

Farm economics of EUBerry

EUBerry 2014 Final Meeting

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EUBerry



Outline

- Why knowledge of economic viability?
- Definitions: gross margin, cost price and farmers income
- **EUBerry** Economic viability of new production methods
 - Selection of countries
 - Selection of innovative production methods
 - Calculations: effect on Marginal gross margin or income
- Results
 - Ex post: effects of some interesting innovative production methods on economic viability
- General conclusions



Why knowledge of economic viability?

- **Ex ante (2012)**: Knowledge of critical conditions for economic profitability may help **researchers** to develop systems that farmers will implement.
- **Ex post (2014)**: Economic profitability is a condition for implementation of sustainable culture systems by the **European fruit growers**.



Cost price and growers income

■ Returns:

- Yield x price
(quality very important)

■ Variable costs:

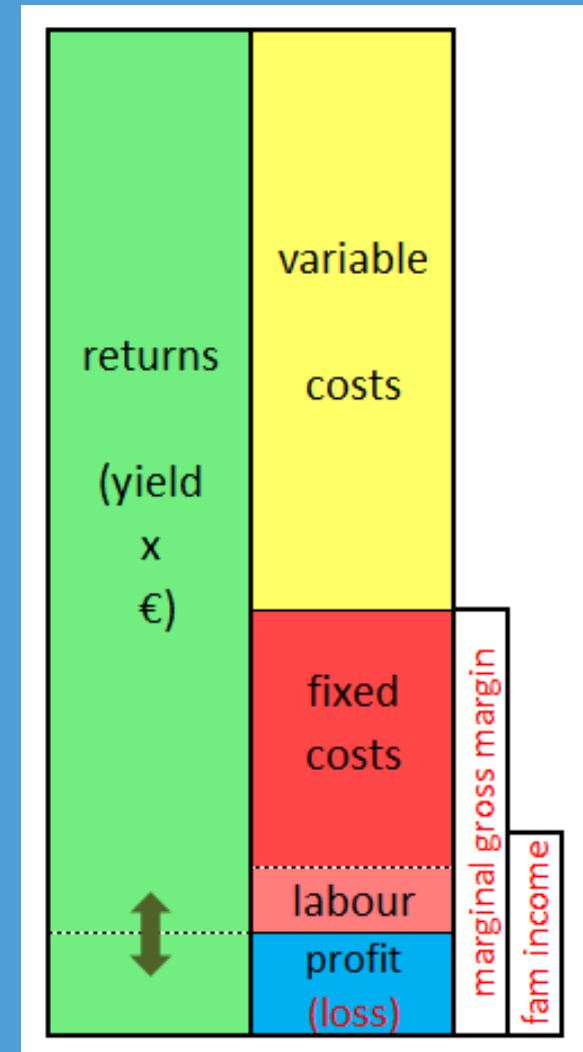
- Costs for materials/hours, used for this culture. Variable costs depend of area (e.g. plants, fertilizer, fuel, crop protection, hired labour, et cetera)

■ Fixed costs:

- Independent of this culture (e.g. depreciation and interest for machines & buildings, family labour)

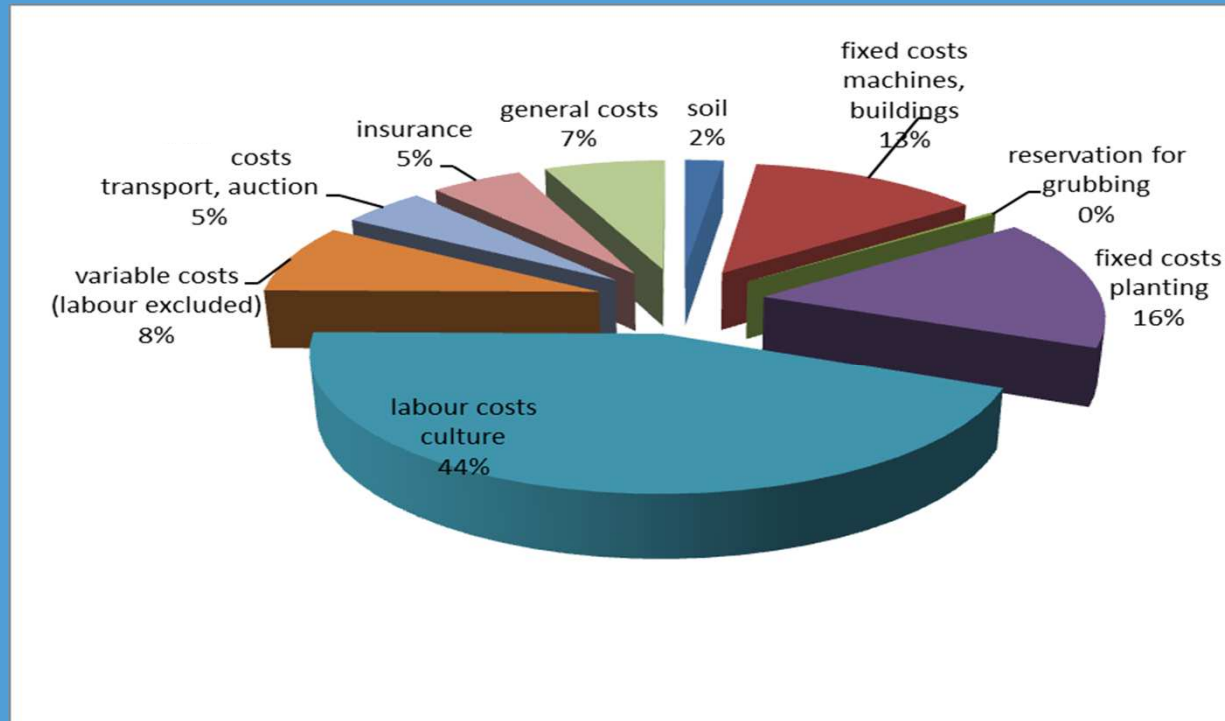
■ Cost price:

- $(\text{var. costs} + \text{fixed costs})/\text{kg sold}$



Cost price of blueberries in The Netherlands

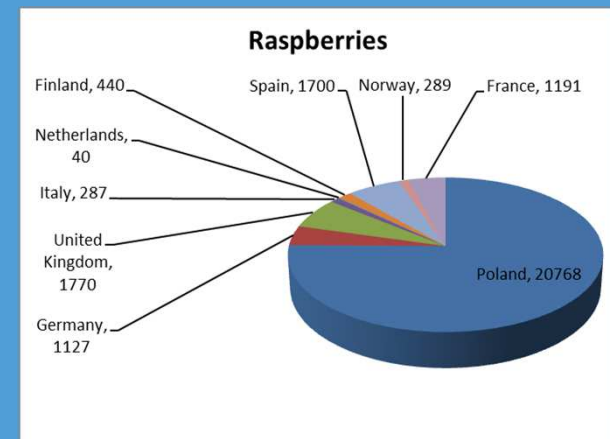
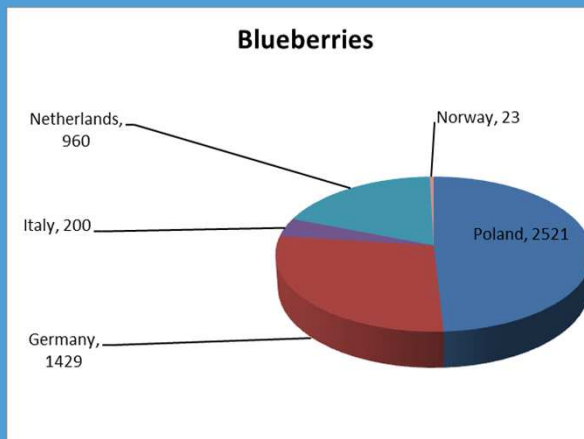
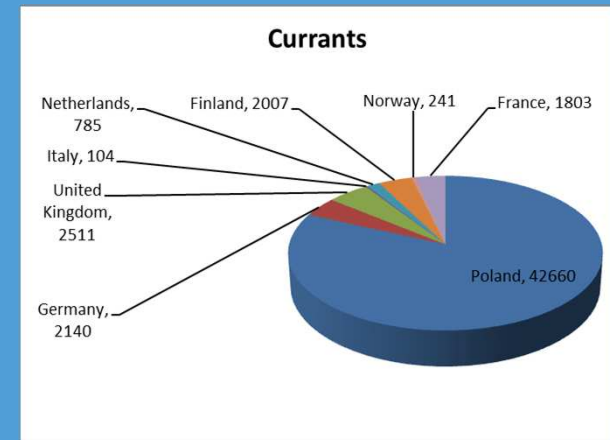
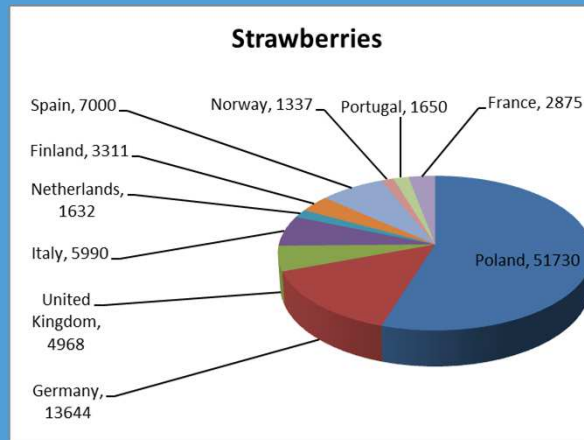
- Major costs are for labour (fixed and variable) and fixed costs for planting and for machines & buildings
- Variable costs (labour excluded) 8%, but at short time affected by fruit grower



EUBerry: Selection of countries for economic calculations

Criteria:

- Production areas of berries in the countries, participating in the EUBerry project (Source: FAO, 2012)
- Geographical distribution
- Availability of data



EUBerry: Economic viability of new production methods; Selection of innovative production methods

Based on questions to the Work Package leaders:

1. New varieties with reduced water requirement (raspberries)
2. Varieties for easier picking (raspberries)
3. Low residue level (strawberries)
4. Reduction of water & nutrients use (straw-, rasp- and blueberries)
5. Effect of ozone on shelf-life (straw-, rasp- and blueberries)
6. In vitro propagation (breeding) (straw-, rasp- and blueberries)

Season extension:

7. LED lighting in tunnels (strawberries and raspberries)
8. mist equipment (spring frost prot.) (straw-, rasp- and blueberries)
9. tunnels/coatings (straw- , rasp- and blueberries)
10. covering or mowing plants (straw- , rasp- and blueberries)



EUBerry: Economic viability of new production methods

Calculation of Marginal gross margin

example: Blueberry in The Netherlands

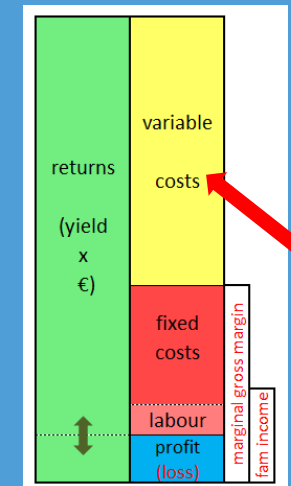
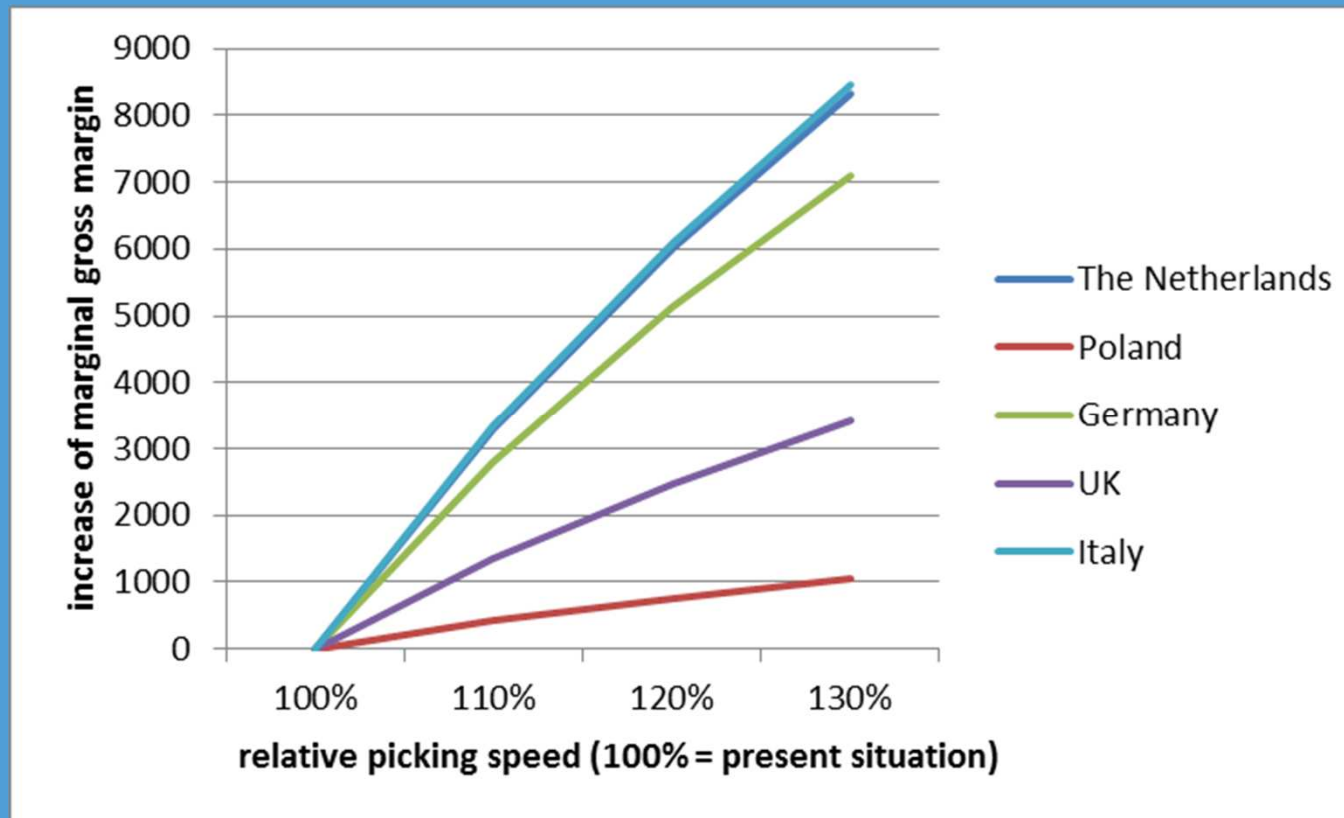
Yield +/- losses (kg per ha)	7.650	
Returns (€/ha)	€	24.863
Fertilizers		
Fuel, <i>et cetera</i>		
Interest on working capital		
variable costs	€	9.328
Gross margin (€ per ha)	€	15.535
Temporary labour		
Transportation, <i>et cetera</i>		
marginal costs	€	498
Marginal gross margin (€ per ha)	€	15.037
founding costs planting		
fixed assets, <i>et cetera</i>		
fixed costs	€	11.700
Labour income berry grower (€ per ha)	€	3.337



Effect of new production methods on economic viability

New raspberry varieties for easier picking

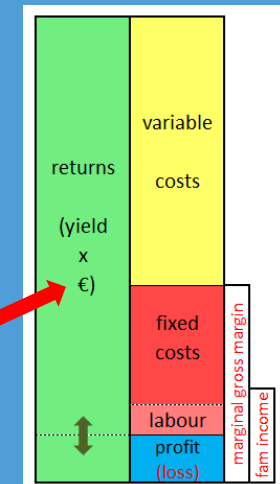
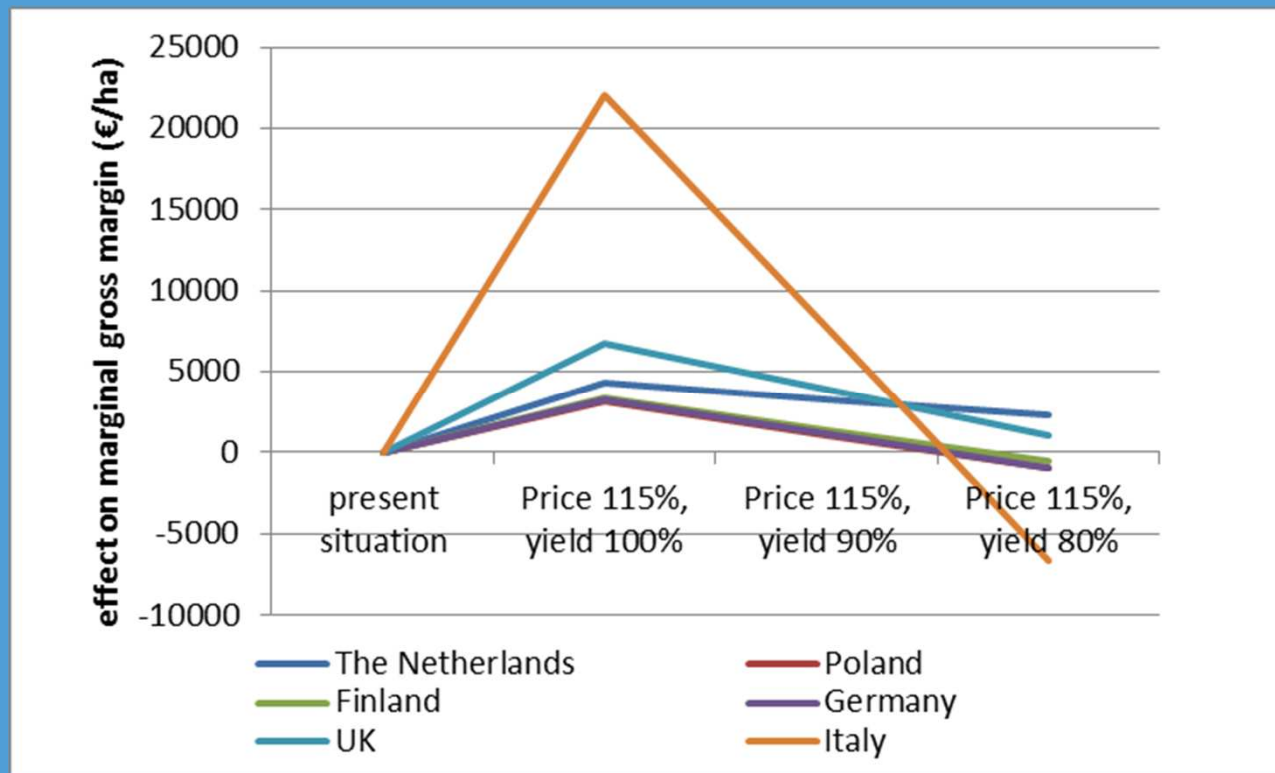
- Ex ante: economic effect depends on yield and wage for hired labour



Effect of new production methods on economic viability

Ex ante: Low residue level (DSS) in strawberries

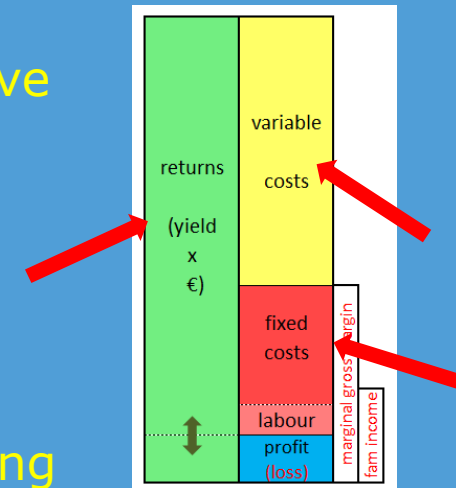
Economic effect depends on quality (price) and yield



Effect of new production methods on economic viability

Ex post: Results Low Residue Level (DSS) in strawberries

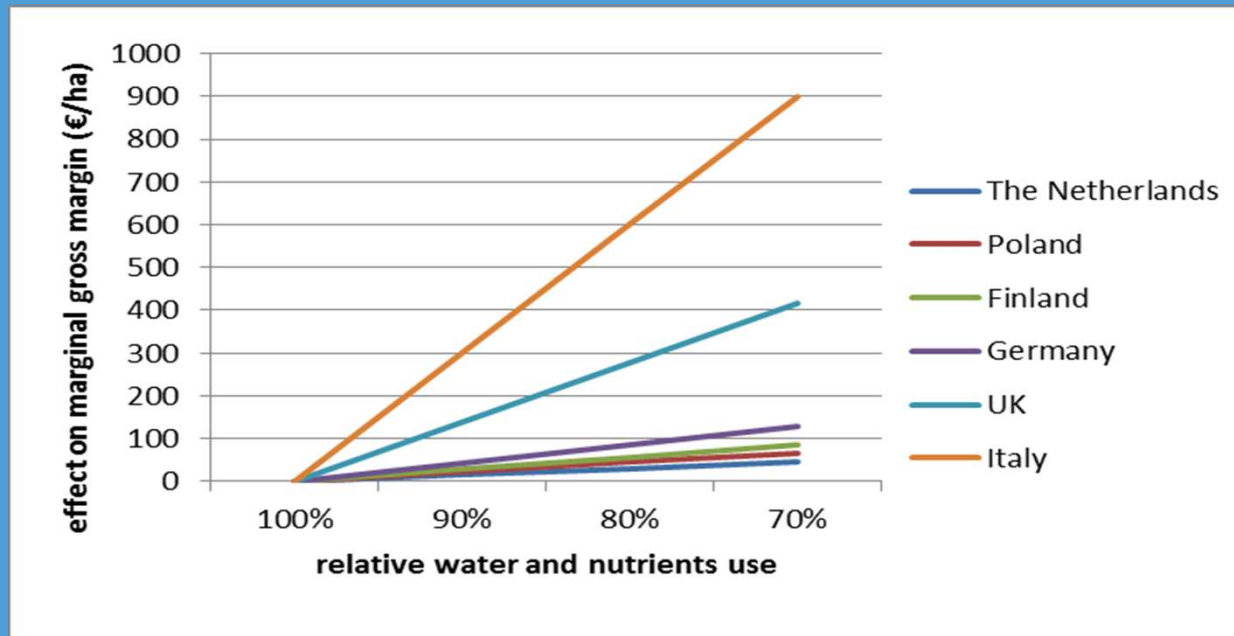
- Reduction of # sprayings (- 1.3), against Botrytis fruit rot (e.g. reduction of 15 g/ha Switch)
- < 5 residues & < 30% or 50% of the MRL cumulative
- Same yield (increased but not significant)
- Effect on variable and fixed costs:
 - DSS (€ 150/year/farm)
 - Additional labour demand for health monitoring
 - Vacciplant (no pesticide) => # sprayings not reduced
- Effect on selling price? (not in short-term, reference meets standard)
- Effect on licence to produce / licence to deliver, not on MGM or income



Effect of new production methods on economic viability

Reduced water and nutrients use

- E.g. in strawberries, but the same in raspberries and blueberries



Ex ante:

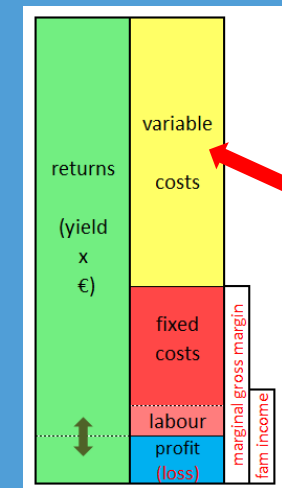
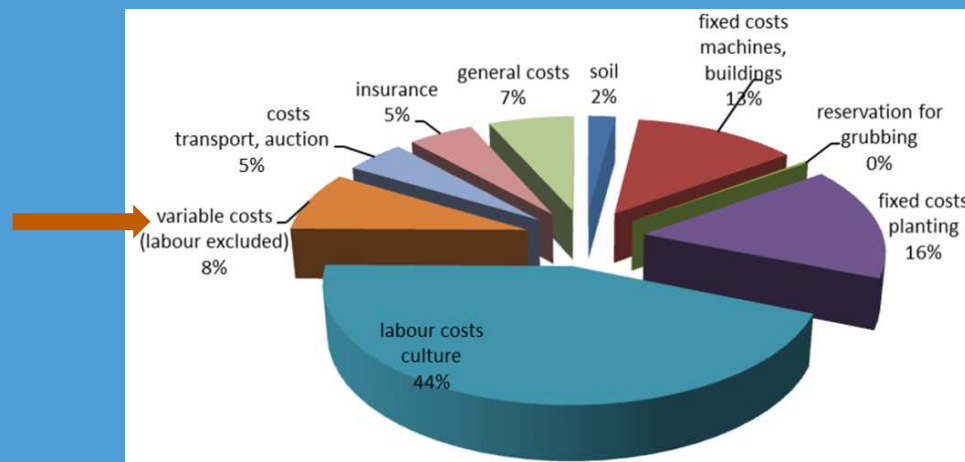
- yield and quality may not decrease
- Additional fixed costs must be very low



Effect of new production methods on economic viability

Ex post: Results reduced water and nutrients use

- No data of experiment results, but minor effect on economic viability



- Selling price, marginal gross margin and farmers income not affected
- More important: effect on Licence to produce

Effect of new production methods on economic viability

Ex-post: season extension using LED

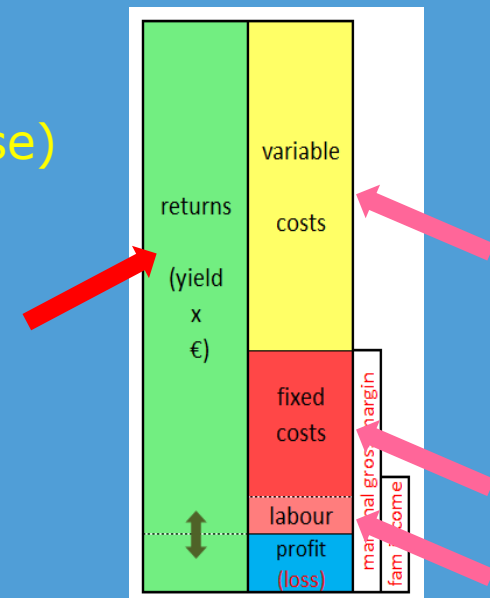
■ studies in Norway (tunnels) and Poland (greenhouse)

● Norway:

- + 10-13% yield on autumn crop (estimation + 400 kg/ha)
- (more if heating had been added)
- increased Brix^o value

● Poland:

- no significant effect on yield
- no relevant season extension



Effect of new production methods on economic viability

Ex-post: season extension using LED

- Estimation of additional returns:
 - P: No additional yield
N: $400 \text{ kg} \times € 4.60 = €1840/\text{ha}/\text{year}$
 - increased Brix^o value is not paid for (N)
 - Ripening time not affected => no effect on selling price (P)



Effect of new production methods on economic viability

Ex-post: season extension using LED

■ Estimations of additional costs:

- LED lamps: about € 225/100 W or € 250/300 W LED (N)
estimation: $1.5 \times 3 \text{ m} = 2,222/\text{ha} = €500,000/\text{ha}$. 10 years, 6% = €65,000/ha/year
- Electric system (not included)
- Labour demand to hang up lamps (not included)
- 45% reduction electricity costs compared to standard HPS (P), but about €3,200/ha/year (60 days, 4 hrs/day, € 0.06/kWh, €0.12 taxes not included)
- 35% increased heating costs compared to standard HPS (P)

- price will reduce, long life span (10,000 hrs), less lamps, but factor 35 now

- Conclusion: economically not feasible
for commercial fruit growers
(at this moment)

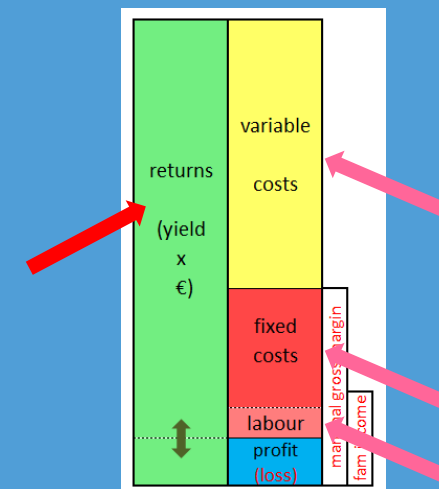


Effect of new production methods on economic viability

Ex-post: season extension (plastic cover, fiber cover, shoot mowing)

- studies in raspberries (Skierniewice, 2011-2013)

		ripening (days +/-)	yield (%)	mean weight
Polesie	control			
Polesie	plastic cover	-9.7	131%	108%
Polesie	fiber cover	-7.0	140%	105%
Polesie	shoot mowing	16.0	87%	101%
Polka	control			
Polka	plastic cover	-9.7	121%	105%
Polka	fiber cover	-9.7	126%	105%
Polka	shoot mowing	16.0	83%	102%
Polana	control			
Polana	plastic cover	-9.7	126%	109%
Polana	fiber cover	-7.0	134%	106%
Polana	shoot mowing	13.7	81%	106%



Effect of new production methods on economic viability

Ex-post: season extension (plastic cover, fiber cover, shoot mowing)

- Quality supposed to be not affected (Brix)

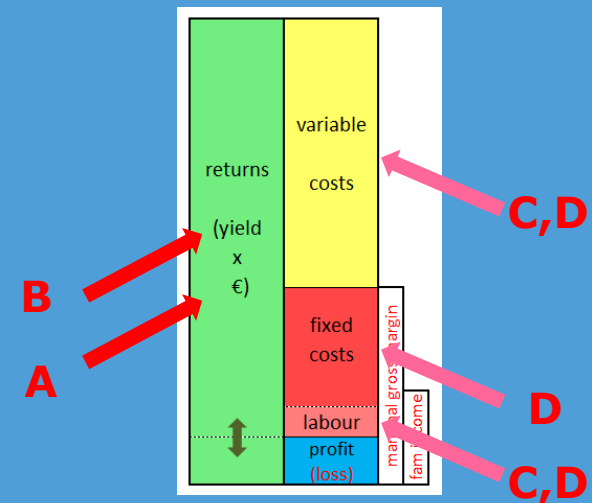
	ripening (days +/-)	yield (%)	mean weight
control			
plastic cover	-9.7	126%	107%
fiber cover	-7.9	134%	105%
shoot mowing	15.2	84%	103%

D

A

B

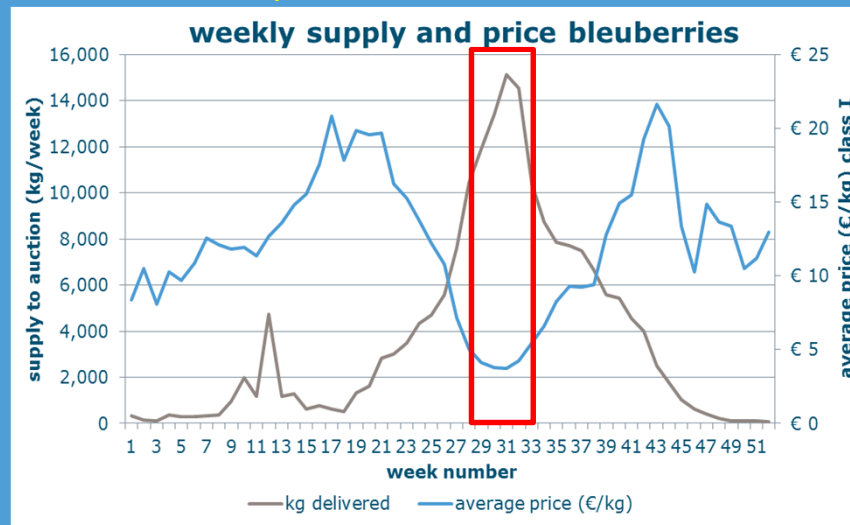
C



Effect of new production methods on economic viability

A: effect on ripening time of the strawberries

Price and total production of blueberries in NL



Effect of season extension for strawberries (2012)



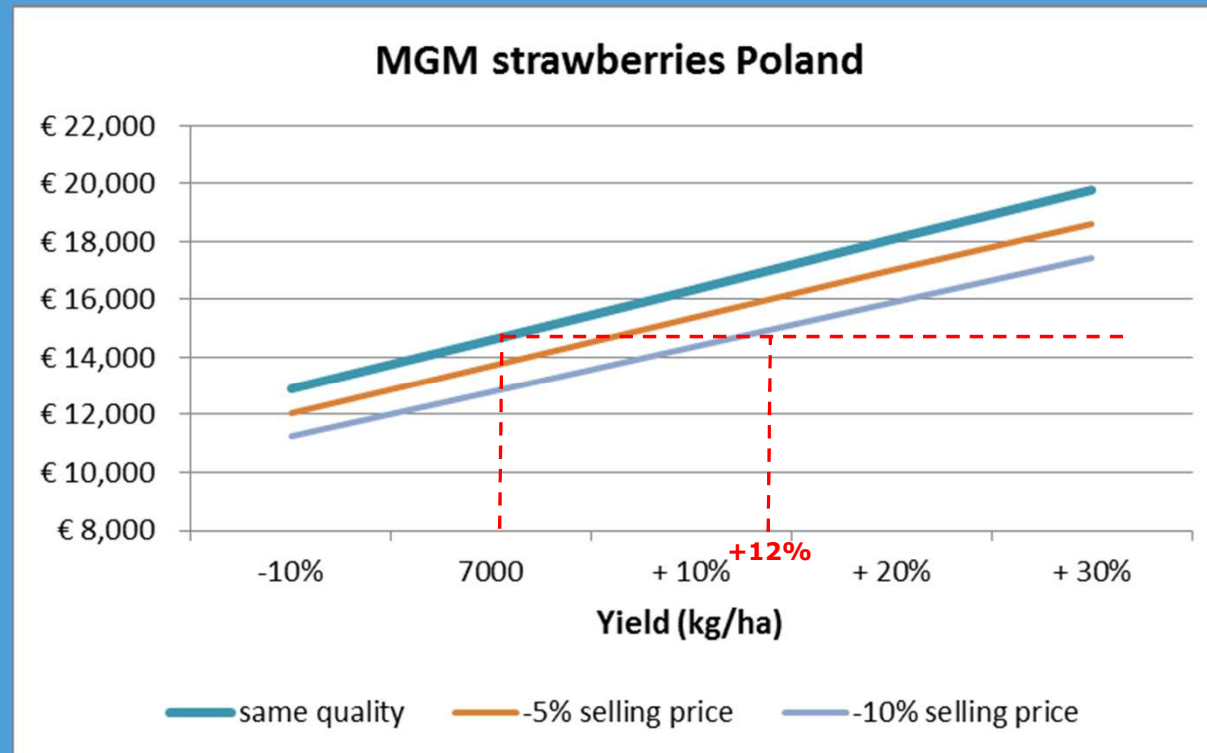
Returns may increase about €1000/ha

	ripening (days +/-)
control	
plastic cover	-9.7
fiber cover	-7.9
shoot mowing	15.2



Effect of new production methods on economic viability

B: effect on yield (7000 kg/ha is normal)



	ripening (days +/-)	yield (%)
control		
plastic cover	-9.7	126%
fiber cover	-7.9	134%
shoot mowing	15.2	84%

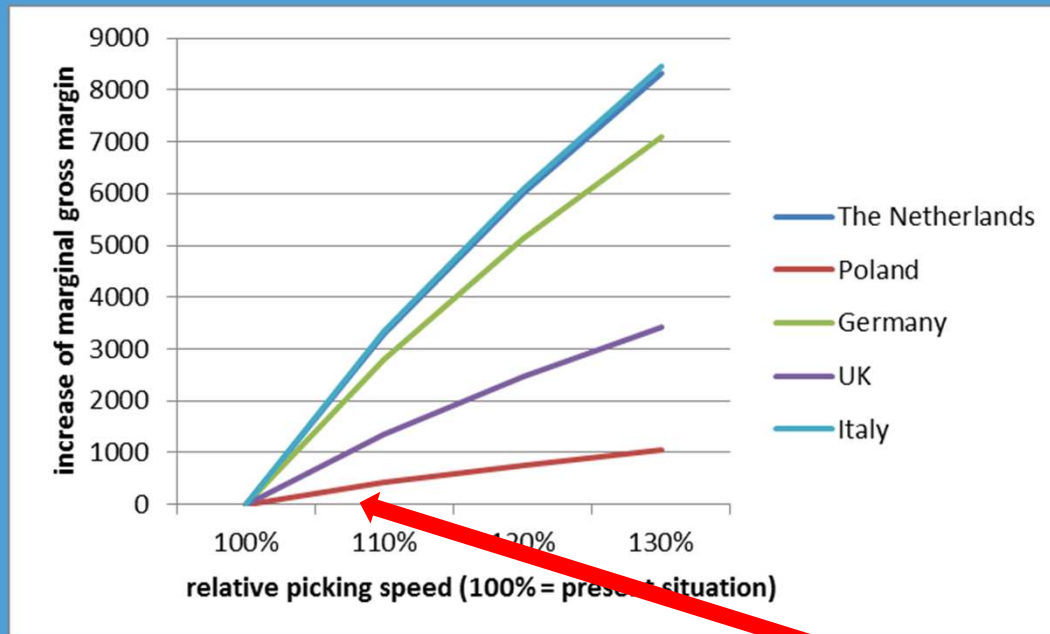
- Quality is essential!
- Returns may increase up to €5000/ha



Effect of new production methods on economic viability

C: effect on picking speed

- (projected on raspberry)



variable costs may decrease € 300/ha

	mean weight
control	
plastic cover	107%
fiber cover	105%
shoot mowing	103%

Effect of new production methods on economic viability

D: effects on direct costs & fixed costs and on farmers income

- Higher yields, higher prices, reduced picking costs 😊
- Additional costs for tunnels, films, energy 😞
 - Tunnels: depreciation, interest, maintenance (fixed)
 - Energy: variable cost



Effect of new production methods on economic viability

Economic viability depends on local situation

- Compare additional returns with additional costs
- Netherlands:
 - annual costs tunnel: € 7,600/ha (NL), € 5,500/ha (PL) => system seems economically profitable in Poland
 - annual costs greenhouse € 12,800 (NL) => probably too expensive
- Variable costs heating (temperature in-/outside, price)



Effect of new production methods on economic viability

mayor effects on yield and production costs:

	durability	Average yield	Labour harvest	Labour tariff	Annual costs tunnel	Energy costs
open production	20 years	8.5 t/ha	2250 hr/ha	€5/hr	-	-
production in tunnel	6 years	7.0 t/ha	1500 hr/ha	€ 14/hr	€ 7,600	€25,000/ha

■ Effect on cost price:

- Open culture € 4.18/kg
- Tunnels: € 11.52/kg
 - 10% lower energy costs: € 11.18/kg
 - One more year (7 years): € 11.00/kg
 - 10% higher yield: : € 10.71/kg
- This is why data / estimations should be as accurate as possible, based on local and individual farmers situation



Conclusions

- Cost price is allowed to increase (a little) if selling price increases
- Quality (price) has mayor effect on Marginal gross margin and on the income of fruit grower
- Reduction of variable costs (water, fertilizer) generally has a minor effect on Marginal gross margin and income fruit grower (exception: hired labour)
- For advice at farm level, (estimations of expected) individual effects on costs, yield and prices are needed



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