Azolla- Biological way of nutrient recovery

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Azolla is an aquatic fern harboring symbiotic association with diazatrophic, nitrogen fixing blue green alga *Anabaena azollae* residing in leaf cavities. This symbiotic association allows alga to fix atmospheric nitrogen sufficient for itself and its host. The fern, on the other hand, provides a protected environment for the alga. It is very gregarious fern doubling its biomass in 2-3 days, storing fixed nitrogen in its biomass. The nitrogen fixing property of fern has led to its usage for different functions such as natural source of nitrogen fertilizer and livestock feed. Apart from fixing nitrogen, it also fixes atmospheric carbon thus reducing carbon load in the atmosphere. It has traditionally been used in Asian countries to provide nitrogen source during rice cultivation. However, its growth is dependent on phosphorus content of soil and water.

I proposed in the given solution that it should be possible to grow Azolla on slurry obtained from biogas plants or waste-water rich in phosphorus. Azolla plants grown on waste-water will extract phosphorus and nitrogen in addition to fixing atmospheric nitrogen and carbon. The accumulated phosphorus and nitrogen in the biomass of Azolla can be returned back to soil as fertilizer or may be used as livestock feed. The small-scale studies performed mostly in Asian countries suggest upto 80% phosphorus recovery from waste-water using this method. It is adaptable to small and large-scale treatments and should be compatible with existing waste-water treatments. Thus, it offers a biological, cost-effective, sustainable and environmental friendly way of nutrient recovery.