Aquaculture Asia

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NACA

An intergovernmental organisation that promotes rural development through sustainable aquaculture. NACA seeks to improve rural income, increase food production and foreign exchange earnings and to diversify farm production. The ultimate beneficiaries of NACA activities are farmers and rural communities.

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We need an aquaculture internet of things

Aquaculture tends to lag far behind terrestrial agriculture in technological development and uptake. Why is anyone's guess, perhaps it is the legacy of a relatively new sector that is still coming to grips with the husbandry of a diverse range of animals and plants, in terms of understanding their needs, developing improved varieties and optimal practices for production. A lot of progress has been made over the last few decades, but much of aquaculture remains an art rather than science.

In particular, aquaculture has been rather slow to adopt automation and information technology, especially in developing countries where labour costs are low, IT personnel are hard to find in rural areas, and perhaps people haven't seen a need for it, or appreciated the potential benefits. Certainly, a farm needs to reach a certain scale of production before it starts making sense. But when you start scaling up there are potential advantages to be had.

The digital revolution of the 1970s first saw the widespread adoption of personal computers, which were connected by the internet revolution of the 1990s, and miniaturised and made portable by the mobile phone revolution of the 2000s. Today the most widespread computers are the mobile phones in our pockets and they represent more than half of global internet access. In Asia, it's almost two thirds.

We are at the beginning of a new revolution, the Internet of Things (IOT): Smart networked devices and sensors that collect information about their surroundings, communicate with people or machines, make decisions based on programming models and interact with the physical world through control of electronic switches, motors and actuators. Many of these devices are low-cost, literally a few dollars and they are getting cheaper all the time. Many require very little power, running for days or weeks on a small battery or indefinitely with the addition of a small solar panel. New wireless protocols allow devices to communicate with nearby mesh networks, or with distant receiving stations literally kilometres away.

There are many potential applications for IOT technology in aquaculture, but the obvious candidates lie in water quality monitoring and early warning. A tiny computer (microcontroller) equipped with relevant sensors could track and log water quality on a continuous basis, providing reports, warnings or advice to farm management when parameters deviate from optimal ranges.

Consider also how much energy is spent on aeration. Rather than running aerators according to experience and rule of thumb, a microcontroller could actually measure dissolved oxygen levels in real time and turn aerators on and off as needed to maintain optimal levels. Significant energy savings should be possible, and again automated warnings could alert the management in a timely fashion and save a pond if something goes wrong. These devices can easily pay for themselves.

Getting into the realm of speculation now, but with real time logging of water quality data it may well be that some interesting correlations will show up with the incidence of particular diseases, which may guide future improvements to farm management practices and productivity. It's worth looking into, and we will.

Simon Wilkinson