Tomato transplants in a biofilter (composed of sand, bacteria, and plants) shown being irrigated with aquaculture water for the first time.

Each biofilter was associated with a fish tank (not shown) of 0.5 cu m. in volume. Each tank was stocked with 39 tilapia fingerlings (average weight = 14.8 g ; approximately 5-7 cm in length).

View of the research greenhouse approximately one week after transplant of tomato crop. There were 16 separate tank:biofilter systems (4 each of 4 different ratios of tank to biofilter volume). The tanks are below the wood-grate walkway. Plant population per biofilter was proportional to biofilter volume (plant number ranged from 4 to 14 plants per biofilter).

Tomato crop after two weeks in the biofilter. Note that algae populations are developing in the irrigation furrows. The algae utilize nutrients in the water in excess of what the plants are currently utilizing. When the plants begin to grow more rapidly the algae will die and release the nutrients which they have stored back into the biofilter for the plants use.

Tomato crop after four weeks of growth in the biofilter. Flowering has started.

Fruit set was excellent and expansion was rapid.

Fruit quality was high from the first trusses (shown) to the last.

Fruit set was excellent and expansion was rapid.
Lush green foliage shows no nutrient deficiencies.

Tomato vines after 18 weeks (note: all fruit has been harvested)

Fruit harvested during the final picking (trusses 5-8). Shown is 239 kg of fruit which represents 58% of the 408 kg total yield from this crop

After 100 days the fish have increased from an average of 14.8g to 216.5g. During the first tomato crop (100 days) the fish increased 110 kg and the plants yielded 309 kg of fruit. The total fish feed input was 149 kg. We harvested 97 kg of fish and the remainder were restocked.

One week following transplant, the cucumber plants are beginning to establish root systems in the biofilter. The algae populations have grown rapidly, storing nutrient for later use.

Two weeks following transplant, the cucumber plants are starting to grow very rapidly. Note the algae populations have almost disappeared since they are now out competed by the plants for nutrients and are also being shaded by the developing plant canopy.

Four weeks from transplant, cucumber vines are vigorous, fruit is being set.

Eight weeks from transplant, cucumber fruit set and expansion is rapid.

Close-up view of developing cucumber fruit.

A sample of the cucumber fruit harvested. Cucumber fruit yield over the 85 day crop interval from 128 plants was 378 kg (264 kg as Grade No. 1).

Fish growth during the 85 day cucumber crop period totaled 51.3 kg. The average fish increased in weight from 161 g to 442 g. (Not shown).

Following a third crop cycle of tomato (not shown) the fish had increase to an average of 690 g but the total increase in fish weight was just 41.3 kg. The reduced increase in fish growth rate during this crop was due to the fact that larger fish grow more slowly that smaller fish. Harvesting the fish at a smaller size (250 - 350 g) results in higher total yield.

A second tomato crop (third crop cycle) yielded 408 kg of fruit.

Following the second tomato crop, 111 kg of fish were harvested.

The total harvest for the three crops (320 days) was 221 kg of fish, 717 kg tomato and 378 kg cucumber. Total fish feed input was 249 kg. Total water used was 72 cu m. including 4 cu m. known to be leakage.

Photograph taken from a video (from television screen, please excuse the poor quality) illustrating the size differential between a fingerling and the fish harvested after 46 weeks.