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Microalgae: The potential next two nails in Malthus's coffin

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Microalgae can be cultivated on minimal amounts of seawater using fertilizer and industrial carbon dioxide in desert facilities near oceans (for cooling). Unlike conventional crops, the whole plant utilized all the fertilizer applied, covered the land continuously, and grown exponentially with continuous harvesting, and all the crop is utilized. Algae yield was 10-20 times more than conventional crops without competing for arable land. The high protein and omega-3 fatty acid composition of algae rendered microalgae as ideal replacements for both fishmeal and fish oil in animal diets, especially for carnivorous fish. They could eventually replace soybean meal and oil in animal diets, and biofuels. Domesticated algae have the potential to be the next quantum leaps that confound Malthus's prediction on resource availabilities. Deleting genes (e.g. nitrate reductase) that are unnecessary for growth in bioreactors, yet necessary in natural environments will mitigate risks from environmental spills. Previous high production costs precluded economically cultivating algae for bulk feed and fuel products. We are developing engineering solutions that overcome these high costs by vastly reducing the amounts of water used, the energy costs of mixing the algae and for gas exchange as well for cooling and harvesting. This high algal density in a thin layer cultivation, in a closed, floating horizontal bioreactor made of thin plastic sleeves without rigid superstructure, using low-energy vibrationally generated shear waves for mixing algae and for gas exchange should inexpensively produce uncontaminated high quality algae as a source of feed and biofuel.

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Augmenting food security through agricultural input subsidy: An evaluation of national agricultural input voucher scheme (NAIVS) with impact on female-headed households in Tanzania

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Agricultural input subsidies have often been promoted as the solution to target food insecurity. This paper aims to investigate the impact of the national agricultural input subsidy (NAIVS) on small-scale farmers in Tanzania particularly, for household food security, while investigating if the programme had any differential impact on female-headed households. On examining the general impact of the NAIVS on small-scale farmers, it is clear that the programme did affect food-security at the household level. Literacy also had a significant impact on household food-security and in terms of production. In terms of the specific impact of the programme on female-headed households, beneficiary female-headed households preferred spending more on education, birth control and family planning. They were also more food-secure and consumed more meals on an average, while the non-beneficiary households preferred spending more on food-suggesting a lack of food self-sufficiency. However, this cannot be attributed the input subsidy alone and needs further research. This paper aims to inform policy-making around agricultural input subsidies and its impacts on female headed households.

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