



Water Usage in Recirculating Farms

Fact Sheet | July 2011

CLEAN WATER is a precious resource to be wisely utilized and conserved. Irrigation claims about 70% of the water that we use.¹ The excess water leaving farms is often contaminated with silt, pesticides, herbicides and fertilizers making it unfit for reuse.²

Recirculating farms are space and energy efficient, and low or no waste output. They use water to grow fish and a wide range of plants. The key feature of these farms is that they can clean and re-use water that is then continuously circulated throughout the farm. There are various types of recirculating farms — for example, those that grow plants (hydroponics), those that grow fish (on-land aquaculture) and those that grow both plants and fish (aquaponics).

Various methods can be used to treat and clean the water from the fish tanks and make it reusable. Many farms remove most waste mechanically and break down the remainder biologically. When the waste is removed some of the water is also removed from the system. Ideally, recirculating farms only replace very small percentages of the total water volume, due to some loss during waste removal and/or evaporation (<1% daily water exchange).³

Recirculating farms can grow plants and fish in an ecologically and economically sustainable manner. They can use

much less water than many other aquaculture and agriculture systems

Water usage is especially important in dry climates, like in the U.S. Virgin Islands. The University of the Virgin Islands Agricultural Experiment Station operates an aquaponic farm — they grow both fish and plants. The farmers at UVI continue to conduct research with new techniques for conserving water. Their commercial sized farm is 29,000 gallons of water and produces 1,400 cases (24–30 heads per case) of leaf lettuce and 11,000 lbs of fish over the course of a year.⁴ This system requires a daily water addition of 1–1.5% of the total system's volume, due to water lost in waste removal, evaporation and evapotranspiration from plants. An addition of 1.5% of the system's volume amounts to 435 gallons daily. This may sound like a lot of water, but if you compare this to the amount of water used to produce lettuce traditionally, in the ground, you get a better sense of the efficiency of recirculating farms. According to United Nations Educational, Scientific and

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Cultural Organization (UNESCO) on average 1-lb head of lettuce requires an average of 15.9 gallons of water to grow.

For the sake of comparison, for a moment set aside the 11,000 lbs of fish the UVI farm produces and focus just on the lettuce and total water usage. The UVI farm provides approximately 37,800 heads of lettuce with the estimated weight of 0.65 lbs per head. This equals 24,570 lbs of lettuce per year. Over that same year, the farm is filled once with 29,000 gallons and has 435 gallons added daily, equaling 158,775 gallons added over the year. With all of this in mind, the overall total to run the farm for a year is 187,775 gallons. Therefore, the UVI farm can produce one pound of lettuce using less than half the water of traditional farming techniques — around just 7.6 gallons of water. The UVI farm can produce the same amount of lettuce as traditional agriculture, using half the water, PLUS 11,000 lbs of fish!

Recirculating farms can be an eco-friendly way to supplement wild caught seafood and provide fresh vegetables, herbs fruits and more for consumers interested making every drop count.

1. Despommier, Dickson. "A farm on every floor." *New York Times*. August 24, 2009.
2. Ibid.
3. Torsten, E.I. Wik, et al. "Integrated dynamic aquaculture and wastewater treatment modeling for recirculating aquaculture systems." *Aquaculture*. 287. 2009 at 361-370.
4. Rakocy, James. "The UVI Aquaponic System." Clean, Green, Sustainable Recirculating Aquaculture Summit. Washington D.C.: hosted by Food and Water Watch. January 2009.

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