Aquaponics - from ammonia to salads.

Dr. Simon Goddek

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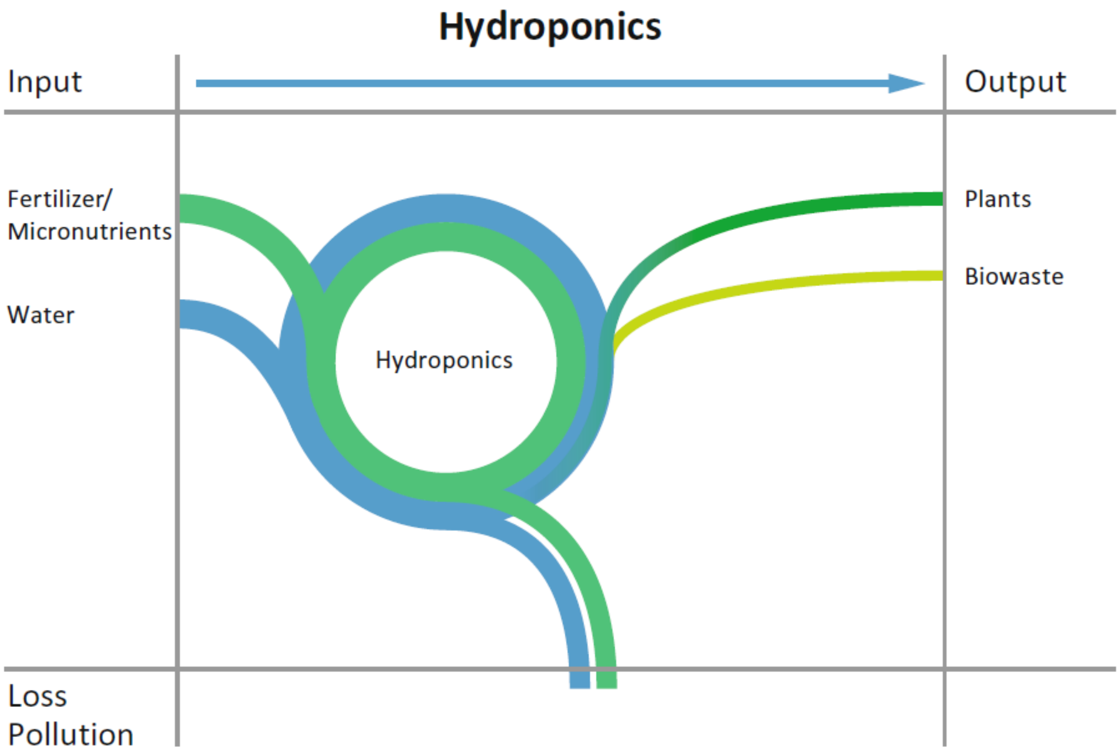
Why Aquaponics?

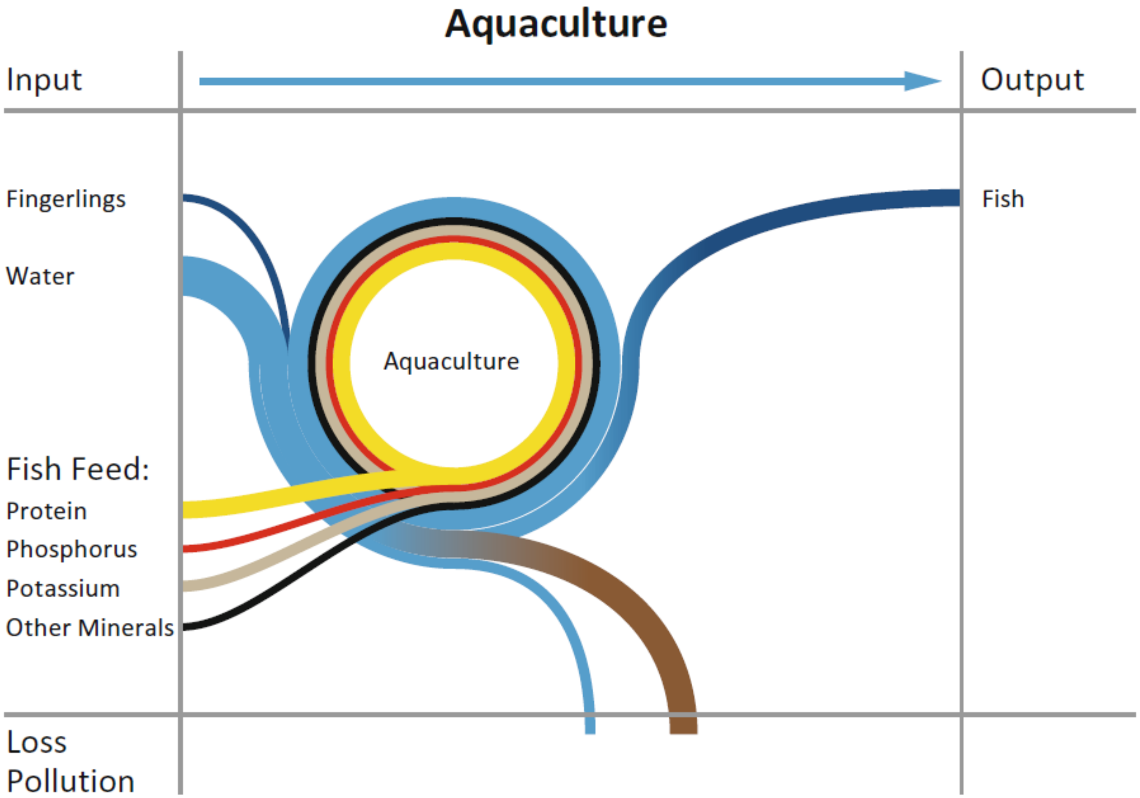
Hydroponic System

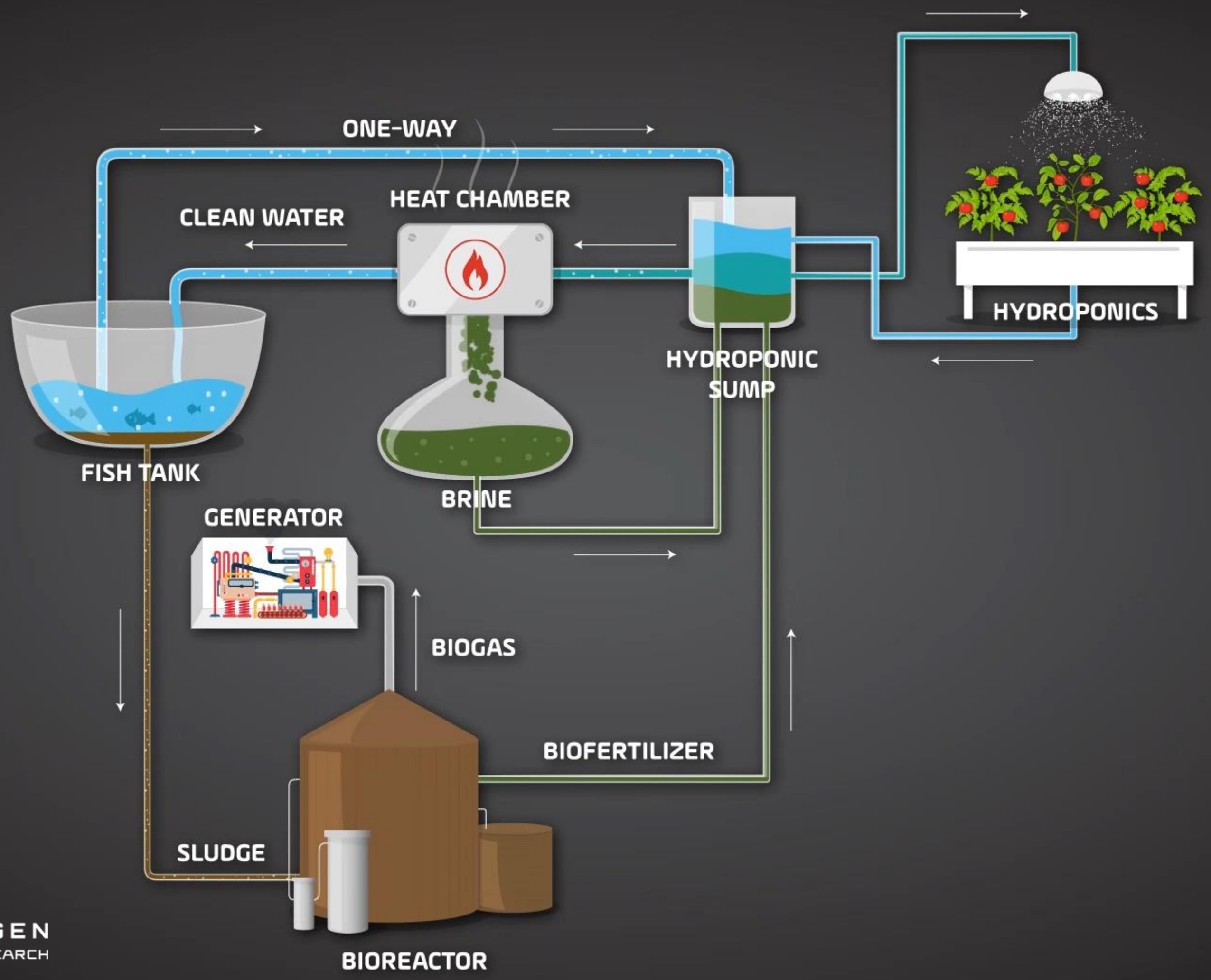
Environmental Impact #1



RAS System

Environmental Impact #2





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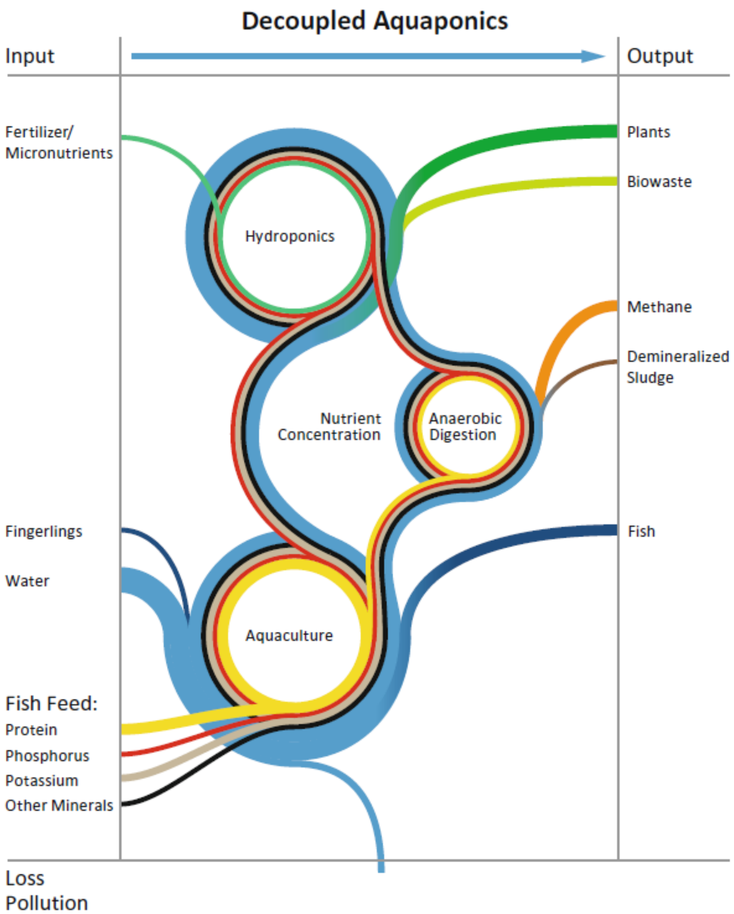
Environmental Impact #3



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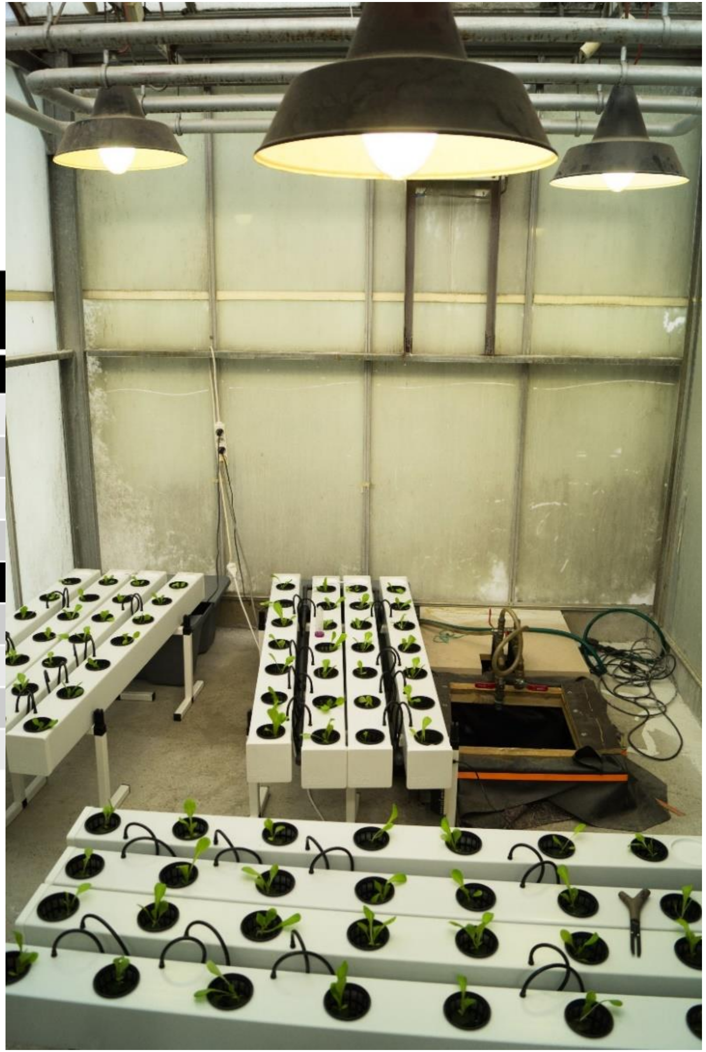
Growth Rate: Not Saline!

Treatment [1]	(N) [2]	Shoot Fresh Weight (g/Plant) [3]
		Trial 1
CAP	26	136.28 [a]
HP	26	98.17 [b]
AP	25	80.55 [b]
Significance		*** [4]
		Trial 2
CAP	24	55.05 [a]
HP	20	39.64 [b]
AP	25	35.72 [b]
Significance		**

(Delaide et al. 2016)



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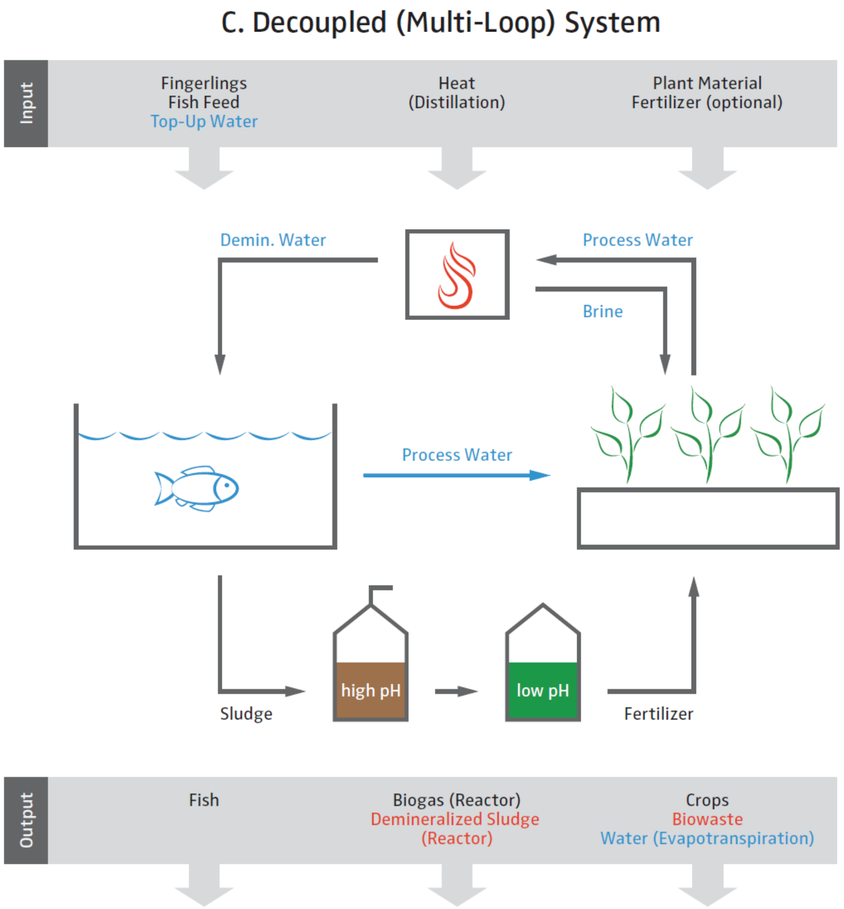
Plant Integration



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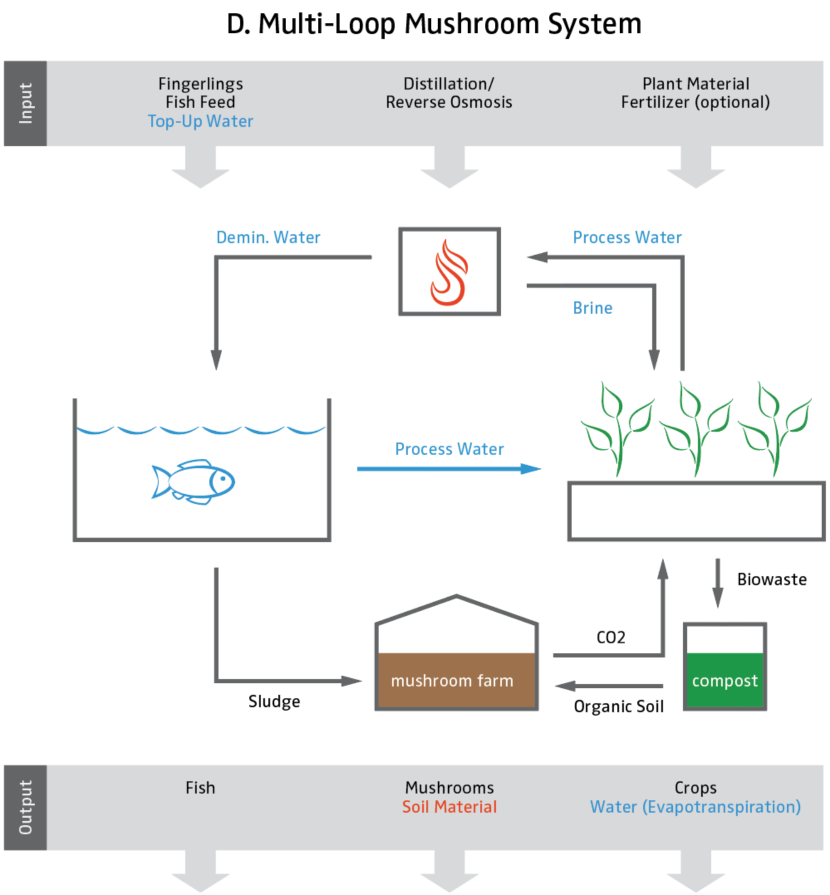
Mushroom Integration



Salinity?

Open Access | Published: 10 August 2018

Comparison of *Lactuca sativa* growth performance in conventional and RAS-based hydroponic systems

Simon Goddek & Tycho Vermeulen

Aquaculture International **26**, 1377–1386(2018) | Cite this article

Abstract

A recent study related to aquaponics has shown that hydroponic lettuce grown in aquaculture-derived supplemented water grew significantly better than lettuce grown in a conventional hydroponic system. The principal objective of this study was to verify this finding in a larger setup. Even though the aquaculture water that was added to the aquaculture-based hydroponic system contained relatively high amounts of sodium, we were still able to observe an enhanced growth performance of the lettuce in that system compared to the lettuce grown in the conventional hydroponic nutrient solution. The lettuce final fresh weight was 7.9%, and its final dry weight even 33.2% higher than the one of the hydroponic control.

Review Paper | Published: 15 March 2011

Salinity stress alleviation using arbuscular mycorrhizal fungi. A review

Rosa Porcel, Ricardo Aroca & Juan Manuel Ruiz-Lozano

Agronomy for Sustainable Development **32**, 181–200(2012) | Cite this article

Abstract

Salinity is one of the most severe environmental stress as it decreases crop production of more than 20% of irrigated land worldwide. Hence, it is important to develop salt-tolerant crops. Understanding the mechanisms that enable plant growth under saline conditions is therefore required. Acclimation of plants to salinized conditions depends upon activation of cascades of molecular networks involved in stress sensing, signal transduction, and the expression of specific stress-related genes and metabolites. The stress signal is first perceived at the membrane level by the receptors and then transduced in the cell to switch on the stress-responsive genes which mediate stress tolerance. In addition to stress-adaptative mechanisms developed by plants, arbuscular mycorrhizal fungi have been shown to improve plant tolerance to abiotic environmental factors such as salinity. In this review, we emphasize the significance of arbuscular mycorrhizal fungi alleviation of salt stress and their beneficial effects on plant growth and productivity. Although salinity can affect negatively arbuscular mycorrhizal fungi, many reports show improved growth and performance of mycorrhizal plants under salt stress conditions. These positive effects are explained by improved host plant

Algae Production (Ulva/Seaweed)

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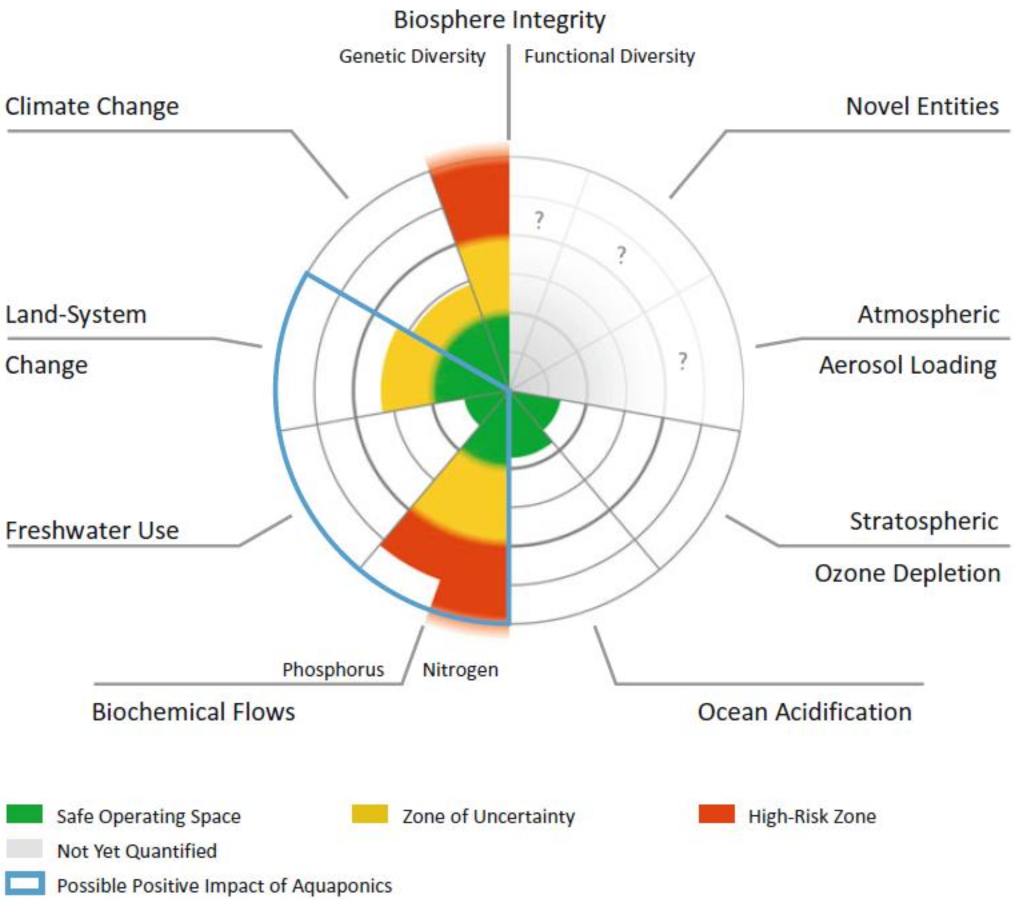
Planetary Boundaries



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Thanks for listening!