ABSTRACT

JAKA WINDARTA. Flood Early Warning System Development at Garang River Semarang Using SMS and Web Based on Information Technology. Under Supervision of HIDAYAT PAWITAN, I DEWA MADE SUBRATA, M JANUAR J PURWANTO, and SURIPIN

One of the large rivers flowing in the center of Semarang City is Garang River with watershed area about 203 km² and having characteristics such as high flood discharge and flash flood. The flash flood on January 25th 1990 caused more than 45 people died and goods loss was estimated to be 8.5 billion rupiahs. In this research, a flood early warning system is made, in which an automatic rainfall recorder (ARR) was placed in upstream of Garang River at sub district Gunungpati and an automatic water level recorder (AWLR) was placed in Simongan weir. To receive rainfall and water level data, a computer as server that is placed in Semarang government office. This also functions for sending flood status of Garang River (prepared/caution/careful) to flood attendants and stake holders. Beside that, artificial neural network (ANN) is used to predict water level in Garang River where the input are rainfall in upstream river for 1, 2, 3, 4 or 5 days before the occasion and the water level in the downstream for 3 hours before the occasion. The output is water level in downstream of Garang River for next 2 hours. This system is integrated with information technology that is SMS (Short Message Services) and Web so that the flood early warning can be accessed anywhere as long as communication network is available. The result of research, time for sending data of rainfall and water level telemetry system is less than 10 minutes, while information system that is built to give flood early warning information is less than 10 minutes. Consequently it fulfill in which the time to receive the information less than time when flood happened that is 2 hours. The result of optimum predicting during the ANN training is model 4 with 20 neurons; speed training 0.9 and momentum 0.3 which the input rainfall are four days before the occasion and the water level are 3 hours before the occasion having MSE 0.0046. Finally, the results of survey to flood attendants and staffs from government show that 86 % of the respondent that they absolutely need the flood early warning system.

Key words: Garang River, short message services, artificial neural network, flood early warning.