A Comprehensive Evaluation of Irrigation Performance and Factors Influencing IPAIR Payment: A Case Study in East Java, Indonesia

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Abstract. Irrigation is an activity of flowing, regulating, and controlling water on a farmer's land based on a certain quantity and period. However, the management of irrigation performance has not been optimal, causing various impacts, especially the imbalance in IPAIR payments. So this study focuses on assessing irrigation performance conditions and analyzing the factors that influence IPAIR payment in Jatimulyo Village. The research area is intentionally or *purposive method* namely in Jatimulyo Village, Jenggawah District, Jember Regency. The type of data used is primary and secondary data. Data collection methods were carried out through interviews and literature studies. The irrigation performance analysis method refers to PUPR Ministerial Regulation No. 12/PRT/M/2015, different test analysis is used to determine inequality in IPAIR payments and multiple linear regression analysis to determine the factors that influence IPAIR payments. The results of the study show that 1) the performance index of secondary and tertiary irrigation is 82% and 77% and both are included in the criteria of good performance. 2) The inequality of IPAIR payments in planting season 3 was greater, namely 54% compared to planting seasons one and two, which were only 37.49% and 34%. 3) Factors that affect IPAIR payments in Jatimulyo Village during planting seasons 1, 2, and 3 are crop productivity, farmer income levels, timeliness of water distribution, and farmer satisfaction with performance growing *up* Meanwhile, the factor of ease of flow of water and suitability of the amount of water given only affects the growing season 3.

Keywords: Irrigation performance, IPAIR payments, factors analysis

INTRODUCTION

Agriculture is the largest sector in the use of water, especially for irrigation needs [1]. As much as 70% of water use in the world is used for the agricultural sector, 22% for industrial needs and 8% is used for community needs. In 2019 the use of water for agriculture was 80%, this value is higher than in 2018 which was only 66%. This condition indicates that the need for water for irrigation is still relatively high even though the available agricultural land tends to decrease. Irrigation management carried out by individual farmers creates conditions of inefficiency in irrigation management so that the government forms an organization tasked with managing irrigation systems. In 1987 the government formed the Association of Water User Farmers (HIPPA) which has the role of managing irrigation networks [11]. The HIPPA organization acts as a forum for water-using farmers fairly and sustainably in the framework of developing and managing quality irrigation systems. Based on East Java Regional Regulation No. 3 of 2009 states that the development and management of irrigation systems is carried out by encouraging the role of HIPPA in the development and management of water by paying attention to every irrigation stakeholder based on the principles of integration, transparency, environmental insight and justice [2].

Although the role of HIPPA in managing irrigation systems tends to increase, it does not rule out the possibility of irrigation problems, especially in the scope of regions in Indonesia. According to the Ministry of Public Works and Public Housing (2019), the reliability of irrigation in Indonesia is still low because 6,383,626 hectares (89.3%) still rely on river areas which cannot be managed optimally [3]. The total area of surface irrigation that can be utilized is only 7.1 million ha or around 78% of the total national irrigation area of 9,136 million ha. On the other hand, the national irrigation capacity is only 56.89 m^3/capita/second which should have reached 1,979 m3/per capita/second [4]. Moreover, irrigation facilities and infrastructure in Indonesia were also damaged by 46% or the equivalent of 3.3

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or the equivalent of 3.3 million ha. This condition is caused by the low management of the irrigation system which ultimately has an impact on decreasing irrigation performance [5].

Irrigation performance conditions directly impact the amount of conformity of IPAIR payments from farmers to irrigation agencies. Several studies have identified various irrigation performances in the primary-secondary or tertiary areas and the impact on the condition of IPAIR payments. Research using the Likert scale scoring method and Force Field Analysis indicates that the performance of HIPPA Tirta Sari irrigation is still relatively low [6]. This is due to the low level of financial management and the condition of the irrigation canals. The low of irrigation causes the institution's cash income, which is obtained from payment of fees from farmers, often does not match the amount that has been set. As a result, HIPPA is not able to optimally manage institutional finances which has an impact on minimal maintenance activities for irrigation canals. The results of this study are in line with research conducted in the Delta Brantas Irrigation Area where the specified water value is Rp. 276,-/m3 or Rp. 2,108,916,-/Ha, while the maximum water contribution that can be paid is up to the ATP limit, which is Rp. 99,-/m3 or Rp. 756,459,-/Ha [7]. This value has a significant discrepancy. This condition is caused by the low service or performance of water management institutions [12]. The value of ATP and WTP is in line with the quality of service and performance provided [4]. The better the service, the farmer's ATP and WTP values also increase, but conversely if the quality of service provided is low, the farmer's ATP and WTP values also decrease [14]. The fees for setting irrigation water tariffs paid by farmers were determined through deliberations of P3A members [8]. Willingness to pay irrigation tariffs depends on irrigation performance in a certain season, meaning that the better the irrigation performance, the closer to perfect the willingness to pay tariffs [9].

Based on this background, this research focuses on studying or evaluating irrigation performance in secondary and tertiary areas as well as the factors influencing IPAIR payments in Jatimulyo Village. Similar studies have been carried out by various parties, but only in terms of the performance of primary-secondary irrigation or tertiary. In addition, in terms of IPAIR, there has been no study that comprehensively examines the level or percentage of IPAIR payments in an area and what factors cause inequality to occur. The data used is primary data obtained from interviews with observers and UPT staff in the Ambulu area, HIPPA institutions and farmers who use irrigation water. The main contribution of this research is to optimize IPAIR payments and irrigation performance by assessing every aspect of physical infrastructure, plant productivity, supporting facilities, operation and maintenance, documentation and personnel or HR conditions.

METHOD

This study uses secondary data from 34 provinces of Indonesia. Indonesia is one of the countries The research area was determined purposively or purposively, namely in Jatimulyo Village, Jenggawah District, Jember Regency, with a research period from May 2022 to March 2023. The research method used was descriptive quantitative. The type of data used is primary and secondary data. Methods of data collection are done through interviews and literature. The informant determination method used was purposive sampling and proportionate random sampling. Informants involved in this study included irrigation observers, the chief of secondary irrigation officers, the chairman of IHIPPA (*Induk HIPPA)*, the chairman of HIPPA and their respective growing *up in* Jatimulyo Village and farmers who use irrigation water. The data that has been obtained is analyzed using various methods, namely the evaluation of irrigation performance which refers to the Minister of PUPR No. 12/PRT/M/2015, different test analyses to determine IPAIR payment inequality and multiple linear regression analysis to determine the factors that influence IPAIR payment inequality in Jatimulyo Village, Jenggawah District, Jember Regency.

Different test analysis in the study was used to calculate the value or significance level of differences in IPAIR payments in each rice planting season 1, 2 and corn planting. The mathematical formula for the paired t-test according to (Norfai, 2013) is as follows:

$$t = \frac{d}{SD\_d/\sqrt{n}} \quad \textbf{(1)}$$

Information:
t = Calculated t value
d = Average difference between measurements 1 and 2
SD_d = standard deviation of the difference between measurements 1 and 2
n = Number of samples.

Interpretation of the paired sample t-test can be done if it has been determined:
- α value

- Df (degree of freedom)=N-1
- Compare the t-calculated value with the t-table value

If the calculated t value has been found, then compare it with the t table value with a significance of 95%.

The comparison value obtained can be decided according to the following criteria:
T table > T count = Ho accepted or Ha rejected
T table < T count = Ho rejected or Ha accepted

The equation model used is a multiple linear regression analysis. The independent variables in this research are the frequency of water supply, distance of land to irrigation networks, plant productivity, land ownership status, and farmer's income level. Meanwhile, the dependent variable is the IPAIR value paid by farmers. This analysis method uses the SPSS (Statistical Product and Service Solution) program. The multiple linear regression equation model is as follows:

$$Y = a + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta X5 + \beta 6X6 + \beta 7X7 + \beta 8X8 + \beta 9X9 + e \quad \textbf{(2)}$$

Description:
Y = IPAIR value paid by farmers (Rp/Season).
a = Constant.
β = Regression Coefficient.
$X1$ = frequency of water supply (times/season).
$X2$ = distance of land to irrigation network (meters).
$X3$ = plant productivity (tons/ha).
$X4$ = land ownership status (1 own land, 2 rented, 3 leased, 4 profit sharing).
$X5$ = farmer income level (Rp/season).
$X6$ = level of ease of flowing water (1 very easy, 2 easy, 3 difficult, 4 very difficult)
$X7$ = Suitability of the amount of water given (1 is very suitable, 2 is suitable, 3 is not suitable, a 4 is not suitable).
$X8$ = timeliness of water administration (1 is very precise, 2 precise, 3 is not precise, 4 not stunned)
$X9$ = Farmer satisfaction with ulu-ulu performance (1 very satisfied, 2 satisfied, 3 less than satisfied, 4 not satisfied.

RESULTS

General Description of The Secondary-Tertiary Irrigation Area of Jatimulyo Village

The research was conducted in Jatimulyo Village, Jenggawah District, Jember Regency. The observed irrigation area is a secondary-tertiary flow from DI Talang which has a total area of 8167 ha of rice fields. The following is a map of the irrigation observation area

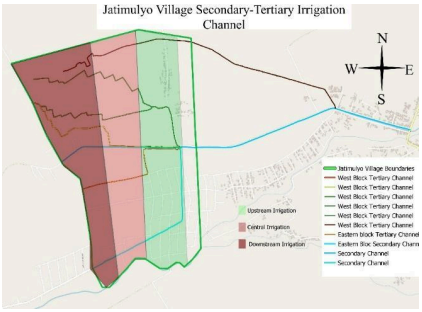

FIGURE 1. Primary, Secondary and Tertiary irrigation canal schemes

Based on the picture above, shows that the secondary irrigation area is the length of the flow with the blue line, while the tertiary area is on the green dividing line. The tertiary area is divided into three strata, namely the upstream, middle and downstream irrigation areas. Determination of irrigation area strata refers to the distance from the intake gate building channel from secondary to tertiary. Irrigation canals for secondary areas are managed by UPT irrigation observers for the Ambulu area with watergate openers and secondary canal cleaning officers. In addition, the scope of the organization in the secondary area is *GHIPPA Tirtomanunggal* which is a combination of a single HIPPA in one area of UPT observers in Talang. Meanwhile, the tertiary area is managed by *HIPPA Tirtowangi. HIPPA Tirtowangi* has 15 technical officers whose job is to channel water from the tertiary canals to the farmers' paddy fields. The area of agricultural land in Jatimulyo Village is 370 Ha with an area of irrigated land managed by *HIPPA Tirtowang*i of 286 Ha.

Secondary-Tertiary Irrigation Performance

Assessment of the performance of secondary-tertiary irrigation consists of six parameters, each of which has a decision-making weight. Each weight obtained will be added up to obtain an irrigation system performance index. Performance evaluation in this study was divided into three, namely in the secondary, tertiary and overall recapitulation of secondary and tertiary irrigation networks. The results of calculations for each weight of secondary and tertiary irrigation areas are presented in the following table:

TABLE 1. Assessment of secondary-tertiary irrigation performance

No	Secondary irrigation channel			Tertiary irrigation channel			Total value
	Parameter	Existing weight (%)	Weight(20%)	Parameter	Existing weight (%)	Weight (80%)	
1	Physical Infrastructure	35	28	Physical Infrastructure	18	3,6	31,6
2	Plant productivity	12,5	10	Plant productivity	11	2,2	12,2
3	Supporting facilities	8,7	6,96	Operational and maintenance conditions	13,5	2,7	9,66
4	Personnel organization	13	10,4	OP/Org/HR officer	14	2,8	13,2
5	Documentation	4,5	3,6	Documentation	4,5	0,9	4,5
6	GP3A/IP3A	8	8	P3A	16	3,2	11,2
Amount		**82**	**66,9**		**77**	**15,4**	**78,36**

Source: *Processed primary data, 2022*

Table 1 shows the results of evaluating the performance of secondary and tertiary irrigation and the total value of the overall performance between secondary and tertiary irrigation. The weight value obtained for the secondary canal physical infrastructure parameters is 35 percent of the total weight of 45% which indicates that the level of damage is classified as moderate and ranges from 20-40%. This means that all physical infrastructure such as carrier buildings, conveyance channels, conveyance channels, drainage channels, access roads, housing and warehouses are still functioning properly and require maintenance that is not classified as intense. The physical infrastructure that needs the most attention is the carrier canal, carrier canal building and operation information board because it has several damages such as leaks, and inadequate facilities. Meanwhile, the tertiary channel weights 18% of the maximum weight of 25%. The performance index of physical infrastructure parameters obtained a value of 72% or the level of damage is classified as moderate or ranging from 20-40%. Damage to physical infrastructure causes the flow of water to be obstructed, causing various problems such as paddy fields in the downstream areas not getting water, some holes reduce water discharge and there is a risk of flooding which can damage plants [10].

The value obtained on the productivity parameters of secondary canal plants is 12.5% of the total weight of 15%. This means that plant productivity is classified as having good performance and has a value of 83%. Plant productivity along the observation area of the secondary canal has a cropping index of 300% meaning that it can be

planted 3 times a year. In addition, the average productivity of paddy obtained is 6.5 tons or higher compared to the average productivity of Jember Regency which only reaches 5.4 tons/ha. Parameters of plant productivity in the tertiary channel the weight obtained is 11% from 15%. The performance index obtained on this parameter is 73% or the performance is classified as good. The cropping index was obtained at 241% of 300% or quite good because throughout the year you can still plant 3 times. However, the productivity of rice plants is only 4.7 tons/ha or lower than the average productivity of rice plants in Jember Regency, which reaches 5.2%.

Parameters of supporting facilities in the secondary channel weight 8.7% of 10% while in the tertiary channel it is 13.5% of the total weight of. On the secondary channel. Channel maintenance facilities have been provided by the UPT service. Irrigation supervisor so as not to use personal equipment. In addition, official vehicles have also been provided for transportation for operational activities. Meanwhile, the tertiary channel obtained a weight value of 13.5% from 20%. The performance index value obtained is 67% or classified as quite good performance. The operating and maintenance conditions had several drawbacks at the study site as well as a lack of capacity growth in the distribution of water when the debit is small, the cleaning of the channels is not good and there are no facilities and infrastructure for cleaning.

Parameters of personnel organization are used to measure the condition of human resources for irrigation officers at the secondary level, such as understanding the boundaries of the assigned tasks, the number of irrigation officers and the position status of irrigation officers. The weight obtained is 13% of the total weight of 15%. The index obtained on this parameter is 93% or very good performance. This means that each officer understands their respective duties and limitations by the AD/ART provided. In the tertiary channel, the weight value obtained is 4.5 out of 5% with a performance index of 93% or classified as very good performance. This index indicates if the ability of irrigation officers to interact with farmers and manage irrigation has been trained. This condition occurs because the average has been an irrigation officer for more than 10 years so they understand field conditions.

The documentation parameter refers to the condition of the completeness of supporting facilities such as the availability of irrigation area books and managed irrigation schemes or maps. The index value obtained is 90% with a weight of 4.5% of 5%. This condition is classified as a very good performance because of the office of the irrigation officer, especially at the UPT. The Irrigation Supervisor already has an irrigation area book complete with network area, number of villages and total land. Meanwhile, in the tertiary irrigation area, the weight of the documentation parameters obtained was 4.5% of 5% with a performance index of 90% or classified as good performance. *HIPPA Tirtowangi* already has an administrative book that regulates every task and obligation of the management. Apart from that, there is also an administration book for archiving data and irrigation canal schemes that have been installed on the wall of the HIPPA office. The deficiency in this parameter is the absence of a picture of the composition of HIPPA members and retired HIPPA members

The performance index value on the GP3A/IP3A component parameters is 80% or good performance. This condition occurs because GP3A/IP3A is already a legal entity and institutional conditions are classified as advanced criteria. In addition, GP3A/IP3A has a structured meeting schedule with UPT officers. Irrigation. In tertiary irrigation channels, the weight value obtained is 16% of 20%. The performance index obtained is 80% or classified as good performance. The institutional condition of HIPPA Tirtowangi in Jatimulyo Village is classified as good because HIPPA is already a legal entity and has a structured meeting schedule. In addition, the division of tasks is clear with the boundaries of each individual so that the institution is classified as developing criteria. The deficiency in this parameter is that HIPPA members are less active in conducting network searches with secondary level irrigation officers.

Overall the secondary canal irrigation performance index has a weight of 82% of the total weight of 100%. Based on the secondary irrigation system performance index according to PUPR Ministerial Regulation No.12/Prt/M/2015 the weight obtained by 82% is classified as good irrigation performance. This means that all parameter components are available and have been operating properly and only require physical and non-physical improvements in each parameter. Meanwhile, the irrigation performance index as a whole for tertiary irrigation areas in Jatimulyo Village is 77%. or classified as good performance. This value indicates if the overall tertiary irrigation canal in terms of physical and non-physical infrastructure has been running by a structured operation but requires intensive and periodic repairs to maintain the effectiveness of the canal from upstream to downstream.

Inequality of IPAIR Payments in Jatimulyo Village

The level of irrigation performance has an impact on every aspect of farming activities, especially on the IPAIR payment aspect. The condition of the level of inequality in IPAIR payments in Jatimulyo Village is explained in the Table 2.

Table 2 shows the differences in overall IPAIR payment rates in Jatimulyo Village. The highest level of difference in IPAIR payments occurred during planting season 3 or dry season 2, namely 54% due to the minimum distribution of water. In planting season 3 there was a decrease in the amount of water discharge which caused several irrigated paddy fields to not get water flow. In addition, rice fields that receive irrigation tend to be inconsistent with the timeliness required so farmers tend to pay IPAIR by the amount that has been set because they do not receive water. Meaenwhile, the lowest payment inequality occurs during the 2nd planting season or 1st dry season. The level of inequality in IPAIR payments that occurs is only 34%, but even so, this value is quite high because the average payment rate given by farmers is only 66%, or still far from 100%. This condition is in accordance with the results of research. which said that the largest farmer participation in irrigation payments occurred in the second planting season because the amount of water was stable or not too much like in planting season 1 and not too little like planting season 3.

TABLE 2. The level of inequality in IPAIR payments in Jatimulyo Village

No	Season	IAIR Rate Paid (%)	IPAIR Payment Inequality Rate (%)	Total number
1	Planting Season 1	62,51	37,49	100
2	Planting Season 2	66	34	100
3	Planting Season 3	46	54	100

Source:*Processed primary data, 2022*

In growing season 1, water tends to be available in large quantities so that the needs of plants for fulfilling water tend to be fulfilled. However, the level of mismatch in irrigation payments during planting season 1 was greater than that of planting season 2, which was 37.49% or the average farmer only contribution 62.51%. This condition occurs due to farmers' perceptions which indicate that water enters paddy fields without the role of *growing up*. Meanwhile, water arrangements are being made *growing up* in growing season 1 it is more complex because apart from adding water *growing up* also actively regulates water disposal so that volume of water entering the paddy fields is not too large or until it stagnates too high.

Factors Influencing IPAIR Payments in Jatimulyo Village

Inequality in IPAIR payments is one of the irrigation problems that occur in all parts of Indonesia, one of which is in Jatimulyo Village. IPAIR inequality in Jatimulyo Village has occurred for more than 10 years and various efforts have been made to overcome it. However, the efforts made have not yielded results due to information constraints and what factors affect the suitability of IPAIR payments. In this section, the researcher raises the factors that influence IPAIR payments paid by farmers in Jatimulyo Village. The variables used are variables obtained from various previous studies and those encountered by research by the conditions in the field. The data that has been obtained is analyzed using multiple linear regression methods with the help of application Statistical Program for Social Science or commonly known as SPSS. This was done to find out how each variable influences the condition of inequality in IPAIR payments in Jatimulyo Village each season. The variables used include the frequency of water administration, the distance between land and canals, crop productivity, land ownership status, farmer income level, level of ease of water flow, appropriateness of water supply, timeliness of water distribution and farmer satisfaction with irrigation technical performance or what is commonly called ulu-ulu. The results of the overall analysis of the variables used in each season are presented in the following table:

TABLE 3. Results of the analysis of the factors influencing IPAIR payments in Jatimulyo Village

NO	Variable	MT1		MT2		MT3	
		Coefficient	SAY	Coefficient	SAY	Coefficient	SAY
	permanent	84.931.246	0,462	75.676,300	0,592	133.589,45	0,205
1	Frequency of Administration air (x1)	6.156,713	0,627^{ns}	-7.916,68	0,961^{ns}	1.567,533	0,811^{ns}
2	land distance with channels (x2)	45,382	0,572^{ns}	40.928	0,642^{ns}	-11,045	0,847^{ns}

NO	Variable	MT1		MT2		MT3	
		Coefficient	SAY	Coefficient	SAY	Coefficient	SAY
3	Productivity tanman (X3)	12.995,741	0,021*	11.727,461	0,043*	22.039,379	0,004**
4	Ownership status Lawn (X4)	35.674	0,997 ns	-2.588,343	0,805 ns	1.172,949	0,913 ns
5	Income Level Farmer (X5)	0.011	0,000***	0,012	0,000***	0,047	0,000***
6	Facility Level dialiri air (X6)	-13.132,962	0,277 ns	-25.702,203	0,110 ns	-5.689,27	0,095*
7	Grant Conformity Water (X7)	-24.381,719	0,192 ns	-15.750,009	0,428 ns	9.472,236	0,011***
8	Punctuality water administration (X8)	64.820,392	0,000***	31.483,588	0,008**	32.583,692	0,056*
9	Farmers Satisfaction with High Performance(X9)	70.178,116	0,004**	96.835,457	0,000***	49.977,607	0,081*
Adjusted R^2 MT 1 = 0,604		Adjusted R^2 MT 2 = 0,782		Adjusted R^2 MT 3 = 0,758			
F-Count MT 1 = 15.752 F-Count MT 2 = 14.452 F-Count MT 3 = 3.665							
***Significance 0.01							
** Significance 0.05							
* Significance 0.10							
Ns = not significant							

Source: *Processed primary data, 2022*

Based on the model and Table 3 above, show the variable frequency of giving water by ulu-ulu to each farmer's paddy fields every season. The frequency of watering each season tends to be different, therefore adjusting the level of minimum and maximum plant requirements. The maximum frequency of giving water to MT 1 and 2 was 8 times with a minimum amount of 2 times while in MT 3 the minimum amount was 2 times and a maximum of 6 times. The results of the analysis showed that the variable frequency of water administration at MT 1, 2 and 3 had no significant results. This means that even though there is a decrease or increase in the frequency of water administration, it does not provide significant results for an increase or suitability for IPAIR payments. This condition occurs because in planting seasons 1 and 2 there is abundant water available so the frequency of water entering farmers' paddy fields often exceeds the maximum limit. This makes farmers feel that the water that enters the paddy fields occurs automatically without the role of ulu-ulu. While in the dry season the frequency of water supply is often not by the amount needed so farmers use the fulfillment of water needs individually.

The next variable is the distance between the land and irrigation canals. The distance between the land and the irrigation canal is the length of the irrigation canal from the tertiary or quarter canal to the paddy fields. The results of the analysis show that the MT1-MT3 significance values are 0.572, 0.642 and 0.847 or do not show significant results. Land that is close to irrigation tends to get water on its own because of the high leakage rate and the low density of irrigation canals. Meanwhile, on land that is far from irrigation canals, water is obtained from overflow or water flow from the paddy fields above it, so this condition makes farmers judge if water enters the paddy fields by itself without the role of ulu-ulu. So that the land distance does not have a significant effect on the increase or decrease in IPAIR payments in Jatimulyo Village. This condition is in line with research conducted by where farmers tend to enter water into the land by making holes in the paddy field bunds. Making holes according to

the irrigation law is an attempt to steal water, but farmers tend to use this method to enter water without the role of ulu-ulu.

The third variable used is plant productivity. Plant productivity is an important factor to raise because it relates to farmers' crop yields, one of which is supported by the availability of appropriate water. The results of the analysis as a whole show that if the variable crop productivity is positive the higher the productivity of the plant, it will significantly affect the increase in the amount of irrigation payments and vice versa. The significance values for each growing season 1-3 were 0.021, 0.043 and 0.004. Meanwhile, the coefficients obtained for each growing season 1-3 were 12995.741, 11727.461 and 22039.3. This value indicates that if there is an increase in crop productivity every 1 ton/ha, the suitability of IPAIR payments in planting seasons 1, 2 and 3 will both increase by IDR 12995.741, IDR 11727.461 and IDR 22039.3. On the other hand, if there is a decrease in crop productivity every 1 ton/ha ha, the suitability of IPAIR payments in planting seasons 1, 2 and 3 will both experience a decrease of IDR 12995.741, IDR 11727.461 and IDR 22039.3.

The significance value and coefficient show that during planting season 3 or when water availability is limited, it has the highest value compared to planting seasons 1 and 2. This condition occurs because during planting season 3 the water discharge tends to be small so many plants grow not optimally due to lack of water that productivity decreases. When there is a low water discharge stress, the suitability of irrigation IPAIR payments has a significant increase and decrease in value due to drastically changing productivity results. This is in line with research (Ernawati, 2018) which states that a mismatch in meeting the needs of irrigation water causes low plant productivity which will later affect the conditions for paying IPAIR.

The fourth variable observed was land ownership status consisting of own land, leased land, arable land and *kedokan* land. This variable is used to find out whether there is a difference between land ownership status and IPAIR payment conditions in Jatimulyo Village. The results of the analysis show that the status of land ownership does not give a significant value to the condition of payment for IPAIR every growing season 1, 2 and 3. This means that the status of land ownership is not a significant determinant of the condition of payment for IPAIR because farmers prefer conditions of water availability which are managed by ulu-ulu. However, the conditions in the field show that several land ownership statuses influence the condition of IPAIR payments, although not significantly. This happens to sharecroppers and *kedokan* that usually IPAIR payments depend on farmers who have rights to the land. Farmers who only have land ownership rights without managing themselves tend to pay IPAIR not according to the amount specified. This condition occurs because farmers do not feel that they are getting significant benefits. Farmers tend to know if water enters the paddy fields by itself, especially during abundant water conditions or during the rainy season (MH).

The next variable is the income level of farmers. The variable income level of farmers is the amount of income earned from farming each season. This variable is used to determine the effect of farmers' income on the condition of IPAIR payments in Jatimulyo Village each season. The results of the analysis show that the farmer's income level variable has a significant positive value on the condition of IPAIR payments in Jatimulyo Village. While the coefficients for each growing season 1, 2 and 3 were 0.011, 0.012 and 0.047. The positive coefficient and significance values show that if each farmer's income increases by IDR 1, IPAIR payments in seasons 1, 2 and 3 also increase by IDR 0.011, IDR 0.012 and IDR 0.047. Conversely, if there is a decrease in farmer income of IDR 1, IPAIR payments will also decrease by IDR 0.011, IDR 0.012 and IDR 0.047.

Farmers' income conditions have a strong influence or relationship with IPAIR payment conditions in Jatimulyo Village. The higher the farmer's income level, the payment to IPAIR also increases because the allocation for meeting production and non-production costs tends to be more adequate. However, when the income of farmers decreases, the allocation for paying irrigation fees decreases because the main priority is to meet production costs for the next planting season. The results of this study are in line with the results of research [5] which states that farmers with high incomes have better financial conditions so that they can manage costs and expenses for the operational needs of farming businesses, especially paying irrigation fees. This condition indicates that farmer income is one of the benchmarks for the ability of farmers to pay irrigation fees by the agreed amount.

The next variable is the ease with which the land is drained by water. The level of ease of water flow means how difficult or how easy it is for land to be drained by water from the nearest irrigation canal. This variable is not only measured from the length of the channel but also the condition of the height of the land. The results of the analysis show that in the 1st and 2nd growing season, the variable level of ease of flow of water does not provide significant results on the suitability of irrigation payments. This condition occurs because during planting seasons 1 and 2 irrigation water is sufficiently available with a high water discharge so that it can reach all of the land or there are no paddy fields which are difficult for water to flow through. Whereas in the 3rd growing season, the results of the analysis show that the variable level of ease of flowing water gives a significant negative result on the condition of paying for IPAIR in Jatimulyo Village. The significance value obtained in growing season 3 was 0.095 with a

coefficient value of -568.927. The negative coefficient shows the direction inversely, meaning that when the ease of flowing water increases by 1 level, the suitability of paying for IPAIR decreases by IDR 568,927. Conversely, if there is a decrease in 1 level of ease of water flow or it can be said that land is difficult for water to flow on in the 3rd planting season but the land receives irrigation water, then the suitability of IPAIR payments will increase by IDR 568,927. During planting season 3, the water discharge tends to be low, so it is difficult for paddy fields that are higher than irrigation canals to get water. So it fields where it is difficult to get water but can still be flowed with irrigation water tend to make farmers pay irrigation fees in full because there is no need to distribute water individually or by other methods such as using a water suction machine.

The 7th variable that is used as a predictor of factors influencing IPAIR payments in Jatimulyo Village is the appropriateness of the amount of water provided. The suitability of the amount of water given is the suitability of the volume entering the paddy fields according to the needs. The results of the analysis show that during the 1st, 2nd and 3rd growing season the significance values obtained were 0.192, 0.428 and 0.011. This value indicates that the suitability variable for the amount of water provided gives an insignificant value in planting seasons 1 and 2, while in planting season 3 it has a significant effect. The significance value obtained in growing season 3 is 0.011 while the coefficient value is 9472.276. The IPAIR suitability variable is an ordinal data interval using the MSI method. So it can be explained that if there is an increase of one unit by the amount of water supply, the IPAIR payment will also increase by Rp. 9472.276. On the other hand, if there is a decrease in one level of suitability for water supply, the amount of IPAIR payments will also decrease by Rp. 9472.276.

In planting seasons 1 and 2 irrigation water is fully available or water availability is fully available throughout the season so that irrigation payments do not change too much. Meanwhile, during planting season 3, water discharge is often available in small quantities so rice fields often receive water in inappropriate quantities. This condition is often one of the reasons farmers do not pay IPAIR in full. These results are in line with research [13] states that if under conditions of critical water discharge a paddy field still gets the appropriate amount of water, IPAIR payments also increase, whereas conversely when paddy fields do not receive an adequate or appropriate amount of water, IPAIR payments will decrease because farmers will meet the amount of water needed individually.

The 8th variable used next is the timeliness of giving water. The timeliness of water supply is the suitability of the time of water distribution from the ulu-ulu with the time the farmers need water. For example, when farmers need water for seeding or transplanting, ulu-ulu can distribute water or provide water to farmers according to the agreed time. The results of the analysis show that the variable timely delivery of water has a significant influence on the suitability of IPAIR payments in Jatimulyo Village during planting seasons 1, 2 and 3. The significance values obtained for planting seasons 1-3 are 0.000, 0.008 and 0.056. Meanwhile, the coefficient values obtained in planting season 1-3 were 64820.392, 31483.588 and 32583.7. This condition shows that if the timeliness of giving water is more appropriate, the suitability of giving water will increase, whereas if the timeliness of giving water is not appropriate, then the payment of IPAIR in Jatimulyo Village will decrease. When there is an addition of one level of timeliness of water supply, the suitability of the amount of IPAIR paid by farmers in each planting season 1, 2 and 3 also increases by IDR 64820.392, IDR 31483.588 and IDR 32583.7. This condition is by the theory put forward where IPAIR payments increase when the amount and timeliness of water distribution is by the needs of farmers.

The final variable used is farmer satisfaction with ulu-ulu performance. This variable is assessed to determine the level of farmer satisfaction with ulu-ulu performance which includes water distribution, canal cleaning, and so on. This variable is used to determine whether there is a relationship or influence between satisfaction with ulu-ulu performance and the amount of IPAIR paid by farmers. The results of the analysis show that in the 1st, 2nd and 3rd growing seasons the significance values are 0.004, 0.000 and 0.081. This value indicates that farmers' satisfaction with ulu-ulu performance each season has a significant influence on the suitability of IPAIR payments in Jatimulyo Village. The coefficient values obtained in planting seasons 1-3 indicate that if each additional 1 level of farmer satisfaction with ulu-ulu performance occurs, IPAIR payments also increase by IDR 70178.116, 96835.457 and 49977.6. The significance value in planting season 1 and 2 was higher than planting season 3. During planting season 1 and 2, farmers actively carried out cleaning and intensive water management because of the availability of water in large debits. In addition, in planting seasons 1 and 2, farmers plant rice which tends to require sufficient water compared to planting season 3 or corn. So farmers feel more satisfied with the performance of ulu-ulu in planting season 1 and 2 compared to planting season 3.

This condition is in line with the results of the analysis with the formulation of problems 1 and 2 in this study. The irrigation performance index obtained was 77% or classified as good performance criteria. Furthermore, in the second problem formulation, the result is that the inequality of irrigation payments in planting season 3 is greater than in planting seasons 1 and 2. This means that it can be explained that irrigation performance, especially in ulu-ulu performance in planting seasons 1 and 2, is better than planting season 3 and directly impacts the conditions of IPAIR payments in Jatimulyo Village. This research is in line with the results of research (Najib, 2023) which

states that the suitability of IPAIR payments depends on the conditions of the managing institution. This means that when the management institution's performance is good, IPAIR payments will be more appropriate because farmers feel real benefits from HIPPA.

The results of the overall analysis show that there are significant and insignificant variables for each season. Variables that always show significant value for each growing season are crop productivity, farmer income levels, timeliness of watering and farmer satisfaction with ulu-ulu performance. These four variables always provide significant value every season because the level of income and crop productivity is directly related to the financial condition of farmers while the variables of ulu-ulu performance satisfaction and the timeliness of water supply are directly related to the benefits and performance felt by farmers. Meanwhile, the variables that do not provide significant value for each growing season are the frequency of water application, the distance between the land and the canal, and the status of land ownership. The variable frequency of giving water does not have a significant effect because farmers tend to depend on the timeliness of giving water, meaning that even though the higher frequency of water given is not by the timeliness of giving water, farmers will not feel the benefits directly. Variable Land distance does not provide significant results every season because even if the land that is close or far from the canal does not get water distribution according to the desired time, farmers tend not to pay for IPAIR in full. Meanwhile, land ownership status does not provide significant results every season because when farmers appropriately benefit from irrigation water, land ownership status is not a measure for paying IPAIR in full.

CONCLUSION

Irrigation performance on the secondary and tertiary canals in Jatimulyo Village is classified as a good performance index but still requires several improvements in every aspect, especially in physical infrastructure and OP (Operation and maintenance). The irrigation performance index has an impact on IPAIR's payment inequality where every season there is always an imbalance of above 30%. Factors that affect IPAIR payments in Jatimulyo Village during planting seasons 1, 2 and 3 are crop productivity, farmer income levels, timeliness of water distribution and farmer satisfaction with performance *growing up* Meanwhile, the factor of ease of flow of water and suitability of the amount of water given only affects the growing season 3.

The suggestions given by researchers based on the research results obtained are:

1. The government through the PUPR service needs to rebuild several carrier canals that have experienced a lot of damage, especially the tertiary canals so that water distribution can run more efficiently.
2. Irrigation boards both at the secondary and tertiary level need to promote operational activities and network maintenance to reduce the level of more severe damage. In addition, there needs to be a good performance relationship between secondary and tertiary irrigation officials so that irrigation problems can be overcome together and continuously.

Tertiary-level irrigation agencies need to re-implement performance to overcome conditions of non-compliance with IPAIR payments, especially in aspects that have a strong influence on the occurrence of conditions of non-compliance or imbalances in IPAIR payments in Jatimulyo Village.

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