

Empowering the citizen to become a scientist

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Questions

How do citizen scientists conduct science?

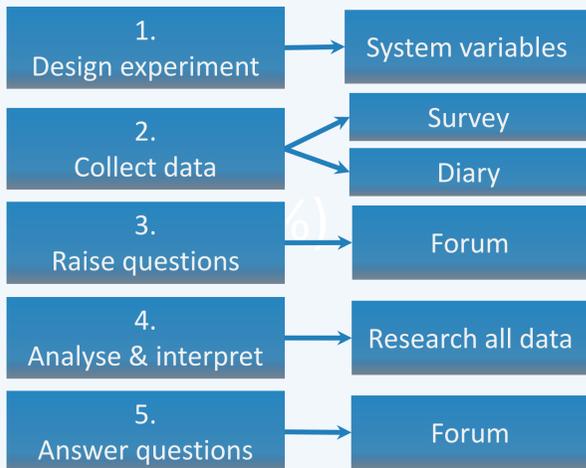
Like Scientists?

The Participants

Citizens with home aquaponics systems

- like to experiment
- Already structured data
- raise questions (hypothesis) that can be answered by the collected data

Role of Citizens



Their Research Findings

Data collected and results obtained

is similar to professionals[2]

water usage of 131 l/kg similar to other studies[3]

136 l/kg and compares to 322 l/kg for ground based agriculture[4].

However their conclusions were not based on analysis of the data.

“Yellowing leaves” may be caused by high of pH levels restricting the uptake of iron.

Another systems with high pH added supplementary nutrients which may have negated the effect of high pH levels.

Mixed from a scientific perspective

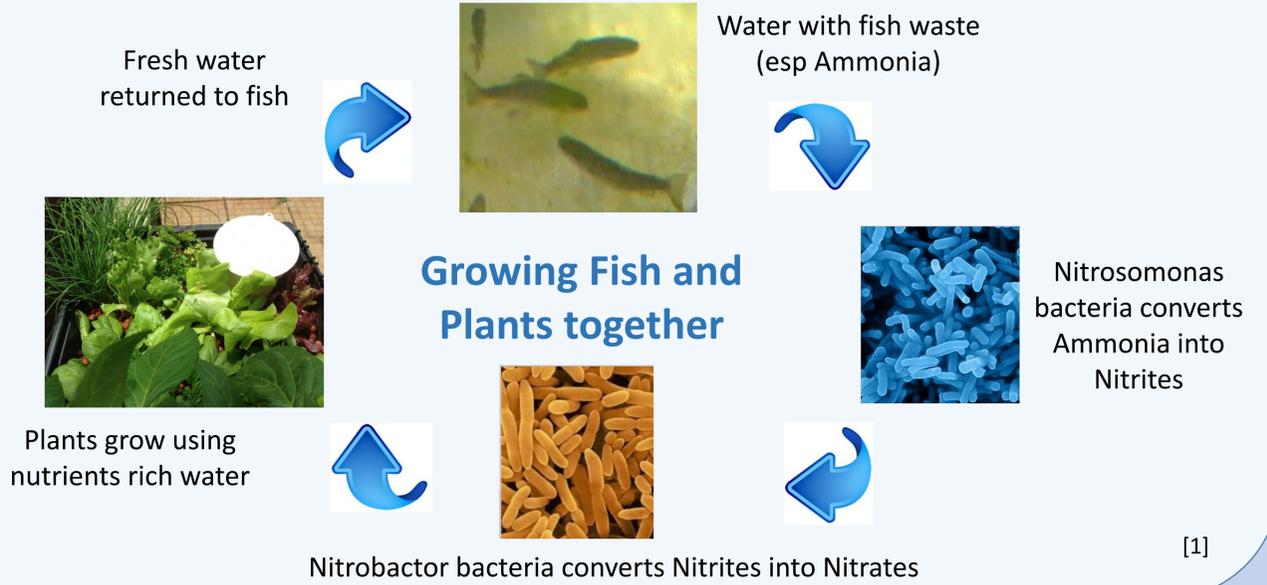
Did citizens do real science?

Sort of but the way they attempt answer their research question was practical rather scientific.

“It works for me so it must be right”

With thanks to all the participants for their invaluable contribution

Aquaponics

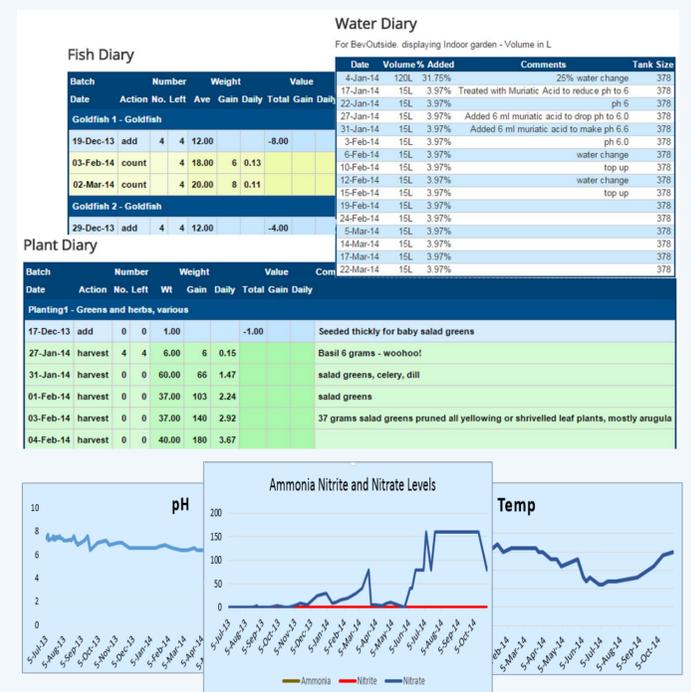


Individual Research

BevOutside (Canada) built a basement system to provide salad greens in winter.



She harvested 1,713g of salad greens using 225 litres of water.



Group Research

Does high pH levels affect the health of the plants?

Participants:

Looked up past research: eg referenced popular Aquaponic Sites (recommend 6.5)

Collected data: 4 participants have pH >8, all other participants had lower pH levels.

Examined their own experiments:

- “Most of my Kale is fine but some have yellowing leaves “
- “my plants look healthy and my fish are thriving so no problem”

Experimented with different pH level and found it made no difference to their plants.

Concluded high pH is not a big problem



Further research could inform the type and level of guidance or training required to enhance the ability for participants to analyse the resulting data.

A meaningful way of validating and disseminating their results, similar to peer reviewed journals is also required [5].

References

1. Bernstein, S. (2011). *Aquaponic Gardening: A Step-By-Step Guide to Raising Vegetables and Fish*: New Society Publishers.
2. Bishop, M., Bourke, S., Connolly, K., & Trebic, T. (2009). Baird's Village Aquaponics Project: McGill University, Barados.
3. Viladomat, L., & Jones, P. (2011). Development of Aquaponic Systems for Space and water Efficient Food Production: Byspokes Organisation.
4. Mekonnen, M. M., & Hoekstra, A. Y. (2012). A global assessment of the water footprint of farm animal products. *Ecosystems*, 15(3), 401-415.
5. Hargreaves, D. H. (1999). The knowledge-creating school. *British journal of educational studies*, 47(2), 122-144.