Case Study 1

eFishery: Shaping the future of Indonesia's aquaculture industry

Founding year:	2013
Geography:	Indonesia
Founding team:	Gibran Huzaifah – Co-founder and CEO
	Chrisna Aditya – Co-founder and CTO
Tweet pitch:	eFishery offers an Internet of Things (IoT)[1] and mobile-based smart feeding technology to improve efficiency and accountability in fish and shrimp farming.
	www.efishery.com

Aquaculture is expected to provide close to two-thirds of global food fish consumption by 2030, according to the UN Food and Agriculture Organization (FAO).[2] With annual aquaculture production of more than five million tonnes, Indonesia has the third largest aquaculture output globally, behind only China and India.[3] While this output is significant, Indonesia's aquaculture sector has yet to reach its full potential. Over 80 per cent of the country's 3.34 million aquaculture fishers and fish farmers still use manual methods.[4] For instance, fish feeding, which accounts for up to 60 to 90 per cent of total production costs in commercial aquaculture, is primarily done using hand-feeding methods. These methods often result in underfeeding or overfeeding, leading to malnourishment, feed wastage and negative environmental impact.[5]

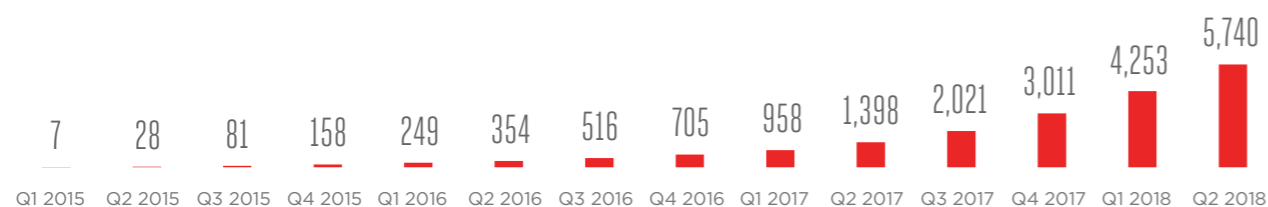To solve these challenges, eFishery has launched an Internet of Things (IoT) mobile-based solution that boosts the efficiency and productivity of fish and shrimp farmers. The solution, Smart Feeder, uses sensors to detect the appetite of fish and shrimp and automatically feeds them the optimal amount. The sensors collect and send data (such as feed volumes, feed consumption and transactional data) to the cloud where the data is aggregated, stored and analysed. Farmers can then access and track these actionable data and insights. Also, eFishery's technology allows farmers to manage their ponds remotely via their phones.

As of October 2018, over 1,300 fish and shrimp farmers in the country have used eFishery's solution, and the start-up has installed its devices in more than 3,000 fish and shrimp ponds across Indonesia. On average, fish farmers using the eFishery solution have increased profits by over 20 per cent.

FIGURE 1

eFishery: Number of Smart Feeders installed

| Q1 2015	Q2 2015	Q3 2015	Q4 2015	Q1 2016	Q2 2016	Q3 2016	Q4 2016	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018	Q2 2018
7	28	81	158	249	354	516	705	958	1,398	2,021	3,011	4,253	5,740

1 The Internet of Things (IoT) describes the coordination of multiple machines, devices and appliances connected to the internet through multiple networks. Find out more at: www.gsma.com/iot
2 FAO, 5 February 2014, "Fish farms to produce nearly two thirds of global food fish supply by 2030", http://www.fao.org/news/story/en/item/213522/icode/
3 FAO, 2018, "The State of World Fisheries and Aquaculture", http://www.fao.org/3/I9540EN/i9540en.pdf
4 Ipsos, 31 August 2016, "Indonesia's Aquaculture Industry: Key Sector for Future Growth", https://www.ipsos.com/en-id/indonesias-aquaculture-industry-key-sectors-future-growth
5 Overfeeding fish leads to food being wasted and changes in water quality. When fish are overfed, they produce a lot more waste than they normally would. That waste releases ammonia and nitrates into the water, which have negative impacts on the environment.

How the service works

Fish and shrimp farmers can either buy or lease eFishery's smart feeding devices. Most choose to lease. This is how the service works:

1 A farmer buys or leases eFishery's Smart Feeder. The leasing model allows farmers to pay a fixed monthly fee.

2 An eFishery agent visits the farmer to install the Smart Feeder and Smart Sensor by the farmer's pond(s).

3 After installation, eFishery's team onboards the farmer. The onboarding process includes teaching farmers how to use eFishery's mobile app and device. eFishery can also help farmers to acquire and use smartphones.

4 Once the device is set up, the farmer inputs the type of fish or shrimp, quantity and feed pellet size they use into eFishery's mobile Android app.

5 The farmer then inputs fish feeding frequency by configuring and scheduling feeding times.

6 During the scheduled feeding times, eFishery's in-water vibration-based sensor, combined with machine learning, detects and determines the appetite of the fish to avoid overfeeding or underfeeding. After deducing the relative hunger of the fish, the fish feeder releases an optimal amount of feed.

7 The sensors collect and send real-time data, such as feed volumes and feed consumption levels, to the cloud. Farmers can access this data through eFishery's web and mobile app on their smartphone, tablet or computer.
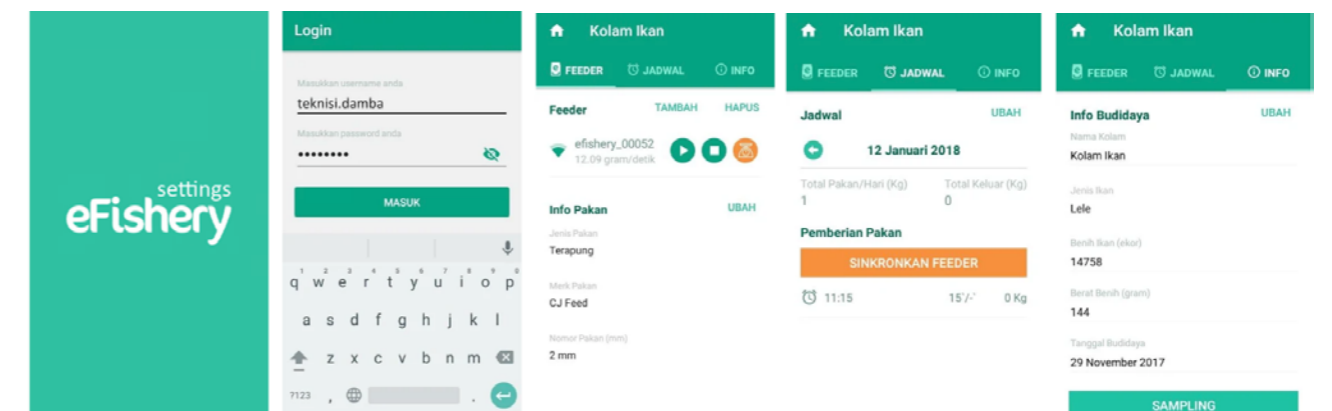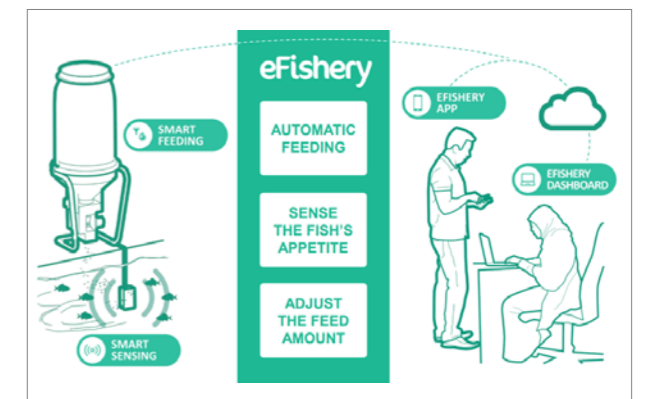
Working with mobile operators

eFishery has teamed up with Indonesia's largest mobile operator, Telkomsel (178 million mobile connections as of September 2018).[6] In March 2018, eFishery began working with Telkomsel Innovation Center (TINC), an initiative aimed at advancing the IoT ecosystem to support the development of commercial products in Indonesia. Through the TINC, Telkomsel and eFishery are developing Narrowband IoT (NB-IoT)[7] devices for the aquaculture sector.

Each Smart Feeder needs to have a SIM card and internet access to perform its full functions. Compared to a standard mobile SIM card, an NB-IoT SIM card will enable the feeder to connect to the internet with minimal data costs, making the feeder more affordable, especially for those with multiple devices. Therefore, working with Telkomsel on NB-IoT will reduce the mobile data costs of eFishery's Smart Feeders.

Between March and September 2018, eFishery successfully completed an NB-IoT pilot with support from Telkomsel. The first commercial model of NB-IoT devices is now being rolled out.

TELKOMSEL

> "eFishery Smart Feeder brings a new business model and opportunity to Telkomsel. Most importantly, the solution will have a positive impact on Indonesia's aquaculture industry and inspire other developers and start-ups to work on IoT-based solutions to solve Indonesia's challenges. The project development is challenging, but eFishery's team is highly capable and competent. The team has been fully committed and responded in meeting the expected outcome."
>
> **— Amelia Kemalasari,
> General Manager Business Development, Telkomsel**

Changing lives

2 ZERO HUNGER

Fish consumption per capita in Indonesia was estimated at close to 34 kg per year,[8] a significant share of total protein consumed.[9] By adopting eFishery's Smart Feeder, small and mid-size fish farmers can increase their productivity, lower their costs and, in turn, reduce prices for consumers. According to a study conducted by eFishery, some farmers have seen up to a 92 per cent increase in net profit after a year of using eFishery's devices.

14 LIFE BELOW WATER

Overfeeding in fish farming significantly increases the amount of organic matter like ammonia or nitrate in water. This is not only dangerous for aquatic organisms, but unsustainable for the industry over the long term. eFishery's solution helps reduce and prevent overfeeding by allowing farmers to feed their fish and shrimp optimal amounts with less pollution in the water.

"eFishery's Smart Feeder has shortened our harvest cycles and improved our water quality. Our feeds are always in great nutritious condition since they are on top of the water for a much shorter period of time before being eaten. My pond's feed conversion ratio has improved significantly. The shrimp sizes have evened out because the Smart Feeder distributes the feeds more evenly."

– Rio Albab, Shrimp farmer from Karawang, West Java

"eFishery's product surely helps improve feeding efficiency. The feed is more efficient because of the control and sensors from the feeder. We hope more farmers adopt eFishery's innovation."

– Slamat Soebjako, General Director of Aquaculture, Ministry of Marine and Aquaculture Indonesia

Working with the GSMA Ecosystem Accelerator

In February 2018, eFishery received a grant from the Ecosystem Accelerator Innovation Fund to extend its value proposition to fish and shrimp farmers by adding more features to its product offerings, including a farm management feature and a financing dashboard that will connect farmers to financial institutions. The funding is also being used to conduct the NB-IoT pilot project with mobile operator, Telkomsel.

By the end of the grant in early 2019, the project is expected to help over 1,000 small-scale fish farmers achieve a combined total of £100,000 in incremental revenue. This is expected to drive job creation at their farms.

6   GSMA Intelligence: www.gsmaintelligence.com
7   NarrowBand-Internet of Things (NB-IoT) is a standards-based low-power wide area (LPWA) technology developed to enable a wide range of new IoT devices and services. NB-IoT significantly improves the power consumption of user devices, system capacity and spectrum efficiency, especially in deep coverage. The battery life of more than 10 years allows a wide range of use cases. Learn more at: https://www.gsma.com/iot/narrow-band-internet-of-things-nb-iot/

8   Ipsos, 31 August 2016, "Indonesia's Aquaculture Industry: Key Sector for Future Growth", https://www.ipsos.com/en/indonesias-aquaculture-industry-key-sectors-future-growth.
9   FAO, 2015, "The consumption of fish and fish products in the Asia Pacific region based on household surveys", http://www.fao.org/3/a-i5151e.pdf.