

Intensive vegetable growing technologies

<http://ujkert.szie.hu/oktatas/letoltheto-oktatasi-segedanyagok/intenziv-zoldsegetermesztes>

Definition of intensive farming

- „designed to increase production without using more land”
 - „constituting or relating to a method designed to increase productivity by the expenditure of more capital and labour rather than by increase in scope”
 - „noting or pertaining to a system of agriculture involving the cultivation of limited areas, and relying on the maximum use of labour and expenditures to raise the crop yield per unit area”
- It depends on the era, on the location (country) and on the crop what is considered intensive or extensive.

What is considered to be intensive in today's field vegetable production?

- Micro-irrigation systems (drip, micro sprinkler)
- Fertigation (fertirrigation)
- Grafting
- (plug transplants)
- Beds, ridges
- Plastic mulches
- Row covers (low tunnel, floating cover)
- Trellis systems
- Shading, net houses
- Integrated pest management
- Machine or machine supported harvest

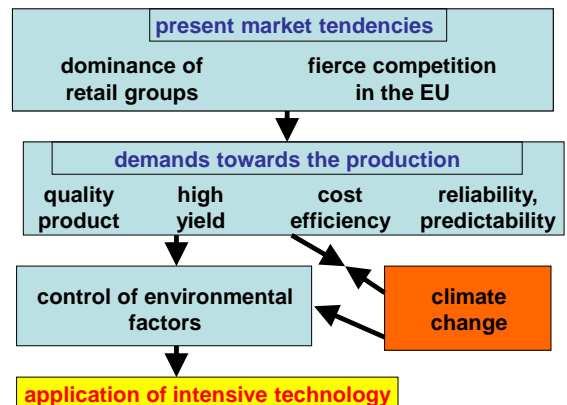
• Subjects:

- General introduction
- Greenhouse technology
- Closed plant production systems
- Irrigation and fertigation
- Soilless systems, substrates
- Transplant (seedling) production, grafting
- Ridges, beds, plastic mulches
- Harvest and post-harvest activities
- Production technology of the different vegetable groups

<http://ujkert.szie.hu/oktatas/letoltheto-oktatasi-segedanyagok/intenziv-zoldsegetermesztes>

What is considered to be intensive in today's greenhouse vegetable production?

- Multispan houses with high gutter
- Automated climate control (climate computer, DSS)
- Soilless production (slabs, hanging gutter system)
- Fertigation based on the radiation
- CO₂ enrichment, supplemental lighting, shading and energy screening, fogging, dehumidifiers
- Grafting
- Biological pest control
- Machinery supported harvest (harvest trolleys, collecting bells) (autonomous harvesters)
- Application of process control system



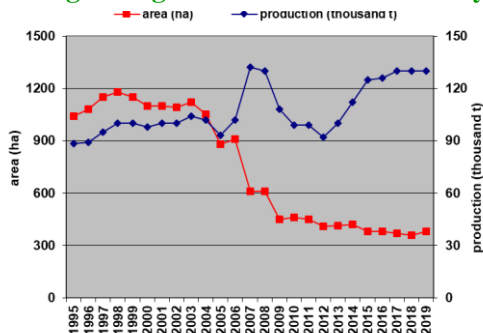
□ **Propagation** – grafting, plug seedlings

□ **(Phytotechnics)** – trellis systems, trimming

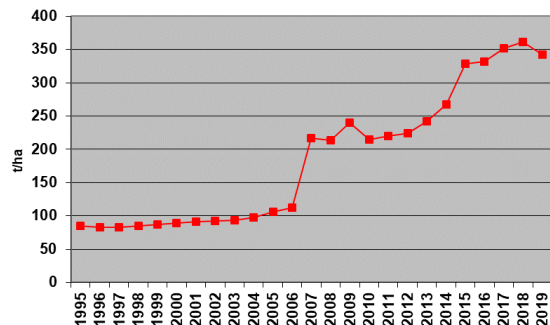
□ **Control of environmental factors**

- **Temperature control** – multispan houses with high gutter, screening, fogging, climate computers; row covers, ridges and beds, plastic mulches
- **Irrigation** – micro-irrigation systems
- **Fertilization** – fertigation, soilless cultivation,
- **Plant protection** – biological control, integrated pest control, grafting

Evolution of area and production of the Hungarian greenhouse tomato industry



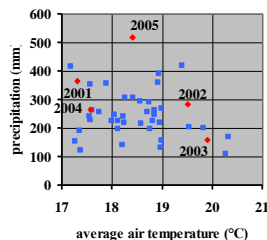
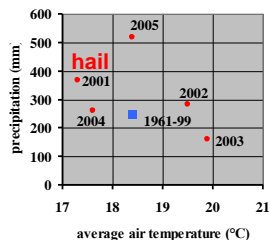
Evolution of yield of the Hungarian greenhouse tomato cultivation



- Integrators, creditors ⇔ reliable production, intensive production technology
- High investment and production costs
- Often just the combination of several intensive technological elements results profit

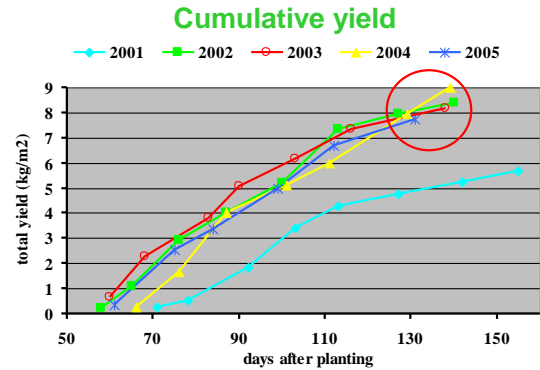
Climatic conditions during sweet pepper growing period (Gödöllő)

Year	Average air temperature (° C)	Precipitation (mm)
2001	17,3	366
2002	19,5	280
2003	19,9	159
2004	17,6	262
2005	18,4	518



Yield characteristics of intensive field sweet pepper production (Gödöllő)

Év	Total yield (kg/m ²)	Marketable product		
		Yield (kg/m ²)	Fruit number per plant	Average berry weight (g)
2001	5,68	5,57	13,6	78
2002	8,41	7,98	17,8	84
2003	8,19	7,34	14,4	91
2004	9,01	8,46	21,9	82
2005	7,70	7,43	14,3	99
LSD5%	1,05	1,30	3,0	10



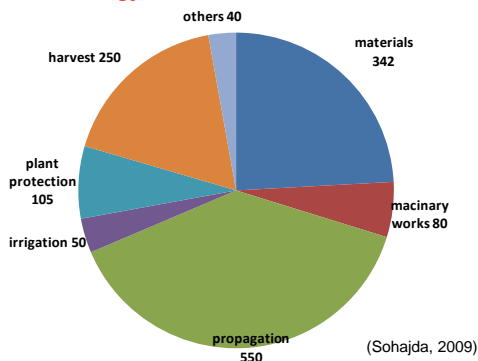
Maximum accountable costs in the horticultural modernization projects (VP-2-4.1.3.1.-16)

- automated glasshouse 35-40thFt/m²
- multispans plastic house 20-25thFt/m²
- multispans tunnel 3,5-6thFt/m²
- high tunnel 3,5-5thFt/m²
- heat exchange system 6thFt/m²
- energy screen 3,5thFt/m²
- shading screen 2,5thFt/m²
- climate control system 1thFt/m²
- ventilators, air exchangers 500Ft/m²
- fertigation system 1,5thFt/m²

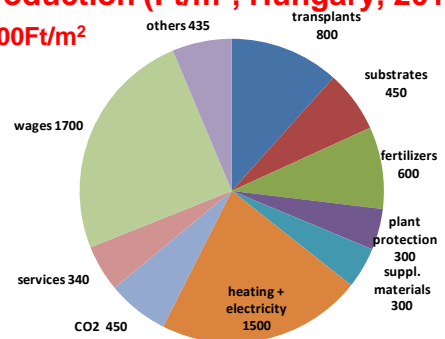
Maximum accountable costs in the horticultural modernization projects (VP-2-4.1.3.1.-16)

- fogging system 2thFt/m²
- supplementary lighting 12thFt/m²
- CO₂ enrichment system 1thFt/m²
- heating system 8thFt/m²
- hanging gutters 2,5thFt/m²
- benches, tables 15thFt/m²
- soilless cultivation system 2,5thFt/m²
- upgrading ventilation system 2,5-4thFt/m²
- gutter height increase 1-6thFt/m²
- process control system 200Ft/m²

Costs of intensive watermelon production (thousand Ft/ha; Dombegyháza, 2009, Σ1400 thousand Ft/ha)



Costs of glasshouse tomato production (Ft/m², Hungary, 2013) Σ7.000Ft/m²



**Profit per hectare of field red coloured sweet pepper
production (2006, Derecske – KITE data)**

	low tunnel	not covered
Machinery work	263 814 Ft	245 813 Ft
Plastic sheet	97 488 Ft	0 Ft
Transplants	727 144 Ft	727 144 Ft
Wages	890 511 Ft	674 727 Ft
Fertilizers, pesticides	371 508 Ft	371 508 Ft
Irrigation	348 730 Ft	348 730 Ft
Sacks, boxes	53 310 Ft	53 311 Ft
Others	303 737 Ft	303 737 Ft
Total costs:	3 056 242 Ft	2 724 970 Ft
Income:	3 702 359 Ft	2 560 223 Ft
Profit:	646 117 Ft	-164 747 Ft