

# Aquaculture to Aquaponics Initiative (Ag2030) Combining the World of Fish farms and Hydroponics

## Today's solution to Today and Tomorrow's problem

### The Big Problem

The Ag2030 challenge asked that we find a solution to help the Australian Agriculture Industry reach the target of 100 billion dollars in production by 2030. Australia is currently around \$70 billion. This we need to double what we are currently doing today in 8 years. We can't just double the land we use or the water we use as this would just be unsustainable. We need to increase productivity of land and water, the worth of the produce and the effectiveness of technology to achieve this. While being conscious that time is limited and a solution for around 10 years' time is practical in the long run but not for this target. We need to use today's technology to solve today's challenge.

### The 'Smaller' Problem

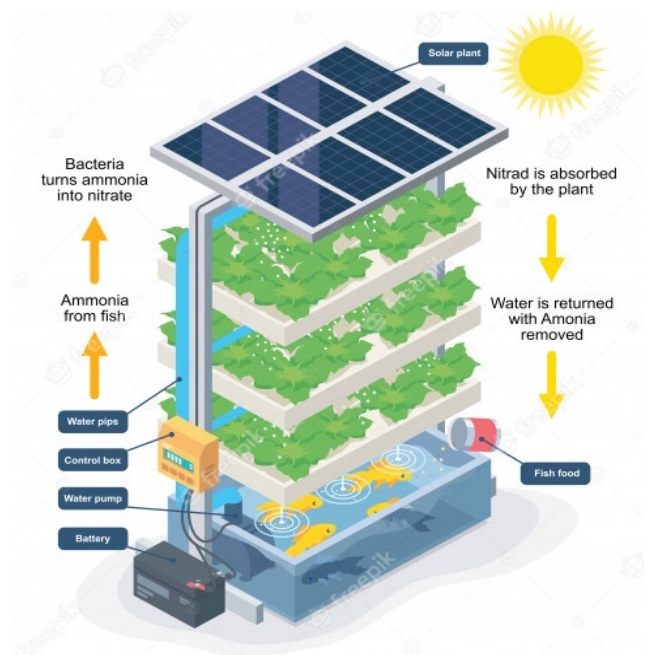
The fish farming industry is massive in Australian with "production value expected to rise by 21% in 2020-21 to **\$3.40 billion** following the assumed normalisation of export markets." Fish such as barramundi, salmon, prawns, and tuna, are often farmed inland which is referred to as aquaculture. However, this industry is far from clean as with housing hundreds and thousands of fish together comes a lot of waste. This can negatively affect the surrounding environment as seen with the Tasmanian Salmon creating **major problems for the surrounding bay due to their waste**. What if there was a way to effectively use their waste sustainably and increase amount production coming from a farm.

### The solution

**Aquaponics** use fish waste to become plant food that the plants then clean the water that then returns to the fish. A closed system that is well known to be **95% more effective at water usage**. Not only then can the farmer sell their fish but also the produce created by the aquaponics system. This means that the productivity of the land is increased. Not only does it produce another revenue stream, but the plants produced have a higher yield with basil known to have a **3X higher yield** than when grown using traditional farming methods. This can be compounded with the use of stacking the **planting vertically** to get more out of the land size. Another benefit is that **zero pesticides** are required. Best of all, this technology exists right now and can be used now.

So how is this to be implemented?

Well, the inland fresh water aquaculture already have ponds filled with fish. By then building an aquaponics system **in relation to or on top of the existing aquaculture system**. Commercial aquaponics have already started appearing in USA with companies like 'Agriculture Solar™ Aquaponics' providing all in one setup services. However, retro fitting existing aquaculture is what is being proposed.





Aquaponics system uses a large amount of energy, but this could be combated by solar panels and other **sustainable energy** solutions. This not only improves the environmental impact and allowing the farming industry to move to more sustainable future which would eventually happen anyway.



Yes, these sorts of facilities don't come cheap. An exact number is not easy to find, so this has made this element difficult, but it would be estimated around \$500,000 per farm (though this number is highly dependent on a number of variables). This is the main issue in the profitability of aquaponics. The solution would be creating a government initiative giving grants or interest loans to help farmers set up the facility. Then farmers can also focus produce that are higher in value, such as tomatoes, lettuces, and basil to help increase the production value of the farm. Effective aquaponics are known to have a **return on investment in as little as 2.5 years** (Agriculture Solar, 2022).

**This means that closed loop aquaponics are more water effective, have increased crop yield and land productivity by effectively using existing technology.**

## Bibliography

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