Increasing the Efficiency and Sustainability of Aquaponics

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It is estimated that by 2050 the human population will increase from the current 7.7 billion to 9.8 billion. To sustain this rapid growth, agricultural techniques must become more efficient. This project investigates the effectiveness of Aquaponics as a viable option for sustainable food production. The aim of this project is to modernize Aquaponics and increase its efficiency in food production and make it a more self-sustaining system. Aquaponics has been used for 1000 years and works off the principle of symbiosis, whereby plants and fish live and benefit each other. The method used to achieve this was by in cooperating solar panels and hydroelectric generators. By using solar panels, electricity is generated to run the single pump and heater needed to operate the system. The addition of hydroelectric-generator allows the harnessing of free-flowing water to run the light emitting diodes, giving plants a day-night cycle. The results were encouraging, the system was able to run continuously without the need for electricity from power outlets. Plant and fish growth were not inhibited, and the yields were adequate for a small-scale aquaponics. Raspberry Pi was used to gather data via photographic imagery and raw data. This was sent to a cloud service allowing other aquaponics users to download the data for optimal growth, digitalizing aquaponics for global use. The project aimed to be an efficient and self-sustaining aquaponics system. From the results gathered, it shows to be a promising agricultural technique that can help sustain the ever-growing food demands

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