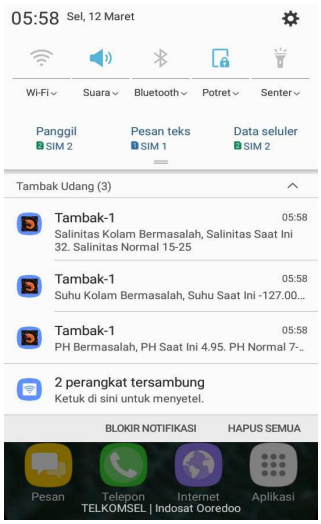

Fig. 15 Notification of the water quality Condition

IV. Conclusion

The Function of the water Spool is to anticipate oxygen deprivation in *vaname* shrimp as well as to help the water circulation when pond temperature is unstable, and the function of the water pump is to anticipate the high salt level in the pond so that the salinity is extremely high causing the process of molting on *vaname* shrimp disturbed. The error rate from each sensor is pH sensor that is 10,5% temperature sensor 0.05% and salinity14,9%, and the max value of water pH is nine occur after the rain, the salinity max value is 40ppt also occurring after rain and temperature are 30°C on March and June when dry season when measured at midnight.

As we can see from the experiment, the water temperature, pH, and salinity changed from time to time based on the season. The erratic season affects shrimp growth when the rain decreases the pH level in ponds. All the sensor's temperature, pH, and salinity work depending on the pond's conditions. The automation system helps the aquafarmer maintain their shrimp ponds easily and efficiently because they can be monitored and controlled using the equipment on the ponds using the android application. The android application also provides information on the water condition of the shrimp Ponds.

The changes in weather (temperature, humidity, and so on) impact the level of successful *vannamei* shrimp cultivation. Continuous rain conditions can adversely affect the pond pH water conditions because the water tends to be on high acidity, temperature changes occur in pond water, and when the temperatures cool down, the vanammei shrimp life force in salinity decreases the acidity and hardness of the ponds water. Thus, the physiological conditions of the shrimp will be disrupted when the source of disease for the shrimp is rising; hence, the shrimp lifeforce of will decrease.

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References

[1] Menteri Kelautan dan Perikanan, "Permen KP. No. 75 Tentang Pedoman Umum Pembesaran Udang Windu (Penaeus Monodon) Dan Udang Vaname (Litopenaeus Vannamei)," *Badan Karantina Ikan, Pengendali. Mutu dan Keamanan Has. Perikan.*, 2016.

[2] M. Junda, "Development of Intensive Shrimp Farming, Litopenaeus vannamei in Land-Based Ponds: Production and Management," *J. Phys. Conf. Ser.*, vol. 1028, no. 1, 2018.

[3] K. Preetham, "Aquaculture monitoring and control system : An IoT based approach," vol. 5, no. 2, pp. 4–7, 2019.

[4] N. Uddin *et al.*, "Development of an automatic fish feeder," *Glob. J. Res. Eng.*, vol. 10, no. 1, pp. 27–32, 2013.

[5] V. A. Wardhany, H. Yuliandoko, Subono, M. U. Harun Ar, and I. G. P. Astawa, "Fuzzy Logic Based Control System Temperature, pH and Water Salinity on Vanammei Shrimp Ponds," in *2018 International Electronics Symposium on Engineering Technology and Applications, IES-ETA 2018 - Proceedings*, 2019.

[6] E. N. S and P. D. E. N. A, "Water monitoring iot system for fish farming ponds," vol. 79, no. 2, pp. 77–79, 2018.

[7] H. A. Mohammed and I. Al-Mejibli, "Smart monitoring and controlling system to enhance fish production with minimum cost," *J. Theor. Appl. Inf. Technol.*, vol. 96, no. 10, pp. 2872–2884, 2018.

[8] R. H. Sudhan, M. G. Kumar, A. U. Prakash, S. A. R. Devi, and S. P., "Arduino Atmega-328 Microcontroller," *Ijireeice*, vol. 3, no. 4, pp. 27–29, 2015.

[9] O. Access, "Real time fish pond monitoring and automation using Arduino Real time fish pond monitoring and automation using Arduino," 2018.

[10] S. Chaudhary, V. Bhargave, S. Kulkarni, P. Puranik, and A. Shinde, "Home Automation System Using WeMos D1 Mini," pp. 4238–4241, 2018.

[11] K. G Sutar and P. T Patil, "Wireless Sensor Network System to Monitor The Fish Farm," *J. Eng. Res. Appl. www.ijera.com*, vol. 3, no. 5, pp. 194–197, 2013.

[12] D. Rana and S. Rani, "Fuzzy logic based control system for fresh water aquaculture: A MATLAB based simulation approach," *Serbian J. Electr. Eng.*, vol. 12, no. 2, pp. 171–182, 2015.

[13] Qurat-Ul-Ain, S. Iqbal, S. A. Khan, A. W. Malik, I. Ahmad, and N. Javaid, "IoT operating system based fuzzy inference system for home energy management system in smart buildings," *Sensors (Switzerland)*, vol. 18, no. 9, pp. 1–30, 2018.

[14] F. Cavallaro, "A Takagi-Sugeno fuzzy inference system for developing a sustainability index of biomass," *Sustain.*, vol. 7, no. 9, pp. 12359–12371, 2015.

[15] P. H. B. Shinde, A. Chaudhari, P. Chaure, M. Chandgude, and P. Waghmare, "Smart Home Automation System using Android Application," pp. 2408–2411, 2017.