

# CALIFORNIA STATE SCIENCE FAIR 2002 PROJECT SUMMARY

Name(s)
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Project Number

22028

**Project Title** 

Growing Crops Using Recycled Water and Biological Filtration

## Objectives/Goals

According to a report released by the United Nations Population Fund, the world's population is approaching the point where there will not be enough fresh water to go around for basic human needs and to irrigate crops. Unfortunately, when irrigating crops, large amounts of water are jost through the soil. As the water flows downward, it also dissolves nutrients in the soil (especially the nitrogen compounds) leaving it depleted and dry.

**Abstract** 

The experimenter hypothesizes that a crop growing system can be designed where the only water loss occurs through evaporation and where fertilizers are added to the soil naturally. Such a system would allow even those areas with limited amounts of water to become fertile farmlands. The objective of this project was to dertermine if such a system could be built and if it would work as expected.

### Methods/Materials

To prove that such a system can be built and that it will work as expected, the experimenter designed who she calls a #bio-channel#. The bio-channel recaptures all unused water and, through biological filtration, adds nitrates to the water providing fertilization.

The experimenter built a small-scale model of the bio-channel she planted Red Apple in the bio-channel and observed the growth and health of the plants. The aminoria, nitrite, and nitrate levels were measure regularly to determine the effectiveness of the biological filter and all water loss was recorded.

### Results

Over a 10-week period the bio-channel worked as expected; the plants grew and flourished. Tp biological filter created more than enough nitrates (indicating additional plants could be supported) an less than one gallon of water was lost per week.

### **Conclusions/Discussion**

The experimenter#s hypothesis was supported by the experimental results. The bio-channel worked as expected allowing the Red Apple to grow and flourish. The water loss was minimal and the biological filter created more than enough nitrates inflicating that a larger soil bed containing additional plants could be supported. Using this system of a larger scale will hopefully produce similar results.

## **Summary Statement**

My project tried to determine if it was possible to create a crop growing system which would recycle it's water and would create its own fertilizers.

### Help Received

Parents helped create model and took pictures. Parents & teachers help proofread report.