

CHAPTER I

INTRODUCTION

1.1. Background

Wadaslintang Reservoir is located in the South Kedu area precisely at the border of Kebumen District and Wonosobo District, Central Java Province. It is approximately 18 km north of the center of Prembun Sub-district. This reservoir dams Bedegolan River, tributary of Wawar River as shown in Figure 1.1. Its total inundation area is approximately 13.67 km², effective volume is 408,000,000 m³, and irrigation area is 33,279 ha. It has two primary canals, i.e. west canal and east canal. The West Wadaslintang Primary Canal irrigates 12,317 ha and its discharge is 16.5 m³/s while the East Wadaslintang Primary Canal irrigates 9,813 ha with 13.5 m³/s discharge.

The S.15 Ka (166 ha) and S.16 Ka (157 ha) fields are located in Siti Adi Village, Purwoharjo Village, and Tukung Gedong Village in Puring Sub-district (Figure 1.2). They are part of service area of Kedungsamak Primary Canal precisely at the end of Sentul Secondary Canal (Figure 1.3).

Those fields do not get sufficient amount of water especially at growing season II (from March to June). This condition has been happening for years in those fields.





Figure 1.3. Kedungsamak and West Wadaslintang Primary Canal

The Sentul Secondary Canal is the longest one in Kedungsamak. Kedungsamak Weir irrigates 6,758 ha (Group I is 1,918 ha; Group II is 2,694 ha; and Group III is 2,146 ha). Those groups rotate annually. The S.15 Ka and S.16 Ka fields are included in Group I as shown in Figure 1.2. The water is taken from Luk Ulo River and West Wadaslintang Primary Canal flows the water to supply additional (*suplesi*) water to Kedungsamak Primary Canal.

The solution for S.15 Ka and S.16 Ka fields is expected to enable the farmers to start growing their plants at the same time with the farmers in other fields located in the same group.

1.2. Problem Statement

A field observation has been done on 11th February 2012 in the Kedungsamak intake, several conveyance structures in Kedungsamak

Primary Canal and Sentul Secondary Canal, and especially S.15 Ka and S.16 Ka field. It indicated some facts which might be the cause of the problem. They are:

1. In culvert 1i Hm. 39 + 00 at Karang Poh Bridge (Figure 1.4), there is constriction so that wetted section of culverts 1i Hm. 39 + 00 is not suitable to wetted section of Kedungsamak Primary Canal. Moreover, when there is sedimentation due to erosion of right side cliff, a turning flow might happen at upstream end of the culvert. In order to prevent that problem, the Kedungsamak Primary Canal only flows $6 \text{ m}^3/\text{s}$ whereas the capacity of the canal is $9 \text{ m}^3/\text{s}$. If the water discharge is $8\text{-}9 \text{ m}^3/\text{s}$, backwater will happen of 50 cm high.
2. Flume 11c in Segment (RS) 11 initially had 60 cm width. Since it was considered too small then rehabilitation work was done. An additional 40 cm width flume was built next to the previous one without demolishing the old one because of lack of fund (Figure 1.5). Consequently, leakages happen at some places in the upstream and downstream ends because the bond between the canal lining (stone masonry) and the old flume (concrete) is deteriorating due to their age. Therefore, water is wasted to the Rama Drainage Canal that flows under the flume.





Figure 1.5. Flume 11c

The S.15 Ka and S.16 Ka fields are parts of Kedungsamak Primary Canal Service Area whose additional water is from West Wadaslintang Primary Canal. However, lack of water happened in those fields. This problem cannot be ignored because the farmers rely on their harvest as their main income. While other farmers in the same group are ready to harvest, the farmers who cultivate S.15 Ka and S.16 Ka may be still trying to start growing their crops.

1.3. Objectives of Study

The objectives of this study are:

1. Reviewing the existing condition.
2. Comparing the deviation of existing condition to the original design that might be the cause of problem.
3. Finding alternatives for solution of the problems based on the identified causes.

1.4. Scope of Study

This study will be focused on:

1. Canal system started from Kedungsamak weir to S.15 Ka and S. 16 Ka fields (Kedungsamak Primary Canal and Sentul Secondary Canal), including diversion structure in the West Wadaslintang Primary Canal that flows additional water to Kedungsamak Primary Canal.
2. Social aspect is excluded from the analysis and discussion.