

ABSTRAK

Danau Maninjau di Kabupaten Agam, Sumatera Barat, merupakan sumber penghidupan penting bagi masyarakat melalui budidaya ikan keramba jaring apung (KJA), namun peningkatan jumlah KJA dan praktik budidaya yang kurang ramah lingkungan telah menurunkan kualitas air dan menyebabkan kematian massal ikan akibat fenomena upwelling. Untuk mengatasi permasalahan tersebut, penelitian ini merancang dan membangun sistem monitoring kualitas air berbasis Internet of Things (IoT) yang mampu memantau suhu air, pH, tingkat kekeruhan, dan kadar amonia secara real-time. Sistem ini menggunakan mikrokontroler ESP32 dan berbagai sensor (DS18B20, pH-4502C, turbidity, MQ-135) yang terintegrasi dengan platform ThingSpeak untuk mengirim dan menampilkan data secara daring. Hasil pengujian di lapangan menunjukkan bahwa suhu air berkisar antara 26,5°C hingga 30,0°C, pH 6,8 hingga 7,5, kekeruhan 20 hingga 50 NTU, dan amonia 0,1 hingga 0,5 ppm. Sistem ini terbukti berfungsi dengan baik dan mampu memberikan informasi yang akurat terkait kondisi kualitas air di berbagai titik dan waktu. Dengan adanya sistem ini, petani ikan dapat memantau kondisi air secara real-time dan mendeteksi perubahan parameter air yang berpotensi membahayakan sehingga dapat segera melakukan tindakan pencegahan. Selain itu, sistem ini dapat menjadi referensi bagi pengembangan teknologi monitoring kualitas air di wilayah perairan lainnya.

Kata kunci: Danau Maninjau, IoT, monitoring kualitas air, *ThingSpeak*, sensor pH, turbidity, amonia (MQ-135), suhu (DS18B20).

ABSTRACT

Lake Maninjau in Agam Regency, West Sumatra, is a vital livelihood source for the local community through floating net cage (KJA) fish farming. However, the increasing number of KJA units and less environmentally friendly farming practices have led to a decline in water quality and mass fish deaths due to upwelling events. To address these issues, this study designed and developed an Internet of Things (IoT)-based water quality monitoring system capable of real-time monitoring of water temperature, pH, turbidity, and ammonia levels. The system utilizes an ESP32 microcontroller integrated with DS18B20, pH-4502C, turbidity, and MQ-135 sensors, and transmits data online via the ThingSpeak platform. Field testing results showed that water temperature ranged from 26.5°C to 30.0°C, pH values were between 6.8 and 7.5, turbidity levels ranged from 20 to 50 NTU, and ammonia concentrations were between 0.1 and 0.5 ppm. The system proved to function effectively and provided accurate information on water quality conditions at various points and times. With this system, fish farmers can monitor water conditions in real time and promptly detect parameter changes that may threaten fish health, enabling timely preventive actions. Furthermore, this system can serve as a reference for developing water quality monitoring technology in other aquatic environments.

Keywords: *Maninjau Lake, IoT, water quality monitoring, ThingSpeak, pH sensor, turbidity, ammonia (MQ-135), temperature (DS18B20).*