

Manufacturing Simple Devices for Hydroponics to Produce Leafy Greens Effectively

Objective

Focus on Hydroponic devices: one effective way of solving labor shortages

Made hydroponic devices to carry out circulation culture that can make our society more sustainable

Methods

Materials used

Frame (shelves of stainless steel, tanks of culture fluids, etc)

Cultivation tubs (plastic trays, simple intake pumps, etc)

LED Lights (Red, blue and green)



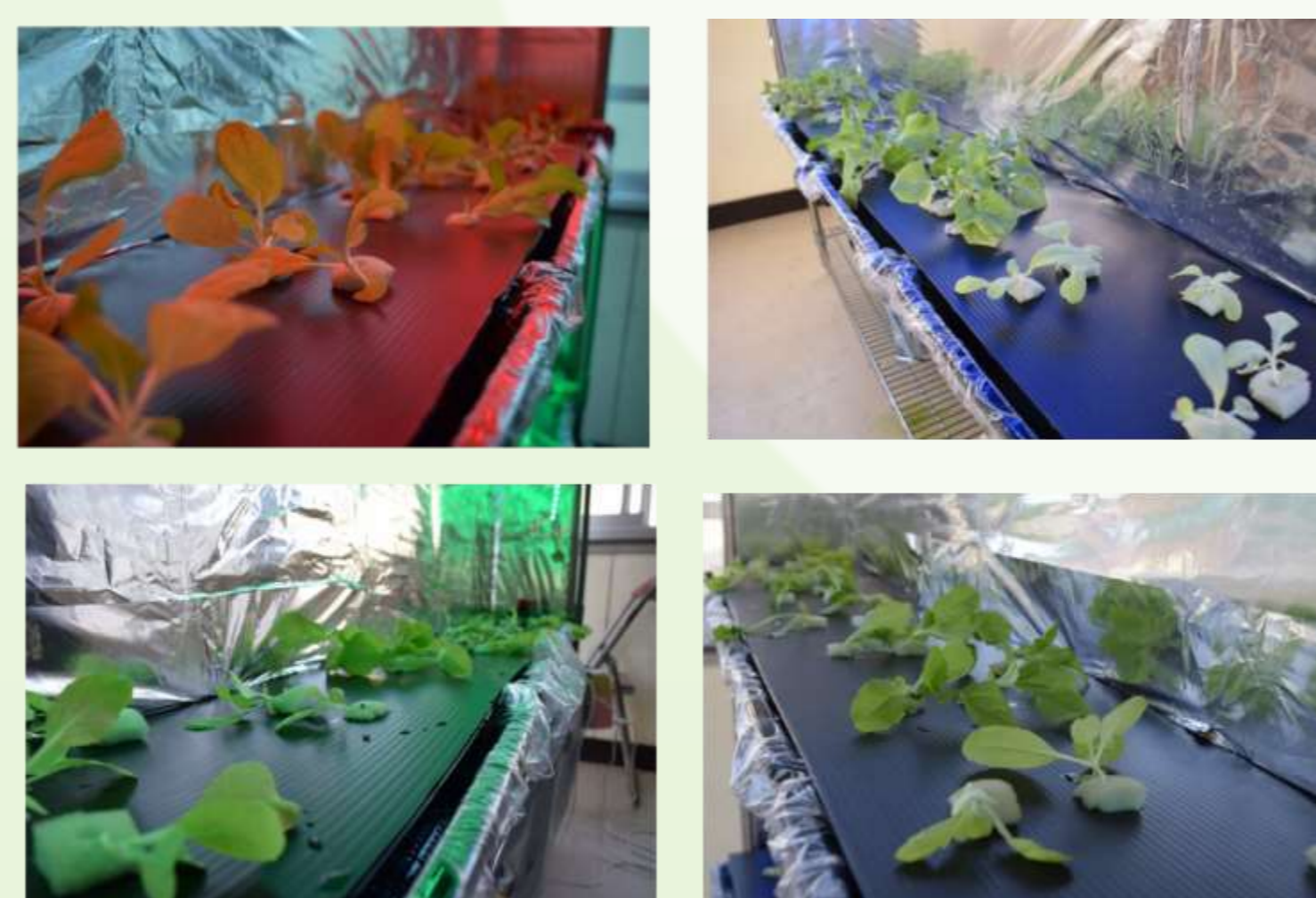
▲ Figure1 Frame



▲ Figure2 Cultivation tubs

Cultivated Vegetables

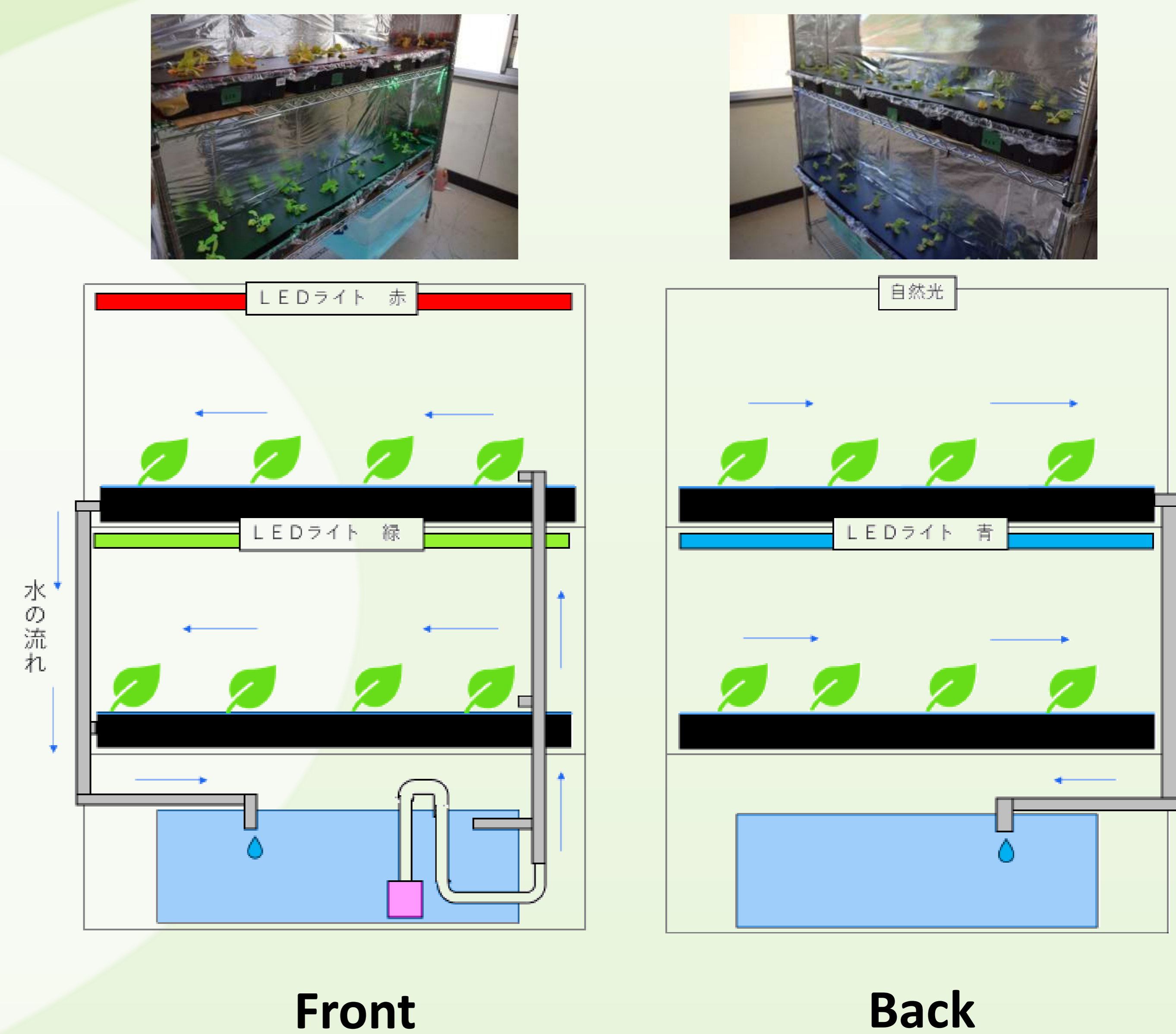
Lettuce, leaf lettuce, Korean lettuce, bok choy (Chinese vegetable)



▲ Figure3 LED supplement (Red, blue, green and sun light)

LED light supplement

Observe growth differences among red, blue and green LED lights

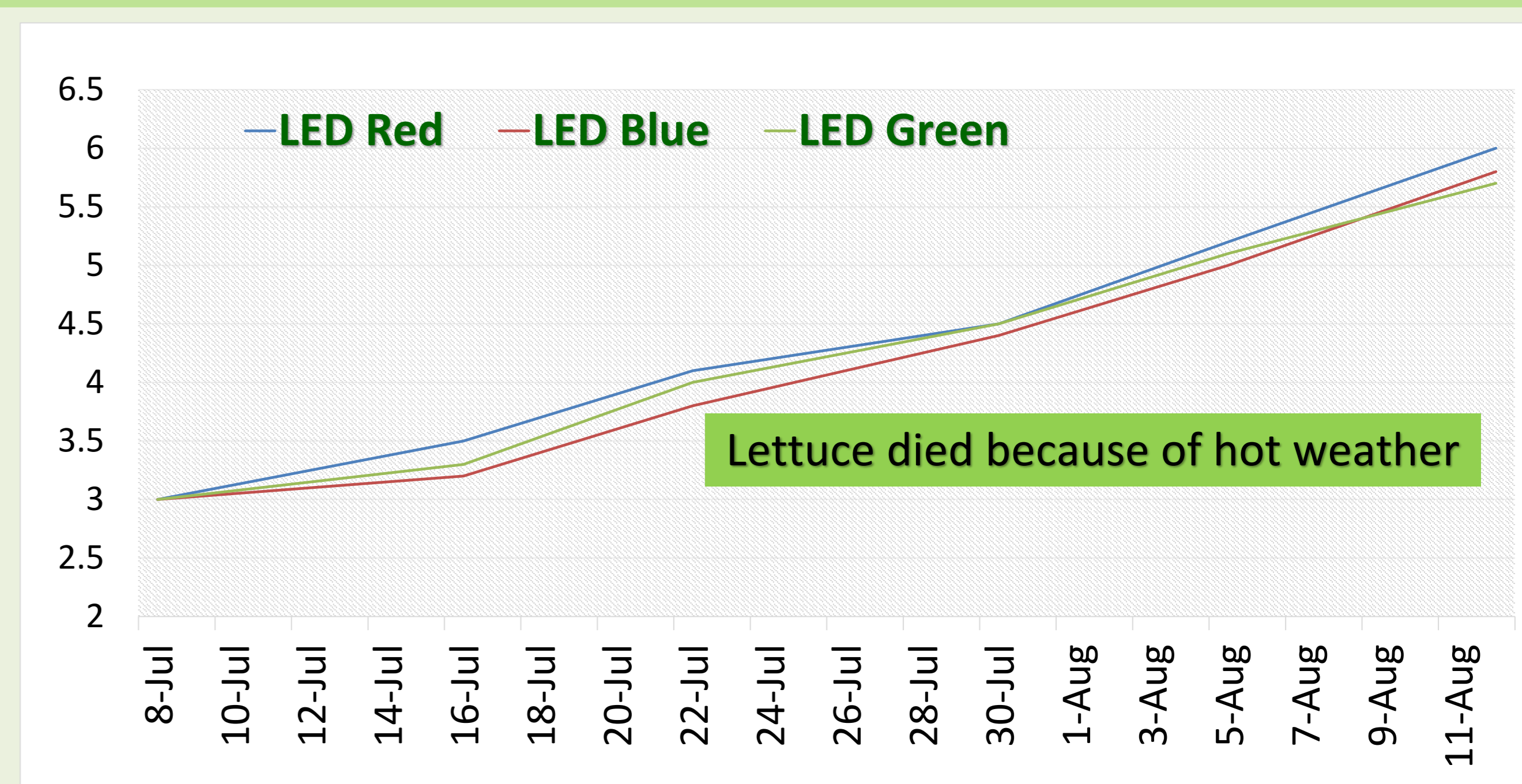


▲ Figure4 Hydroponic devices

Results

▼ Table1 Failures and ways to improve

Failures	Cause	Ways to improve
The plants grew prematurely	Insufficient lighting (Used only LED lights)	✓ Use LED lights and sun light
Bad growth	It was too hot for the vegetables to grow	△ Use air conditioners



▲ Figure5 the number of lettuce leaves sift (An average of 5 lettuce for experiment)

Conclusion

There were almost no differences by visual inspection

Next steps

- Measuring the difference of carbon dioxide consumption by photosynthesis in each experimental fields with CO2 monitors
- Continuing to look into what kind of light environments are necessary to raise plants
- Finding how to bring more attention to hydroponics cultivation research