Drilled wells water level data recording system for irrigation of rainfed rice using Arduino and pressure sensor

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Abstract. The use of groundwater is one of the alternatives used to increase productivity in rainfed rice fields. Various researches and technologies have been developed to suppress the negative effects of overuse of groundwater. One important parameter is the change in the water level around the well during the pumping process, which is observed through the observation well. For that, we need an instrument to measure changes in water level in real-time. This instrument was developed using the HDL 300 submersible liquid level sensor, which utilizes pressure changes from the water level. To connect the sensor with the Arduino Uno microcontroller module using the HW685 Module. The calibration results show that the linearity of the change in the sensor value to the change in the water level reaches 99% following the equation y = 86.297x + 73.522.

1. Introduction

The success of rice cultivation is supported by various components, one of which is irrigation. However, there are still many rice fields in Indonesia that are not supported by the availability of technical irrigation. These lands only use rainwater as a source of irrigation; therefore, the rice cultivation process is stopped during the dry season. This land is known as rainfed rice fields. In order that rice cultivation can still be carried out in the dry season, farmers usually carry out water pumping, which can be sourced from rivers or groundwater. However, excessive groundwater exploitation, especially in agriculture, can lead to land subsidence, as happened in one of the agricultural areas in Bandung, West Java, which experienced land subsidence up to 6 cm/year [1].

Groundwater pumping in rainfed rice fields during the dry season can be minimized by constructing an embung so that the negative effects of pumping can also be suppressed. In addition, with the presence of embung, it is hoped that it can maintain the water level profile below the surface, even though groundwater pumping is carried out in the borehole around the reservoir. Embung is a form of water harvesting made in a small farm reservoir. This water harvesting can be used to reduce drought and enables the use of run-off beneficially [2]. In Tanasitolo Subdistrict, Wajo District, farmers have built several embung and collect water during the rainy season in the reservoir to be used during the dry season. In addition, water pumping from groundwater is also carried out, especially for land whose surface is higher than the surface of the reservoir water. Therefore, this location can be