CHAPTER V
CONCLUSION

5.1 General conclusion

A series of 3 experiments were conducted during 2018 – 2020. The 1st experiment studied the effects of 3 irrigation practices (rain-fed conditions, half water supply, and full water supply) on growth, yield, and yield components of sugarcane. The results found that drip irrigation with a full water supply irrigated water to crop 1,121 mm (close to water requirement) and had the highest average yield of 19.7 ton/rai, which was 19.4% and 31.1% more than drip irrigation with a half water supply and rainfed conditions, respectively. Therefore, this study found that irrigation was essential for sugarcane production in Northeast conditions since it increased yield and yield components. The maximum yield increment derived from the irrigation with water supply at crop water requirement.

The 2nd experiment studied the response of the physiological processes to well-irrigated conditions, water deficit conditions at tillering stage (3 MAP), and water deficit conditions at the stalk elongation stage (7 MAP). It was found that water deficit had influences on the physiological process, growth, and yield of sugarcane. Well-irrigated conditions had the highest photosynthesis rate, transpiration rate, and stomatal conductance and could maintain good water status in the leaf. While water deficit conditions at 3 MAP and 7 MAP had negative effects on all physiological processes. The well-irrigated condition had 44.4% and 52.6% higher cane yield than water deficit conditions at 3 MAP and 7 MAP, respectively. Moreover, it was found that the water deficit in the stalk elongation stage (7 MAP) had a more negative impact on growth and physiological processes and produced a 5.7% lower yield than the water deficit in the tillering stage (3 MAP).

The 3rd experiment compared the effects of drip irrigation controlled by a water balance model and a wireless sensor system on growth, yield, and irrigation water use

efficiency (IWUE) of sugarcane. Even though there was no statistically significant difference, the drip irrigation controlled by wireless sensor tended to produce a higher yield than the water balance model. Moreover, in both soil textures, the irrigation controlled by wireless sensor increased IWUE resulting in less irrigation water of 7.1 and 15.5% than irrigation controlled by the water balance model in LS and SCL soil, respectively. The results can be concluded that drip irrigation controlled by a wireless sensor was more accurate compared to the water balance model. Moreover, it was more convenient and easier to be used by farmers compared to the water balance model. However, the cost of wireless sensor was still expensive for small farmers.

5.2 Recommendation

Drip irrigation was essential for sugarcane production in the Northeast conditions but to gain a maximum yield increment, irrigation water supply should be followed a crop water requirement. If there is enough water resource, irrigation should be fully irrigated throughout the growing period. Under water limited resource, half amount of plant water requirement can be applied to maintain reasonable high sugarcane growth and yield. In addition, under water limited resource, the irrigation should be performed to avoid water deficit conditions during critical periods especially at tillering and stalk elongation stage.

Drip irrigation controlled by the wireless sensor had higher precision than the water balance model. However, the cost of the wireless sensor was still expensive for small scale farmers. Therefore, it can be recommended for large scale farmers as the price per unit area will be less expensive.