



# Polydome

## High Performance Polyculture Systems

Polydome is a revolutionary approach to greenhouse agriculture that offers the possibility of commercial scale, net-zero-impact food production. It outperforms traditional systems in production levels while enabling increased energy savings, production stability, and market response.

Polydome is a step toward truly sustainable agriculture and can double our food production by 2050 while reducing the overall impact of agriculture. It can be applied to large scale commercial situations, urban agriculture, rooftop placement and used for social purposes.



# It's time for the next leap forward in food production systems.

**Polydome systems produce high quality food efficiently and locally while creating environmental benefits and caring for human and animal welfare. They are a major step toward truly sustainable agriculture.**

## High yields

Using Polydome, cities as densely populated as New York City could provide the majority of their own food supply using available roof space, with its high yields (60 – 90 kg per square meter) and diverse outputs (over 50 crops, two mushroom varieties, chickens, eggs, fish, and honey). A less dense city like Rotterdam could provide an estimated 80% of its food needs using only 3% of its surface area.

## Productive ecosystems

Though it can use advanced greenhouse technology, Polydome's maximizes food production by relying on symbiotic biological relationships between species. These have been found through intensive research and correlated in a database featuring over 500 species.

## Active polycultures

While greenhouses generally produce only one kind of crop, Polydome is a polyculture system with many crops and livestock growing at once. Plants, crops, animals, and insects are strategically interwoven to connect waste, water, and energy flows and capture the benefits of varied space and light conditions.

## Economically resilient

Polydome is highly profitable. It provides high-density production, captures several high-value niche markets, and saves on technological inputs.

## Environmental Benefits

Depending on the mix of crops and animals, Polydome systems can be zero-waste, and energy-positive. Plant waste is reused, CO<sup>2</sup> is captured for increased growth potential, energy is generated through solar and bio-systems.



## Key Polydome Benefits

### Economic & Environmental:

- » By following through on the design principles of Polydome to their fullest extent, we can achieve something previously unheard of in human history: approaching net zero-impact food production.
- » Stacking of crops in space and time achieves very high density production.
- » Integrated Pest Management (IPM) and nutrient cycling strategies result in avoided costs: no need for pesticides, chemical fertilizers, pollination services, and many other inputs that are typically associated with a greenhouse system.
- » Internal reuse of material flow reuse can make the greenhouse into a zero-waste facility, and reduces the need for outside resource purchases.
- » Diverse, local production reduces local community's dependence on food products shipped from distant locations.
- » Polydome production can replace other forms of environmentally damaging farming.

### Sustainable Business:

- » Economic productivity higher than in conventional high-tech horticulture.
- » Diversification of crops offers protection from sudden market volatility in commodity prices.
- » Product diversity reduces the chances of total crop failure as a result of disease or pests; some crops will always be more susceptible than others.
- » Diversification allows capture of all the small "high-value" markets in a local area.
- » The opportunity for direct sales creates a possibility for greater earnings.
- » Crop output is relatively easily adjustable on an annual basis to the demands of the local market.
- » Initial investment continues to produce returns for several decades.

### Socio-Cultural:

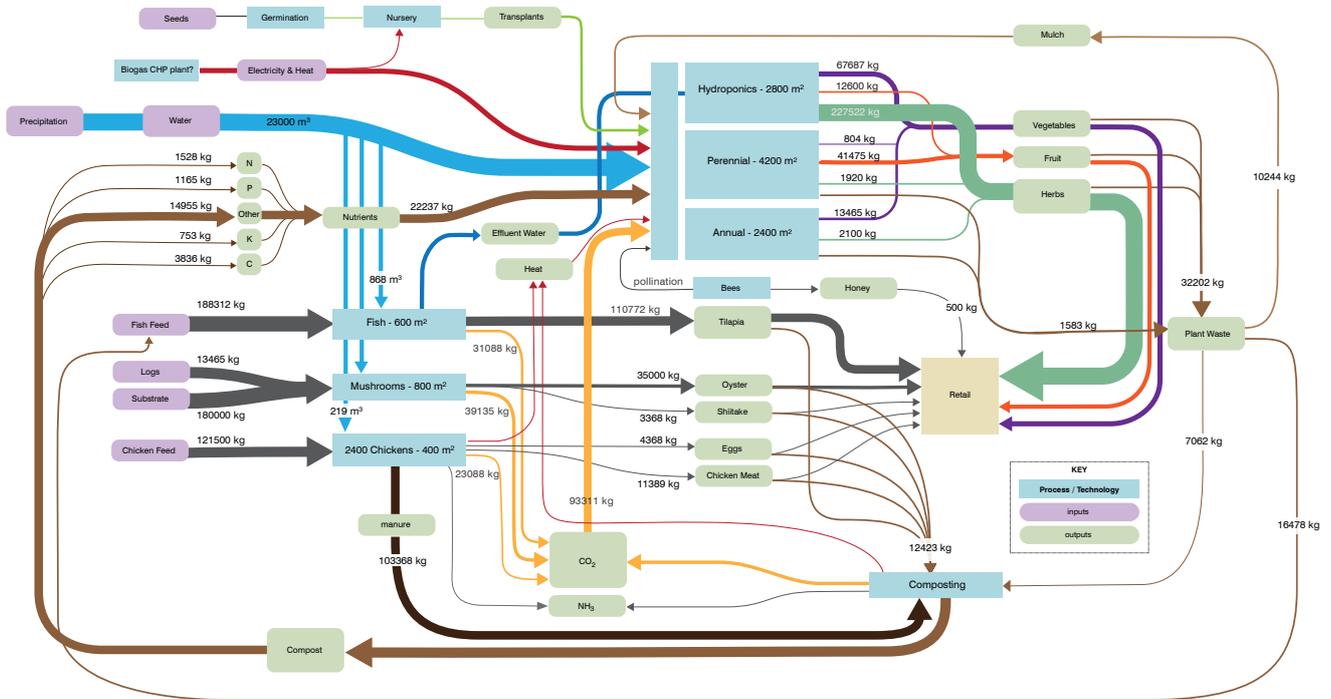
- » The Polydome greenhouse creates opportunities for creative, diverse labor in comparison to traditional agriculture.
- » Polydome creates the possibility for direct interaction with local community and allows for direct market response to local demands.
- » Can potentially improve the health of nearby residents by providing access to fresh, local produce..
- » Contributes aesthetically to the local environment.
- » Can reduce transportation in its food network, improve food security and food access, thereby aiding climate adaptation strategies.
- » Polydome systems are compatible with other forms of local agriculture.
- » Polydome can reconnect urban dwellers with the biological building blocks of life, and be used as an education tool.

## Potential for Cities

Polydome is applicable to a wide range of applications, ranging from small urban agriculture to commercial systems. For example, a Polydome system combined with a shop or restaurant can sell directly to customers. Shrinking the distance between producer and consumer

produces higher profits and increases food security. Polydome provides possibilities for urban agriculture that might not be feasible with traditional systems, such as small to medium scale direct-sale urban food facilities.





### Closing Material Cycles

All the material and energy flows in Polydome can be designed to feed into one another; creating a zero-waste system with a renewable energy and water supply.

### Learn more?

Polydome's research book has been published and can be obtained free of charge from [Except's website](#).

### Partners

Polydome is developed by Except Integrated Sustainability, a cooperative of experts in science, design, engineering, and business, as an answer to the pressing need for viable alternatives to traditional agriculture practice. Partners in research and development include InnovationNetwork, SIGN, Koppert biological systems, Technokas & Bode projecten, Fytagoras and Wageningen UR.



### The Polydome Book

The book contains a full overview of the inner workings of Polydome. It can be downloaded for free from [here](#).



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