



# Technical Audit on Operation and Maintenance Needs in Tlatak Irrigation Area in Magetan Regency of East Java

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# OUTLINE



**Background**

**Objective**

**Research Method**

**Assessment and Result**

**Conclusion**

# BACKGROUND

- **Irrigation water needs in Tlatak are not met.**
- **Based on information and field surveys, non-fulfillment of irrigation water requirement in irrigation area of tlatak resulting from a lot of water taking unrecorded discharge and duration and there is damage to irrigation channel infrastructure, so that water can not be distributed optimally.**



# BACKGROUND

- **Irrigation water shortage has the potential to reduce the development of agricultural land. To handle the irrigation water shortage assessment of physical condition, function of infrastructure, and Irrigation efficiency are needed.**



# OBJECTIVE

- ❑ **Efficiency of irrigation in Tlatak irrigation area**
- ❑ **Physical condition and function values of each infrastructure existing currently**
- ❑ **Actions to be taken to improve the value of infrastructure conditions in Tlatak irrigation area**

# RESEARCH METHOD

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This study are to find out the efficiency of irrigation water in Tlatak irrigation area, to find physical condition and function values of each infrastructure existing currently, and to find out the attempt taken to improve the value of infrastructure conditions in Tlatak irrigation area

# Irrigation Efficiency

**Irrigation efficiency is the ratio of water used to water tapped expressed in % (Irrigation Planning KP-01, 2010).  
The formula used in estimating the water loss:**

$$B = \frac{\text{Inflow} - \text{Outflow}}{\text{Outflow}} \times 100\%$$

- B** : Water loss during distribution;  
**Inflow** : Volume of water inflowing/taken from Intake;  
**Outflow** : Volume of water released

# Assessment on Irrigation Network Performance

**Performance index of irrigation system is estimated based on Public Work Minister's Regulation No.32 of 2007**

<b>Work Index Value</b>	<b>Performance</b>
<b>80-100</b>	<b><i>Very Good</i></b>
<b>70-79</b>	<b>Good</b>
<b>55-69</b>	<b>Poor and requiring attention</b>
<b>&lt; 55</b>	<b>Bad and requiring attention</b>
<b>80-100</b>	<b><i>Very Good</i></b>



# Assessment on Physical Condition of Irrigation Network Infrastructure

**Classification of irrigation network physical condition and recommended maintenance based on Public Work Minister's Regulation No.12 of 2015**

<b>Damage Level</b>	<b>Condition</b>	<b>Recommended Maintenance</b>
<b>&lt; 10% of Prior Condition</b>	<b>Good</b>	<b>Routine maintenance</b>
<b>&lt; 10-20% of Prior Condition</b>	<b>Mildly damaged</b>	<b>Periodical maintenance</b>
<b>&lt; 21-40% of Prior Condition</b>	<b>Moderately damaged</b>	<b>Repairing</b>
<b>&gt; 40% of Prior Condition</b>	<b>Severely damaged</b>	<b>Severe Repairing/ Replacement</b>

# Assessment on Planting Productivity

## □ Water Need For Rice Plant

$$NFR = ET_c + P + WLR - Re$$

**NFR: Water Need for Rice Plant;**

**Etc : plant's need for water;**

**P : percolation;**

**WLR: Water Layer Replacement;**

**Re : effective rain;**

# Assessment on Planting Productivity

- **Water Need for Secondary Crop**

$$IR = (ET_c - Re)$$

**IR: Water Need for Secondary Crop;**

**Re: Effective Rain**

# Assessment on Planting Productivity

## □ Effective Rain

$$R_e = 0.7 \times \frac{1}{15} (R_{80})$$

**Effective rain based on monthly rainfall is R80 meaning that its incidence impossibility is 20%.**

# Assessment on Planting Productivity

## □ Evapotranspiration

$$E_t = \frac{\Delta E_n + \gamma E_0}{\Delta + \gamma}$$

**E<sub>t</sub>: Potential Evapotranspiration;**

**E<sub>n</sub>: Depth of Evaporation Calculated Based on The Net Radiation Received By The Earth's Surface;**

**E : Evapotranspiration**

# ASSESSMENT AND RESULT

**Irrigation  
efficiency of  
Tlatak  
Irrigation  
Area 74,24 %**

<b>Channel Name</b>	<b>Efisiensi (%)</b>
<b>Tratak Left Secondary channel 1</b>	<b>89,82</b>
<b>Tratak Left Secondary channel 2</b>	<b>71,10</b>
<b>Tratak Left Secondary channel 3</b>	<b>88,92</b>
<b>Tratak Left Secondary channel 4</b>	<b>63,17</b>
<b>Tratak Left Secondary channel 5</b>	<b>89,49</b>
<b>Tratak Left Secondary channel 6</b>	<b>77,05</b>
<b>Tratak Right Secondary channel 1</b>	<b>75,08</b>
<b>Tratak Right Secondary channel 2</b>	<b>82,33</b>
<b>Tratak Right Secondary channel 3</b>	<b>70,03</b>
<b>Tratak Right Secondary channel 4</b>	<b>88,41</b>
<b>Tratak Right Secondary channel 5</b>	<b>48,31</b>
<b>Tratak Right Secondary channel 6</b>	<b>72,66</b>
<b>Tratak Right Secondary channel 7</b>	<b>66,61</b>
<b>Tratak Right Secondary channel 8</b>	<b>56,37</b>

# ASSESSMENT AND RESULT

No	Item	Weight Value	Weight Condition Value
1	<u>Physical infrastructure condition</u>	45	30.19
2	<u>Planting productivity</u>	15	4.72
3	<u>Supporting Media</u>	10	6.48
4	<u>Personnel Organization</u>	15	11.8
5	<u>Documentation</u>	5	3.86
6	<u>Water User Farmer Association</u>	10	4.05
<b>Total</b>		<b>100</b>	<b>61.11</b>

**Performance index value of irrigation system is 61.11**

# Discussion

- **The capacity of each channel is not enough to distribute water discharge. This is evidenced by the value of irrigation efficiency 74,24 %. The value is below the government set value for the secondary channel of 90%.**





# Discussion

- **The availability of water in the dam is not able to meet the water needs of irrigation areas Tlatak.**
  - ✓ **Rice Production Plan : 2937.7 Ton/Ha**
  - ✓ **production result : 1933,1 Ton/Ha**
- **Percentage of rice productivity: 65.80%**

# Discussion

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- **Farmers' associations do not yet have legal entities and have little participation in maintaining infrastructure in Tlatak irrigation areas**

# CONCLUSION

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- 1. Efficiency of irrigation was 74.24%,**
- 2. Irrigation system performance of 61.11%. Those number indicated that the Tlatak irrigation network included in the category of less attention.**

# **CONCLUSION (Cont.)**

## **Management to Increase Performance Tlatak Irrigation Area :**

- 1. Improvements to the destruction of irrigation channel**
- 2. Improvements to the buildings that were damaged**
- 3. Adding water source source to deep wells**
- 4. Increasing participation of water user from farmer associations**

**Thank You**

**Any Question?**