential adjustments in practices or market conditions that enhance profitability. The treatments with Adlay + mungbean and Adlay + soybean likely maintain or increase their ROC, reinforcing the financial viability of these intercropping systems. Consistency in high ROIs across multiple seasons suggests that certain intercropping combinations are robust options for farmers, helping them mitigate risks associated with market fluctuations and crop failures.

Overall ROC may show an upward trend, highlighting improvements in farming practices or changes in market prices that favor these cropping systems. Intercropping systems such as Adlay + soybean and Adlay + mungbean may demonstrate particularly high ROIs, suggesting continued investment in these combinations is worthwhile. The figures indicate a positive trajectory in capital returns, reflecting effective resource utilization and the financial benefits of diversifying crop systems.

The analysis across the three years shows that intercropping systems can sustain high returns on capital, which is crucial for long-term viability in agriculture. The variations in ROC highlight the importance of adapting to market conditions and crop performances over time. Farmers can optimize returns by selecting the right combinations based on both yield potential and market prices. These figures underscore the value of strategic planning in crop selection and management practices to maximize profitability. Farmers should prioritize treatments that consistently yield high ROC over multiple cropping seasons.

CONCLUSION AND RECOMMENDATION

Conclusion

The results of the intercropping experiments with Adlay and various grain legumes illustrate a convincing circumstance for intercropping as a strategy for enhancing both yield and profitability in agricultural systems. The observed LER values indicate effective land use, while the economic analyses highlight how market dynamics and cost efficiencies can make intercropping profitable even when individual crop yields do not show significant differences. These findings align well with the broader literature on intercropping, reinforcing its viability as a sustainable agricultural practice that enhances resilience and economic stability for farmers.

The analysis of yield, Land Equivalent Ratio (LER), and economic performance from the intercropping of Adlay with various grain legumes across three cropping seasons reveals the effectiveness of intercropping systems in enhancing agricultural productivity and profitability. The results indicate that intercropping not only maintains competitive yields but also provides a favorable LER, suggesting efficient land use. The combination of Adlay with mungbean consistently demonstrated higher yields and LER values, highlighting its potential as a beneficial intercropping strategy.

Moreover, the economic analyses across the cropping years show that while some treatments did not yield statistically significant differences, they still resulted in profitable net returns. Planting adlay as sole crop can also be profitable but result shows that with intercrops it will provide higher income. Treatments like Adlay + mungbean and Adlay + soybean showed strong financial outcomes, making them attractive options for farmers looking to maximize profitability while maintaining sustainability. By understanding these trends, farmers can make informed decisions that enhance both their profitability and sustainability in the agricultural landscape.

Recommendation

As revealed on the results, mungbean is the most profitable intercropped for adlay among the three grain legumes. As it shows highest net return and ROC among the three treatments with intercrops.

While peanut and soybean can also be intercropped with adlay since it also shows highest net return compared to planting soybean and peanut solely. But among the three intercrops, intercropping adlay with mungbean is the most profitable due to higher farm gate price of mungbean compared to soybean and peanut.

Intercropping adlay with grain legumes revealed to be more profitable than mono cropping. However, further verification of this packaged of technology must be done in farmers' field through conduct trials to determine the optimal planting densities and configurations for different legume combinations with Adlay to maximize yield and profitability to determine further factors that contributes to the yield obtained by different treatments.

The analysis across the three years shows that intercropping systems can sustain high returns on capital, which is crucial for long-term viability in agriculture. The variations in ROC highlight the importance of adapting to market conditions and crop performances over time. Farmers can optimize returns by selecting the right combinations based on yield potential, market price, and demand considerations. These figures underscore the value of strategic planning in crop selection and management practices to maximize profitability. Farmers should prioritize treatments that consistently yield high ROC over multiple cropping seasons. Regular market analysis can help farmers make timely decisions regarding crop selection and maximize their returns. Farmers should consider implementing intercropping systems, particularly combinations like Adlay + mungbean and Adlay + soybean, which have proven to be both productive and profitable. Educational programs and agricultural extensions should be tailored to facilitate the adoption of these systems. Further research is recommended to examine the long-term benefits of intercropping on soil health, pest resistance, and overall farm sustainability. Understanding these aspects can help farmers make informed decisions regarding crop rotation and intercropping practices.

Table 1. Yield and Land Equivalent Ratio (LER) of Adlay and Different Grain Legume Intercrops, 1st Cropping 2015

Treatments	Yield (t/ha)		LER
	Adlay*	Legume	
1. Adlay 75 x 50 cm	1.45	-	1
2. Adlay 100x 37.5 cm	1.29	-	1

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue X October 2024

3. Adlay + mungbean	1.31	0.63	1.54
4. Adlay + soybean	1.34	0.42	1.33
5. Adlay + Peanut	1.09	0.51	1.17
6. Mungbean mono	-	1.08	1
7. Soybean mono	-	1.20	1
8. Peanut mono	-	1.39	1

* c.v. = 9.113%

*not significant at 5% level of significance

Table 2. Yield and Land Equivalent Ratio (LER) of Adlay and Different Grain Legume Intercrops, 2nd Cropping 2016

Treatments	Yield (t/ha)		LER
	Adlay*	Legume	
1. Adlay 75 x 50 cm	1.92	-	1
2. Adlay 100x 37.5 cm	1.85	-	1
3. Adlay + mungbean	1.84	0.50	1.64
4. Adlay + soybean	1.79	0.75	1.43
5. Adlay + Peanut	2.13	0.41	1.43
6. Mungbean mono	-	0.76	1
7. Soybean mono	-	1.57	1
8. Peanut mono	-	1.35	1

* c.v. = 6.7%

*not significant at 5% level of significance

Table 3. Yield and Land Equivalent Ratio (LER) of Adlay and Different Grain Legume Intercrops, 1st Cropping 2017

Treatments	Yield (t/ha)		LER
	Adlay*	Legume	
1. Adlay 75 x 50 cm	2.02	-	1
2. Adlay 100x 37.5 cm	1.96	-	1
3. Adlay + mungbean	1.85	0.41	1.44
4. Adlay + soybean	1.94	0.69	1.61
5. Adlay + Peanut	1.79	0.51	1.24
6. Mungbean mono	-	.81	1

7. Soybean mono	-	1.08	1
8. Peanut mono	-	1.51	1

* c.v. = 5.45%

*not significant at 5% level of significance

Table 4. Economic Analysis of Adlay and Legume Intercrops, 1st Cropping 2015

Treatments	Adjusted Yield (t/ha.)		Total Gross Return (Php/ha)			Total Cost of Production (Php/ha)	Total Net Return (Php/ha)
	Adlay (14% MC)	Legume (12% MC)	Adlay	Legume	Total		
1. Adlay 75 x 50 cm	1.45	-	43,500	-	43,500	40,800	2,700
2. Adlay 100x 37.5 cm	1.29	-	36,000	-	36,000	40,800	-4,800
3. Adlay + mungbean	1.31	0.63	39,300	31,500	70,800	34,700	36,100
4. Adlay + soybean	1.34	0.42	40,200	14,700	54,900	33,700	21,200
5. Adlay + Peanut	1.09	0.51	32,700	20,400	53,100	36,150	16,950
6. Mungbean mono	-	1.08	-	54,000	54,000	31,850	22,150
7. Soybean mono	-	1.20	-	42,000	42,000	34,550	7,450
8. Peanut mono	-	1.39	-	55,600	55,600	40,950	14,650

Farm Gate Price of crops/kg used in the analysis.

Adlay=Php 30.00

Mungbean =Php 50.00

Soybean = Php 35.00

Peanut = Php 40.00

Table 5. Economic Analysis of Adlay and Different Legume Intercrops, 2nd Cropping 2016

Treatments	Adjusted Yield (t/ha)		Gross Return (Php/ha)			TOTAL COSTS OF PROD'N (Php/ha)	TOTAL NET RETURN (Php/ha)
	Adlay (14% MC)	Legume (12%MC)	Adlay	Legumes	Total		
1. Adlay 75 x 50 cm	1.92	-	57,600		57,600	25,540	32,060

2. Adlay 100x 37.5 cm	1.85	-	55,500		55,500	25,540	29,960
3. Adlay + mungbean	1.84	0.50	55,200	30,000	85,200	36,460	48,740
4. Adlay + soybean	1.79	0.75	53,700	22,500	76,200	36,960	39,240
5. Adlay + Peanut	2.13	0.41	63,900	16,400	80,300	39,210	41,090
6. Mungbean mono	-	0.76	-	45,600	45,600	20,640	24,960
7. Soybean mono	-	1.57	-	47,100	47,100	21,640	25,460
8. Peanut mono	-	1.35	-	54,000	54,000	26,140	27,860

Farm Gate Price of crops/kg used in the analysis.

Adlay=Php 30.00

Mungbean =Php 60.00

Soybean = Php 30.00

Peanut = Php 40.00

Table 6. Economic Analysis of Adlay and Different Legume Intercrops, 1st Cropping 2017

Treatments	Adjusted Yield (t/ha)		Gross Return (Php/ha)			TOTAL COSTS OF PROD'N (Php/ha)	TOTAL NET RETURN (Php/ha)
	Adlay* (14% MC)	Legume (12%MC)	Adlay	Legumes	Total		
1. Adlay 75 x 50 cm	2.02		60,600		60,600	25,540	35,060
2. Adlay 100x 37.5 cm	1.96		58,800		58,800	25,540	33,260
3. Adlay +mungbean	1.85	0.41	55,500	24,600	81,100	36,460	43,640
4. Adlay + soybean	1.94	0.69	58,200	20,700	78,900	36,960	41,940
5. Adlay + Peanut	1.79	0.51	53,700	20,400	74,100	39,210	34,890
6. Mungbean mono		.81		48,600	48,600	20,640	27,960
7. Soybean mono		1.08		32,400	32,400	21,640	10,760
8. Peanut mono		1.51		60,400	60,400	36,140	24,260

Farm Gate Price of crops/kg used in the analysis.

Adlay=Php 30.00

Mungbean =Php 60.00

Soybean = Php 30.00

Peanut = Php 40.00

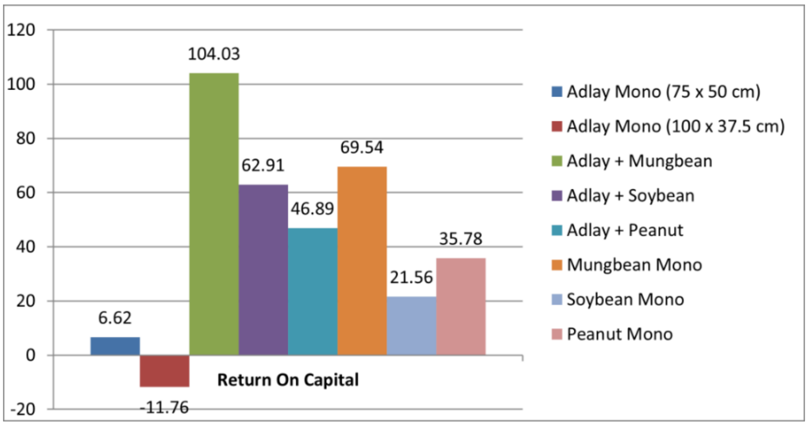

Figure 1. Return on Capital of the Different Treatments on the Profitability Assessment on Adlay Intercropped with Different Grain Legumes, 1st Cropping 2015

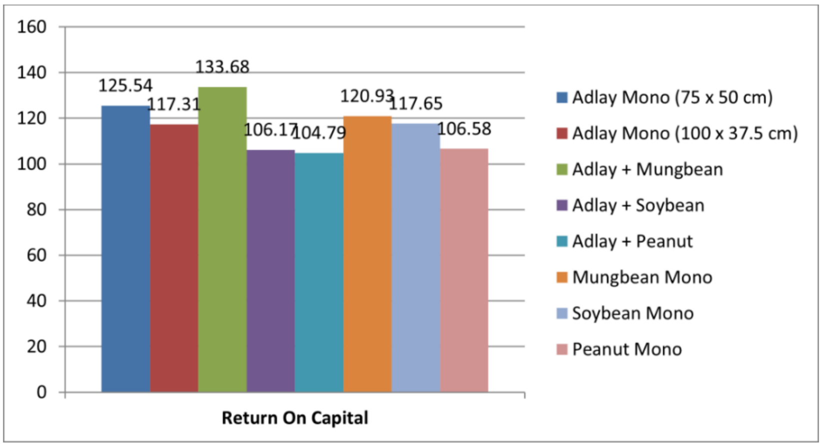

Figure 2. Return on Capital of the Different Treatments on the Profitability Assessment on Adlay Intercropped with Different Grain Legumes, 2nd Cropping 2016

Figure 3. Return on Capital of the Different Treatments on the Profitability Assessment on Adlay Intercropped with Different Grain Legumes, 1st Cropping 2017

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue X October 2024

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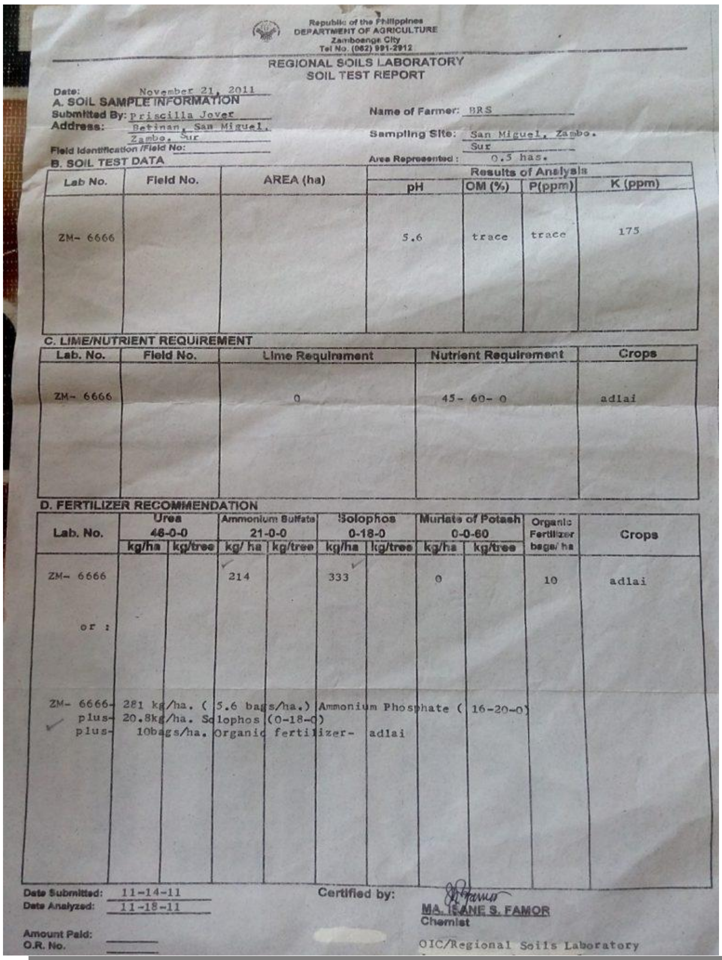
APPENDICES

APPENDIX A. Result of Soil Laboratory Analysis, 2011



Republic of the Philippines
DEPARTMENT OF AGRICULTURE
Zamboanga City
Tel No. (062) 991-2912

REGIONAL SOILS LABORATORY
SOIL TEST REPORT

Date: November 21, 2011

A. SOIL SAMPLE INFORMATION

Submitted By: Priscilla Jover
Address: Betinan, San Miguel, Zambo. Sur
Field Identification /Field No:
Name of Farmer: BRS
Sampling Site: San Miguel, Zambo. Sur
Area Represented : 0.5 has.

B. SOIL TEST DATA

Lab No.	Field No.	AREA (ha)	Results of Analysis pH	OM (%)	P(ppm)	K (ppm)
ZM- 6666			5.6	trace	trace	175

C. LIME/NUTRIENT REQUIREMENT

Lab. No.	Field No.	Lime Requirement	Nutrient Requirement	Crops
ZM- 6666		0	45- 60- 0	adlai

D. FERTILIZER RECOMMENDATION

Lab. No.	Urea 46-0-0		Ammonium Sulfate 21-0-0		Solophos 0-18-0		Muriate of Potash 0-0-60		Organic Fertilizer bags/ ha	Crops
	kg/ha	kg/tree	kg/ ha	kg/tree	kg/ha	kg/tree	kg/ha	kg/tree		
ZM- 6666			214		333		0		10	adlai
or :										

ZM- 6666- 281 kg/ha. (5.6 bags/ha.) Ammonium Phosphate (16-20-0)
plus- 20.8kg/ha. Solophos (0-18-0)
plus- 10bags/ha. Organic fertilizer- adlai

Date Submitted: 11-14-11
Date Analyzed: 11-18-11
Amount Paid:
O.R. No.

Certified by:
MA. ISANE S. FAMOR
Chemist
OIC/Regional Soils Laboratory