

Urban aquaponics in CPH

Dr. Paul Rye Kledal/ www.igff.dk



Personal introduction



- Agricultural Economist, PhD
- Researcher at CPH University (12 year)
- Organic Farming – economic organization of value chains – Developing countries
- Started **IGFF** and its affiliate **CHINAMPA Ltd.**
- Main focus on **Urban farming & Aquaponics**
Research projects with Norway, Iceland, Spain

www.igff.dk

Urban roof top aquaponics in CPH



- **1.200 m² roof shares with another company leaving each a production space of 500 m²**
- **Estimated aquaponic production: 4-5 tons fish, 12- 16 tons of leafy greens/year**
- **Econ. Support: CPH municipality 2 mio. DKK for roof platform, elevator, fencing**
- **Research projects: Aquaponic NOMA, Ecoponics (EU)**
- **Geo-technical analysis on concrete and soil**



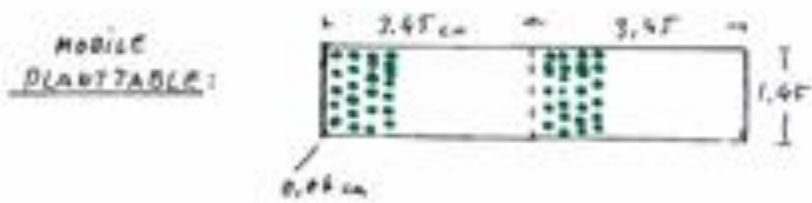
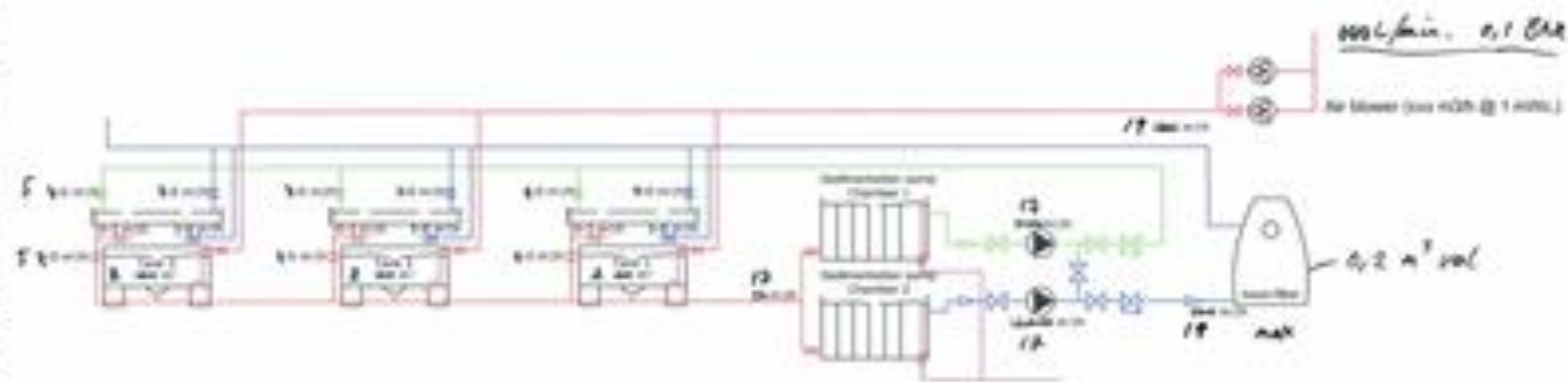
IGFF Aquaponic Test system



IGFF aquaponic test plant

Cooperation with AgroTech A/S (12 month)

Renting Test cube in research greenhouse: 48 m²,
Plant growing area: 30 m²



Plants grown in pots with soil

Symbiotic effects of aquaponics

- **Fish tanks as heating buffers (energy savings)**
- **CO2 from fish utilized by plants**
- **Fish manure replacing plant fertilizer**
- **Plants in soil (pots) => zero deficit on potassium, iron, calcium (organic certification)**
- **'Economies of space'**

- **Finalized an IKT greenhouse tool with aquaculture added**

- **Documenting the potential variable cost savings in aquaponics**

Why Urban aquaponics?

- **60% of the worlds population lives in cities. 75% in 2050**
- **Every week a new city of > 1 mio. inhabitants emerges**
- **Growth in Megapolis of 10 mio+**
- **In 35 years world population will have increased with 2.5 billion (Two more China's)**
- **Cities are responsible for 70% of the world's CO2 emissions**
- **Food supply based on a very Centralized food system, dependent on fossil energy**

Urban aquaponic roof top farming

- **Provides support to food security and climate resilient city:**
- **Utilize rain water in production**
- **Utilize heat from building**
- **Very Short food supply chain**
- **Reduction in transport & packaging (CO2 emissions)**
- **City Compost in horticulture section (closing the urban resource cycle)**
- **Roof tops: a conflict free zone of space**

Thank you for your attention



Economics

Sales/ turnover

- **Variable costs**
 - Heating
 - Feed
 - Water
 - Labor

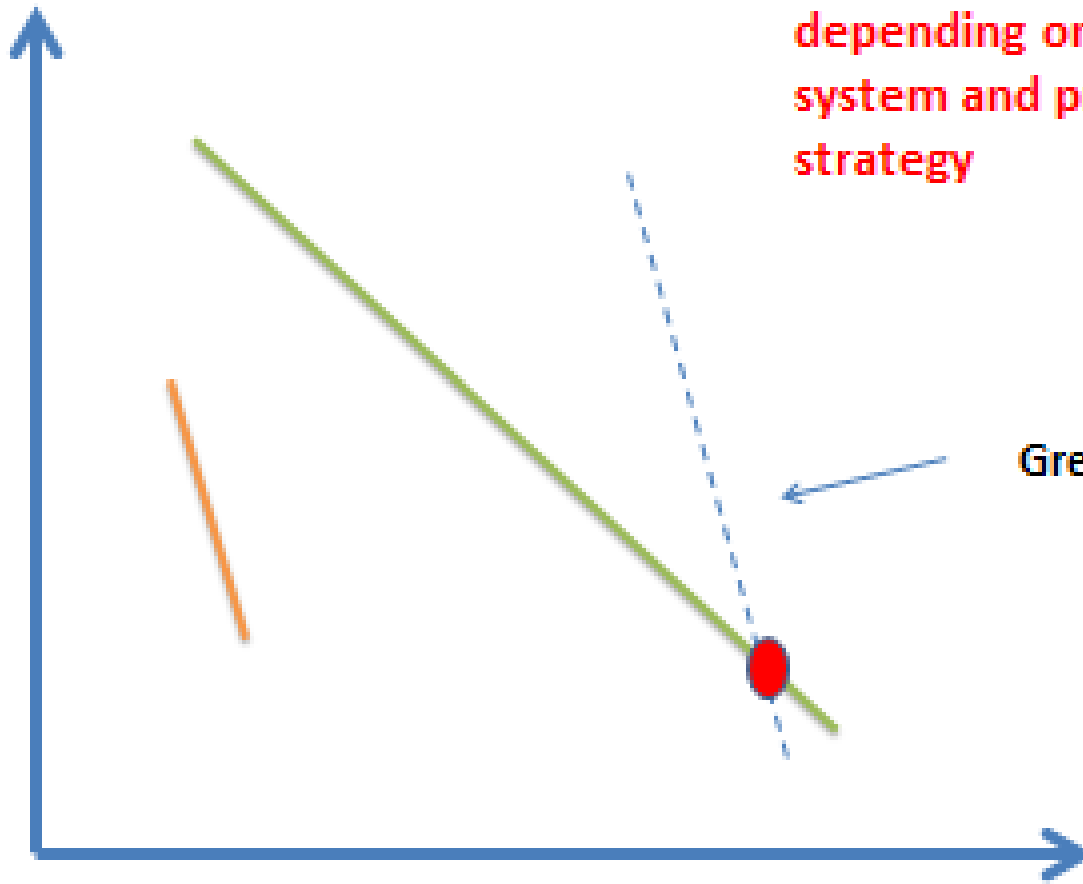
= Contribution margin I

- **Fixed costs**
 - Aquaculture equipment
 - Greenhouse & equipment

= Contribution margin II (Profits)



Marginal cost/fish produced



Marginal Cost curves depending on production system and production strategy

Greenhouse MC

Ton Fish produced/year