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PERFORMANCE ANALYSIS OF IRRIGATION AREA IN PEMALI BREBES

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ABSTRACT

Irrigation Area Pemali comprised in the district of Banjarharjo Brebes Central Java, the located Approximately less than 50 km from Cirebon and 40 km from Bradford Central Java, and exist some villages such as, Cikakak, Coral Maja, Tiwulandu Village in East and Tonjong, shovel , Gandol in West. Irrigation Area Pemali duct have the name is the Regional Master Irrigation Pemali or named DI Jangkelok Hilir. At first, the water Able to dilute more less 6677ha but in this time only more less 6349ha, the trouble is the diversion of the use of land. This Pemali irrigation area was built in the years 1901 - 1904. The irrigation areas of irrigation area Pemali supply six kemantren such as Kemantren Cibendung, Kemantren Bantarsari, Kemantren Losari Upstream, Downstream Losari Kemantren, Kemantren Kubangjero, and Kemantren Rungkang. The purpose of this research is Become a reference from evaluation of performance of the irrigation area in irrigation area Pemali by analyzing the physical condition of building Although duct in the irrigation area of the Regional Irrigation Pemali, analyzing of human resource in the irrigation area of the Regional Irrigation Pemali, analyzing of rain Hydrology in the irrigation area of the Regional Irrigation Pemali, analyzing of income from weir Cibendong, analyzing of the patterns plants in the irrigation area of the Regional Irrigation Pemali, and analyzing planning plant and the realization of planting in the irrigation area of the Regional Irrigation Pemali. The method of this research is qualitative method, in the which the fission of the problem is explained that the subject or the object of research based on the facts roomates used during doing the research in the performance of irrigation system and try to make a good relation in deep from the aspects particularly subject. Based on the build irrigation condition in this area is classified as satisfactory with percentage of damage Reached 11.30%. Meanwhile, the duct condition in this irrigation area irrigation area is good Pemali classified with percentage of damage Reached 8.21%. The condition of the organizer in DI Jangkelok available irrigation area Pemali only 51 people, while in needed is 67 people with less percentage Reached 17.94% so that service toward the duct condition is less completed and have the impact to net condition wake or less roomates always damaged, this situation should be increased.From the results of the analysis of the ratio of demand with available discharge effective discharge rainfall added Irrigation Area in Jengkelok, Cibendung Weir fulfilled, but many unused discharge it is Necessary to modify the cropping pattern in order to maximize the potential of available discharge. The planting realization in 7 years ago in the irrigation area Irrigation Area Jangkelok Pemali it is less from the planning plant, but in the period of 2011/2012 Occurs Increased 7.34% and the realization of planting intensity is average 243.77% while the average of planning plan is 268.91% Tus in the lower plant productivity in this case since it can not be done to planting in this wide area.

Keyword: *Irrigation, Performance Analysis, Regional Irrigation*

I. INTRODUCTION

1.1. Background

Irrigation area is located in the district Pemali tegah Java Tegal, located approximately less than 50 km from the Cirebon, West Java and 40 km from Java Brebes tegah. included in the sub-district area Margasari Tegal.

Irrigation Area Pemali have Pemali Parent channel. At the beginning of manufacture of water to irrigate ± 26.952 ha but currently only able to irrigate ± 25.131 ha, due to the transfer of land use. , This Pemali Irrigation Area was founded in 1983. The irrigation area irrigation area Pemali airport 15 (fifteen) kemantren namely kemantren Bulakparen, kemantren Rancawuluh, kemantren Bukakelor, kemantren Grinting, kemantren Petunjungan, kemantren Sawojajar Downstream, kemantren Pakijangan, kemantren Sawojajar Hulu, kemantren Wanasari, kemantren Cantaloupe, kemantren Wangandalem, kemantren Krasak, Tegal kemantren wulung, kemantren Bojong, kemantren Gegerkunci.

No maximum agricultural productivity results in Irrigation Area Pemali the impact of not maximal intensity cropping in the irrigated areas, the problems caused by the decreasing likelihoodthe performance of irrigation system in irrigation system.

1.2. Research Problem

Ineffective and inefficient system Irrigation Irrigation Area Network Performance Pemali irrigation area shows that the implementation of the principle - the principle of optimal performance of irrigation network. then the problem can be identified as follows:

1. Is provided sufficient discharge flow needs?
2. How is the performance of irrigation systems Irrigation Area Pemali ?
3. How cropping irrigation area Pemali ?

1.3. Research Purpose

The purpose of the analysis of the irrigation system in the irrigation area irrigation area Pemali are:

1. To analyze discharge (availability, mainstay, needs), planting areas and cropping intensity
2. To analyze the performance of irrigation network
3. To analyze the cropping pattern.

II. LITERATURE REVIEW

2.1. Analysis

Analysis is the activity of thinking to describe a subject to be part - or component parts so that it can be in the know traits - traits or mark each part then the relationship to one another as well as the function of each - each part of the whole section.

2.2. Performance

Performance is the result of the quality and quantity of work achieved in executing their duties in accordance with the responsibilities given to him (Anwar King Mangkunegara, HR Performance Evaluation, 2000).

2.3. Irigation

Irrigation comes from the term irrigatie irrigation in Dutch or in English. Irrigation can be interpreted as an effort to bring water from the source for agricultural purposes, drain and distribute water regularly.

Broadly speaking, the purpose of irrigation can be classified into two (2) categories, namely:

1. Direct purpose, namely irrigation to wet the soil has a goal related to the capacity and the water content of the air in the soil so it can achieve a condition in accordance with the requirements for plant growth in the land.
2. Interest Indirect, namely irrigation have goals that include: regulating the temperature of the soil, washing of soil containing toxic, transportation of fertilizers through the flow of the water, raising the ground water level, increasing the elevation of a region by flowing water and precipitate sludge- borne water, and so forth.

Table 2.1 Condition Assessment Criteria Function and Building Irrigation Channels

No.	Kriteria Kondisi	Kondisi (%)	Rekomendasi Penanganan
1	Baik (B)	70-100	UpGrading dan optimalisasi
2	Sedang	55 - 70	Rehabilitasi Sedang
3	Kurang	<55	Rehabilitasi Berat

Permen PU No. 32/PRT/M/2007

2.4. Debit

Water discharge is a measure of the amount of water volume that can pass in a place or which can be accommodated in a Gated per unit time. (Sidharta, Irrigation and Water Building, 1997).

2.5. Procedures For Planting Patterns and System Group

To meet the water needs of the plants, the determination of cropping patterns are things that need to be considered. The table below is an example of cropping patterns that can be used. The table below is an example of cropping patterns were used:

Table 2.2 Planting Pattern

Ketersediaan Air Untuk Jaringan Irigasi	Pola Tanam Dalam Satu Tahun
Tersedia air cukup banyak	padi - padi – palawija
Tersedia air dalam jumlah cukup	padi - palawija – tebu
Daerah yang cenderung kekurangan air	padi - palawija – bera

Sumber : Dirjen Pengairan (1985)

2.6. P3A Institutions in Irrigation Networks

In order to encourage the participation of water user farmers in the management of the exploitation and maintenance of irrigation, the effort to cultivate the Association of Farmers Water Management (P3A) to become independent, need to create an atmosphere that support for the empowerment potential in farmers manage irrigation water, among other things through submission Management of Irrigation (PPI) (Sukasi 2001 in Rostaningsih and Way, 2003).

2.7. Poligon TYSEN

Polygon Tysen widely used because it can provide the data precipitation data provide a more accurate, because every part of the catchment area of rain is represented proportionally by a rain penakar tool. In this way, the manufacture of polygon drawing done once, while changes in rainfall data per point can be processed quickly without counting more area per section polygons.
Then the average rainfall in the area in question can be calculated according to the following equation:

$$P = \frac{P_1A_1 + P_2A_2 \ldots + P_nA_n}{\sum A} \qquad \ldots\ldots\ldots[1]$$

Information :
P = The average rainfall
P1, P2, Pn = Rainfall at stations 1.2, n
A1, A2, An = The area represented by the station 1.2, n

III. METHODOLOGY

3.1. Research Method

The method used in this research is descriptive qualitative method - inductive. The nature of this descriptive study is intended to provide a description and explanation of the data and information obtained during the study, whereas the inductive approach based process and observations in the field / facts - the empirical facts.

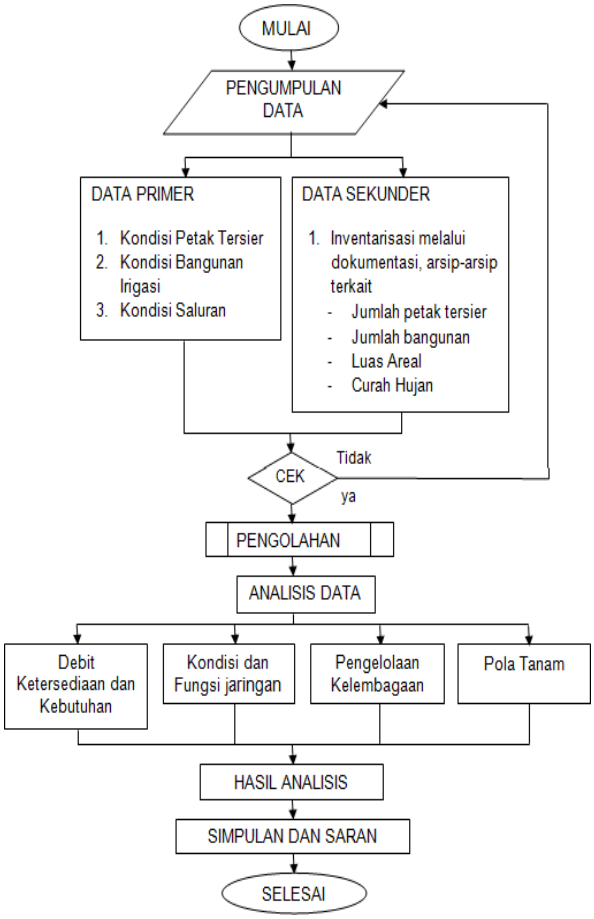

Figure 3.1 Research Method

3.2. Collecting Data Method

The method used is as follows:

3.2.1. Observation

Observation is collecting data by observation / direct observation in the field. With this direct survey can be seen directly in field conditions in order to obtain a picture that can be taken into consideration.

3.2.2. Interviews

Interview method yaitupengumpulan data by question and answer directly to the relevant parties to the problems examined which is a combination of activities to see, hear, and asked, with reference to the interview guides in order to obtain sufficient data about the object of research directly from the words and action informant.

3.3. Bibliography

Bibliography is the data collected by means of an inventory and collect data through documents and archives - archives related.

3.4. Type and Source of Data

3.4.1. Data Types

In this research use primary and secondary data. Primary data is data obtained from the location analysis and survey results that can be directly used as the source of the analysis. Secondary data is the supporting data used in the manufacturing process and the preparation of the thesis, which can be obtained from relevant agencies and other supporting data.

3.4.2. Data Source

Data - data used comes from the study location and the elements / agencies / institutions.

3.5. Data Analysis Method

3.5.1. Analysis of Physical Condition

Analysis of the physical condition of the building and on a network of irrigation channels. Rating physical condition is crucial, because the physical condition of the building of water into the main assessment, if physically it was well worth the performance of other aspects such as the provision of water management analysis can be done.

3.5.2. Debit Analysis

a. Water Availability

The calculation of the availability of water using Rational Method as a method of approach is a way to determine the relationship with the river flow is rainfall intensity and physical function parameters.

b. Mainstay discharge

Debit mainstay is the minimum flow of the river to the possibility of being met pre-defined that can be used for irrigation.

c. Irrigation Water Needs Analysis

Irrigation water requirement is the volume of water required to meet the needs of evapontranspirasi, loss of water, the water needs for plant by observing the amount of water provided by nature through rain and groundwater contribution. (Anonymous, 1996).

To meet the water needs of the plants, the determination of cropping patterns are things that need to be considered. And Systems Group To obtain optimum plant growth in order to achieve high productivity, the planting should pay attention to the distribution of water evenly to all tertiary in the irrigation network.

d. Institutional Analysis and Human Resources

Refers to Regulation of the Minister of Public Works No. 32 / PRT / M / 2007, the needs of Power Operations & Maintenance are as follows:

- Head of Branch / observer / UPTD / branch offices / Korwil: 1 + 5 staff per 5000-7500 Ha
- Mantri / Interpreter irrigation: 1 person per 750-1500 Ha
- Dam Operations Officers (POB): 1 person per weir, can be added a few workers for a large dam
- Officers Pintu Air (PPA): 1 person per 3- 5 tap building and building for the channel is between 2-3 km or 150 sd service area. 500 ha
- Worker / pekarya Channels (PS): 1 person per 2-3 km long channel.

e. Analysis AKNOP (Figures needs- Operation and Maintenance)

AKNOP is needs-based operation and maintenance of irrigation management of the results of the search inventory damage irrigation networks established through deliberation (Kimpraswil Decree No. 529 / KPTS / M / 2001).

3.6. Research Location

Location irrigation systems analysis at Irrigation Area Pemali Margasari this entry Tegal districts of Central Java.

Figure 3.2 Research Location

IV. RESULT AND DISCUSSION

4.1. Condition and Function of Irrigation Networks

Weir Irrigation Area Pemali Notog little damage, damage to the condition of the building reaches the average – average 11.61%. And to condition the irrigation channel reaches the average – average 15.77%.Its impact on the decline in function of irrigation networksso that the water service on Irrigation Area Pemali be less than optimal. It needs a repair or replacement of damaged equipment, while the condition of irrigation canals need for routine and periodic maintenance.

4.2. Human Resources

From the analysis can be known that the number of managers in the Irrigation Area Pemali available only 201 people, whereas what is needed is 216 people with the percentage shortfall reached 9.38%, so service to the channel conditions are lacking and the impact on network conditions often poorly maintained or damaged , it is necessary the addition of management personnel if the relevant agencies.

4.3. Calculation of Poligon TYSEN

This method takes into account the weight of each station that represents an area in the vicinity. In an area in the watershed is considered that the rain is the same as that occurred in the station closest, so that rain recorded on an area representing the station.

From the analysis in table 4.1 is known that Notog dam watershed area is 1303.125 km². Based on the results of the calculations obtained Polygon Tysen each watershed area rainfall station area in use.

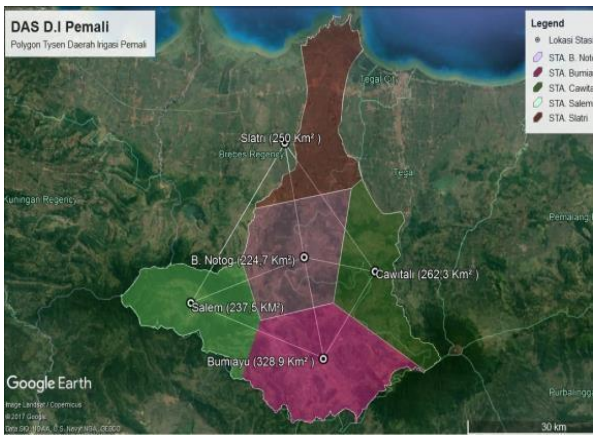

Figure 4.1 Polygon Tysen

Table 4.1 Poligon Tysen Calculation

NO	Nama Stasiun	Jumlah Kotak	Skala	Luas (Km²)
1	Salem	38	6250	237.500
2	B. Notog	35,95	6250	224.688
3	Bumiayu	52,5	6250	328.125
4	Cawitali	41,8	6250	261.250
5	Slatri	39,8	6250	248.750
6	Jumlah	208,05	6250	1.300.125

4.4. Comparison of Debit Needs and Debit Potential 80%

From the analysis using a second cropping patterns Modifications to the ratio of discharge needs to discharge Potential in Irrigation Area Pemali weir Notog can be concluded that the cropping pattern is fulfilled, and the use of debit potential maximum by using the cropping pattern using Rice - Rice - Rice / Palawija to start the planting season one in November.

4.4. Calculating of Maintenance and Operating Cost

Figure 4.2 Cost Comparison chart Operation and Maintenance In Pemali

From the above data it can be seen that the Operation and Maintenance Costs in Pemali Irrigation Area in 2015 obtained the cost is Rp 87,530,765,818 and in 2016 obtained the cost is Rp 77,800,577,587 of these data can be seen that AKNOP decreased costs.

V. CONCLUSION AND RECOMENDATION

5.1. Conclusion

1. Condition and function of the building on Dam Irrigation Area Pemali Notog be classified as minor damage, with an average percentage of both reached 88.39%, while the classification is damaged by an average of 11.61%.From the calculation of CPM scheduling analysis, the development of Kinderfield School takes time for 41 weeks.
2. Condition and function of the channel on Irrigation Area Pemali Notog weirs are in the classification of minor damage, with an average percentage of both reached 84,23%, while the classification is damage by an average of 15,77%.
3. Power manager at Weir Irrigation Area Notog available only 201 people, whereas what is needed is 216 people with the percentage shortfall reached 9.38%, so service to the channel conditions are lacking and the impact on network conditions often poorly maintained or damaged, it is necessary to increase management personnel if the relevant agencies.
4. From the results of the above analysis it is known that extensive watershed area is1,300 km ² Notog weir. Based on the results of the calculations obtained Polygon Tysen each watershed area rainfall station area that is in use.
5. The cropping pattern in use on Notog Weir Irrigation Area Pemali is Rice – Sugarcane - Crops.
6. From the analysis of the debit comparisonwith the discharge requirements is available on Notog Dam Irrigation Area Pemali met, but a lot of unused discharge this case the need for modification of cropping patterns to maximize the potential of the discharge provided.
7. From the analysis using cropping pattern Modifications to the ratio of discharge needsto discharge potential in irrigation area Pemali weir Notog met, and the use of debitPotential maximum by using the cropping pattern using the Rice - Rice - Rice / Crops and start planting one in November.
8. Judging from potential discharge and rainfall available in Weirs Notog, cropping patterns could use Padi-Padi-Padi / Palawija.
9. From the data it can be seen that AKNOP Operation and Maintenance Costs in Weirs Notog in 2015 obtained the cost is Rp. 87.530765 billion and in 2016 obtained thecost is Rp. 77.800577 billion of such data can be seen that AKNOP decreased costs.

5.2. Recommendation

Based on the analysis and discussion, suggested the following matters:

1. The gathering of data on relevant authorities both flow data, rainfall, planting plan, the realization of planting, building conditions and the channel and the number of HR should be stored insoftcopy in order to facilitate the search if it will be needed, minimizing loss and destruction.
2. For irrigation water services on Weir Notog of Regional Pemali optimal irrigation (effectively and efficiently)Needs to be promoted normalization (Improvement, Rehabilitation, Care and Maintenance) of the irrigation network (Channel and irrigation) this should be done regularly so meminimalisair damage that will occur either in the building or irrigation channel
3. For the implementation of the Operation and Maintenance of the Irrigation Area Pemali weir Notog in accordance with theoperating manual as well as maintenance and governance arrangements of irrigation and irrigation water efficiently and effectively (the right time, the right space, the right guarantees and also the right quality) then the quantity of HumanResources needs adjust to the needs and quality of human resources should be increased through institutional strengthening, education and technical training to irigasian field.
4. Socialization needs of stakeholders to farmers planting tenstang procedures that will apply every year in order to achieve Cropping Intensity Max (300%), and the farmers know what pattern will be used.

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