GSD

GLOBAL SCIENCE DIRECTIVE

Sustainable Agriculture Project

As the human population continues to increase worldwide, developing countries frequently suffer from lack of quality food and clean water for its population. The sustainable agriculture project is being designed to generate large amounts of food with comparatively little human input for deployment in regions suffering from hunger. Development of this project is also important for educational purposes as students and researchers are challenged to design a large and complex system that will need to supply all the organisms involved with the appropriate nutrients and minerals necessary for life. The ultimate ideal of such a system is that the only real input should be sunlight as plants and algae can be used to produce nutrients that can in turn be used to feed larger organisms such as fish, goats, and ultimately humans. Many organizations are actively involved in the development of this technology for its implications in hunger abroad, hunger in local communities, and even for exploration beyond our planet.

Aim 1: To develop a sustainable system built on algae and plants. This system will be designed so that water is recycled and the only input comes from the sun. Specific species of bacteria and plants will be necessary for the production of all essential nutrients required for the successful growth and development of the organisms.

Aim 2: A new level of complexity will be added to the system by introducing insects and small fish species. These organisms will be especially important for their abilities to produce the types of nutrients necessary for the health and growth of higher-order animals and to recycle various waste products back into the system.

Aim 3: Higher-order animals will be added to the system such as chickens, goats, and larger fish. As the caloric demand increases, it will be increasingly important to maintain the quality and quantity of the microbial populations in the system. Modifications will be made to optimize growth and development conditions. Veterinarian assistance will be required to monitor the health of the animals.

Aim 4: Trial systems will be developed and implemented in the local community to supplement the food supply. If adequate production is maintained, the system will be expanded for deployment overseas. Differing environmental conditions will have to be accounted for and the system will be modified to compensate for obstacles inherent in the selected regions.