CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on the analysis from this study, several points can be highlighted as conclusions as follow:

1. Irrigation water demand that must be provided by the Ketro Dam has been estimated with an irrigation area of 400 hectares. The planting season starts in the first half month of November with the paddy-paddy-corn planting pattern. Corn crops are planted in the period of July until October. The highest water demand for rice plants is in the first half month of November with a requirement of 1.66 m^3/s. On the contrary, in February and October, there is no need for water at all.

2. Reservoir Simulation using historical data has been done. The comparison of the simulation generated elevation and the observed elevation shows a Correlation Coefficient value of 0.781 and Root Mean Square Error (RMSE) value of 2 m. Besides, from the simulation, it can be concluded that Ketro Dam has succeeded in fulfilling the irrigation needs of 82.1 percent. Therefore, the Ketro Dam can still cope with current water demand since it has exceeded the standard set by the government (KP-01), which is 80 percent.

3. Ketro Dam's rule curve has been generated for the wet, normal, and dry year. For the wet year, it can be seen that most of the year, the water elevation stays at the spillway elevation (99 m) except in August until mid-October. For the normal year, the lowest water elevation (91.7 m) can fall below the dead storage elevation (92.1 m). For the dry year, the elevation of the reservoir is at the lowest point (90 m) for approximately two months, which happens in August to October.

4. RCM data evaluation was conducted. It can be seen that the comparison of RCM data and ground station data has an error value of 19.7% for the Relative error parameter and 154.86 mm for the Root Mean Square Error Parameter. The low level of accuracy is also possible due to the discrepancy of RCP 2.6 projections with the earth conditions during the simulation. It is also found that the longer the projection time does not cause an increase in the error value.

5. Reservoir Simulation using RCM projected precipitation data has been done. Simulation results show the failure of the ketro dam in meeting irrigation needs in the period of 2021-2045. Besides,the simulation results show that the year 2031-2035 is the wettest year while the 2036-2040 is very dry year so it will be very difficult to meet the needs of irrigation water. In addition, the big difference of the rate of success between the current and future scenario analysis raises doubts whether the result of the future condition analysis can be considered true. Therefore, it is suspected that the analysis used in this thesis (future scenario analysis) has not accurately projected the future reliability of Ketro Dam.

6. For a current scenario / situation, Ketro dam can still meet the needs of irrigation. It is indicated by the high rate of irrigation fulfillment (82.1%) while the standard set by the government is 80% (KP-01). For a future scenario / situation, based on the rate of irrigation fulfillment, Ketro Dam failed not completely in fulfilling the irrigation needs but failed to meet the standard that have been set by the government (80%).

5.2 Recommendations

Considering the possible weakness on completing this analysis, further considerations and suggestions needed to improve the quality of analysis results, as following:

1. Historical rain data available in the current scenario analysis is only for 10 years (2009-2018). Having longer data will make the analysis more accurate
2. Record the daily Ketro River Discharge so that the model generated discharge can be calibrated.
3. Record the daily irrigation outflow discharge so that the calculated irrigation demand can be calibrated.
4. Analysis needs to be done for RCP 8.5 scenario considering that in this thesis only used RCP 2.6 scenarios.
5. It is necessary to carry out further analysis for future condition to ensure the accuracy of the analysis results

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