Economic evaluation of input reductions in protected cultivation in Europe

Workshop "Results of the EU Project

"Euphoros - Efficient Use of inputs in Protected HORticulture"

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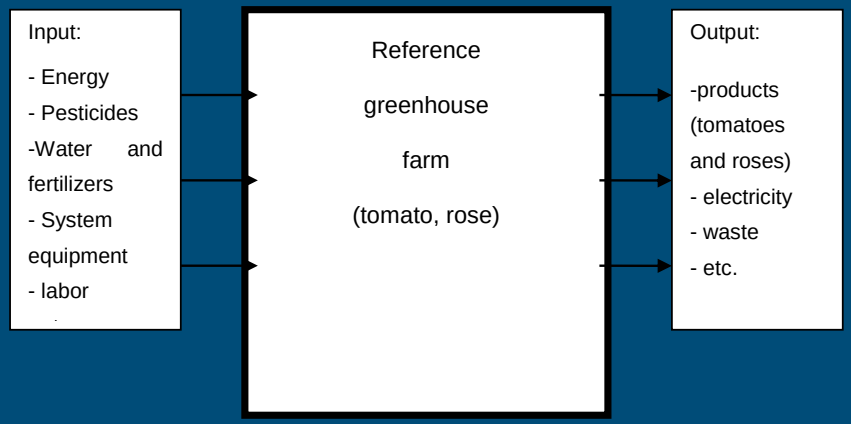
- Scenarios and options
- Closing growing system
- Reduced volume and increased life span of growing media
- New type of multi-tunnel greenhouse with improved ventilation
- Webtool – Economic simulation model
- Questions

Economic evaluation – cost-benefit analysis

- Description of reference situation: all costs and benefits

System boundary: farm level



- Description of options: specific costs and benefits
- Economic indicators:
  - net financial result: balance of benefits and costs
  - payback period: time when an investment is earned to repay
  - investment capacity: calculated investment related the balance

Scenarios and input reducing options

- Scenarios
  - 1. Tomato crop in multi-tunnel greenhouse (Spain/Italy
  - 2. Tomato crop in Venlo greenhouse (The Netherlan
  - 3. Rose crop in Venlo greenhouse (The Netherlands)

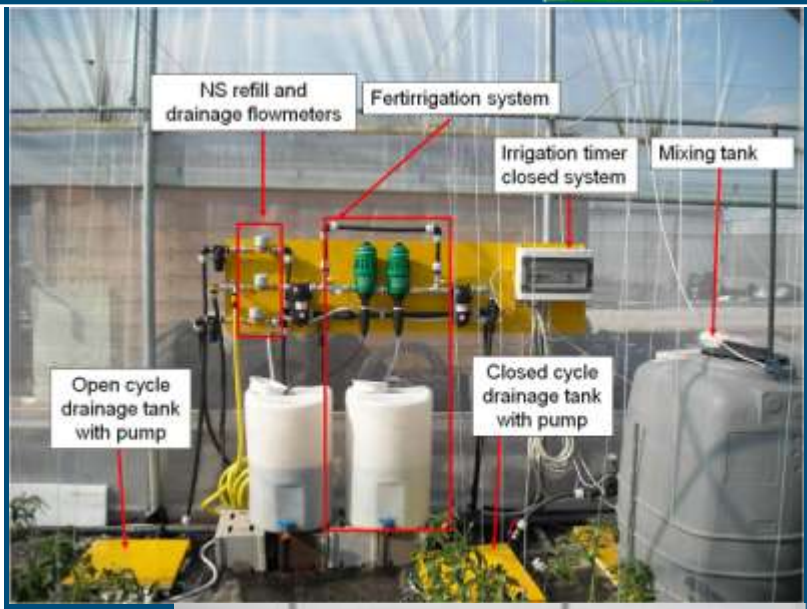
- Input reducing options for scenario 1
  - Closed growing system
  - Reduced volume and increased life span of growing media
  - New type of multi-tunnel greenhouse with improved ventilation

Closing growing system for tomato crop

Investment and yearly cost of closing growing/ cultivation system (€)

Input reducing option	Closed system Chem analysis by LAB		Closed system Chem analysis by Quick test UV filtration (disinfestation)	
System component	*Invest-ment*	*yearly costs per ha*	*Invest-ment*	*yearly costs per ha*
Fixed costs				
Slow sandfilter	2500	250		
Hydraulic components	5000	500		
UV filtration			17500	2625
Rough sand filter + add hydr			5000	500
Quick test (Reflectoquant))			800	160
Maintenance costs (5%)		375		1165
Interest (2,5%)		190		580
Sub total		1315		5030
Variable costs				
Frequent chem anal (12x/2x)		600		160
DNA scan		600		600
Reagents for quick analysis				50
Sub total		1200		810
Total costs		**2515**		**5840**
Saving water + fertilizers		**4650**		**4650**
Financial result		**2135**		**-1190**
Pay-back period (years)		**2.4**		**8.7**

Source: UNIPI, Italy; Quantitative Information Greenhouse Horticulture 2010, 2010



Photos: UNIPI, Italy

- Test site: Pistoia, Italy
- Farm scale: 1 ha

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Reduced volume & increased life span of growing media

Savings of reduced volume and increased life span substrate (€)

Substrate bags (perlite)	*Reference*	*Option 1:*	*Option 2:*
	3 yrs life span	*25% volume reduction*	*4 yrs life span*
Units of bags per ha	4650	4650	4650
Investment (€/unit)	1.80	1.42	1.80
Investment (€ total)	8370	6591	8370
Depreciation (%)	33.3	33.3	25.0
Maintenance+interest (%)	7.5	7.5	7.5
Costs (€/ha)	**3420**	**2690**	**2720**
Savings (€/ha)	**-**	**730**	**700**

Source: EEFC, Almeria, Spain

Perlite bag after 3 year cultivation

Photos: Perlite Italiana, Milano, Italy

- Scenario: Multi-tunnel greenhouse, Spain
- Tomato crop
- Farm scale: 1 ha

New type multi-tunnel with improved ventilation

Costs and benefits of new type multi-tunnel greenhouse (€/m2)		
		Multi-tunnel and improved ventilation
Starting points		
Extra investment		9.50
Extra production (kg/m2)		14.9
Extra costs for grafted plants, fertilizers, CO2		
Extra benefits	yield	9.10
Extra variable costs		4.45
of which:	plantmaterial	0.50
	water & fertilizers	0.80
	CO2	2.50
	electricity	0.25
Extra fixed costs		3.05
of which:	labour	1.65
	depreciation, mainten. & interest	1.40
Net financial result		1.60
Payback period (years)		5

Source: EEFC, Almeria, Spain

Photos: EEFC, Almeria, Spain

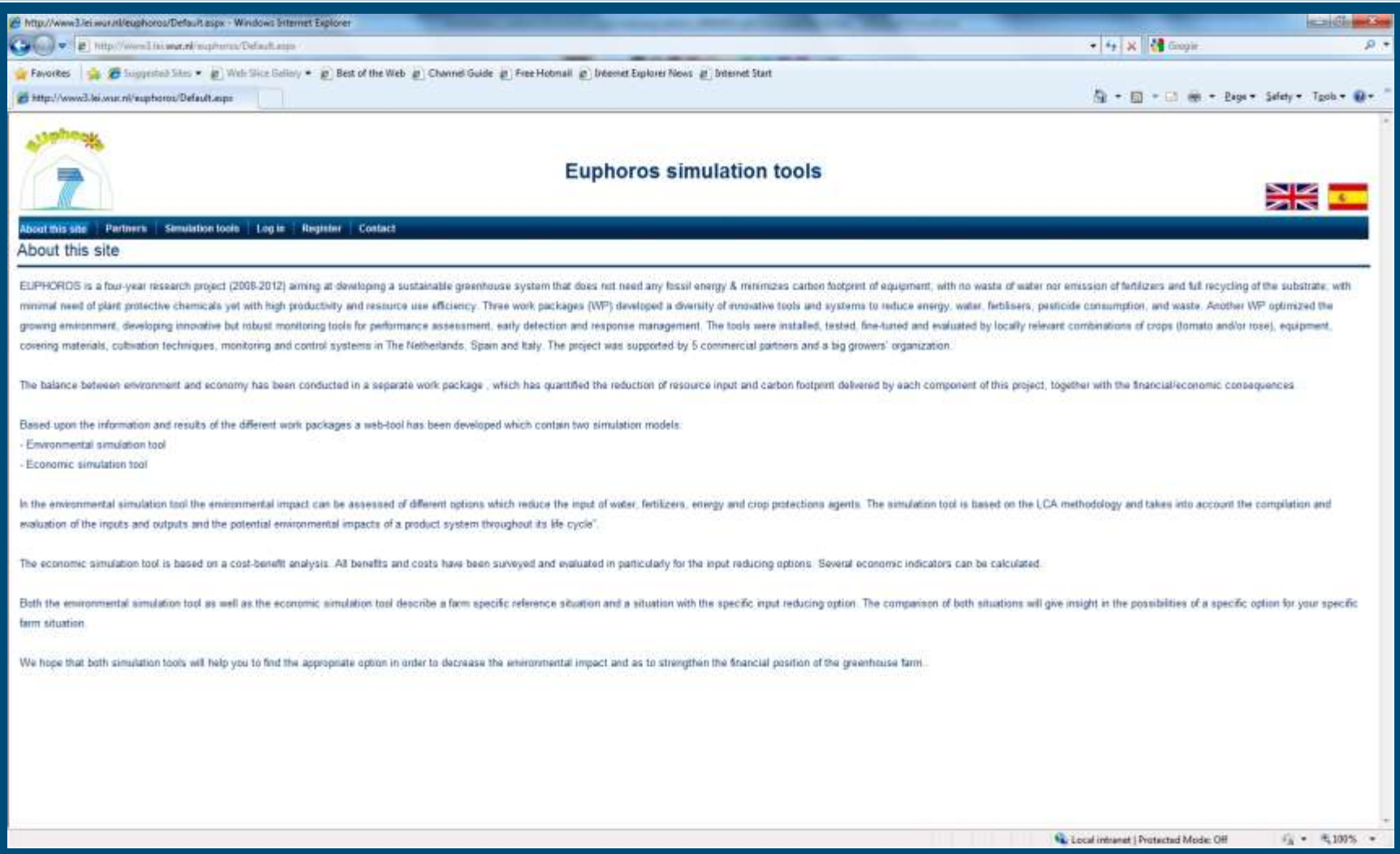
- Scenario: Multi-tunnel greenhouse, Spain
- Tomato crop, long cycle (July – June)
- Farm scale: 1 ha

Euphoros webtool

Environmental simulation tool

Economic simulation tool > demo

Webtool – Economic simulation tool



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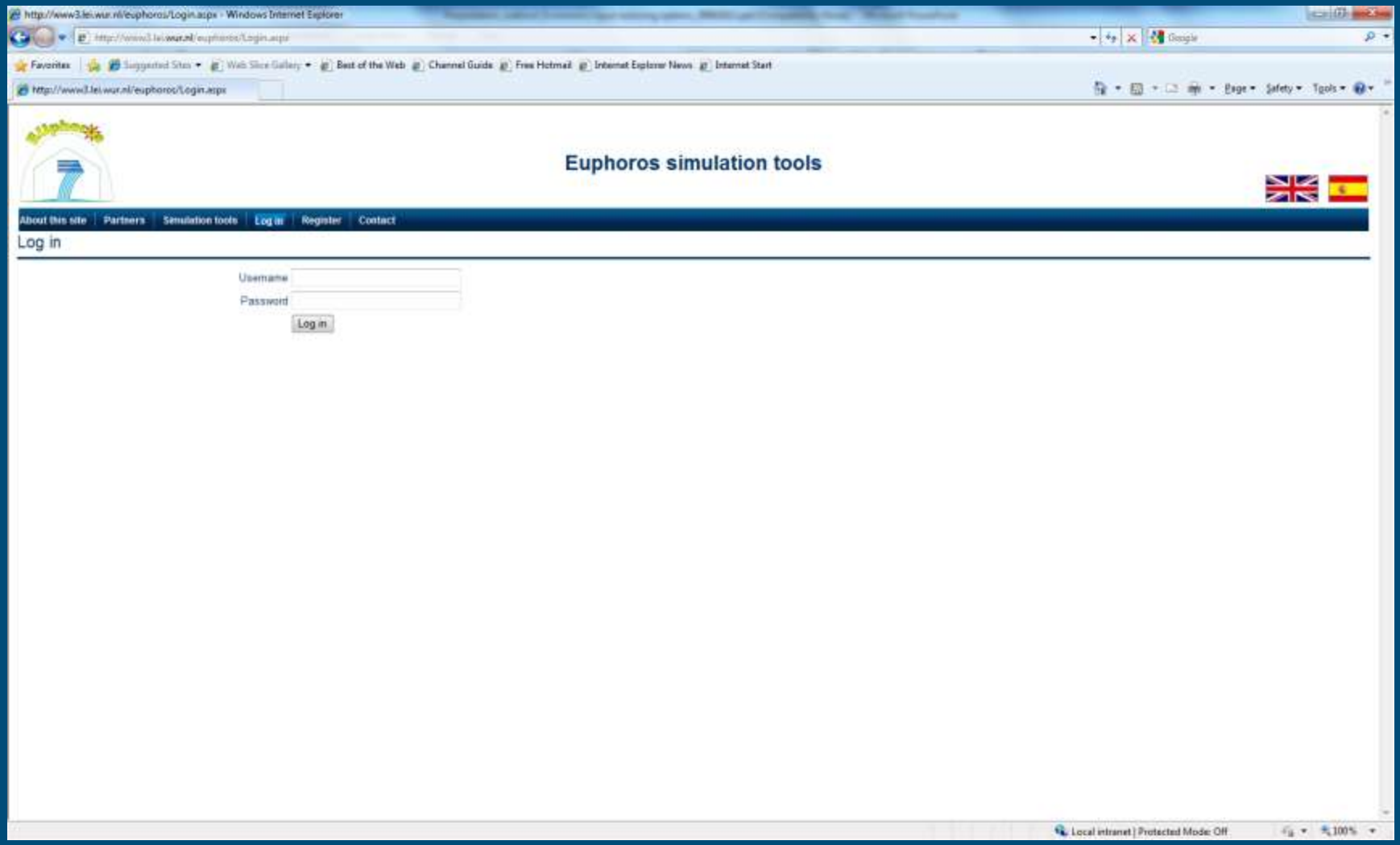
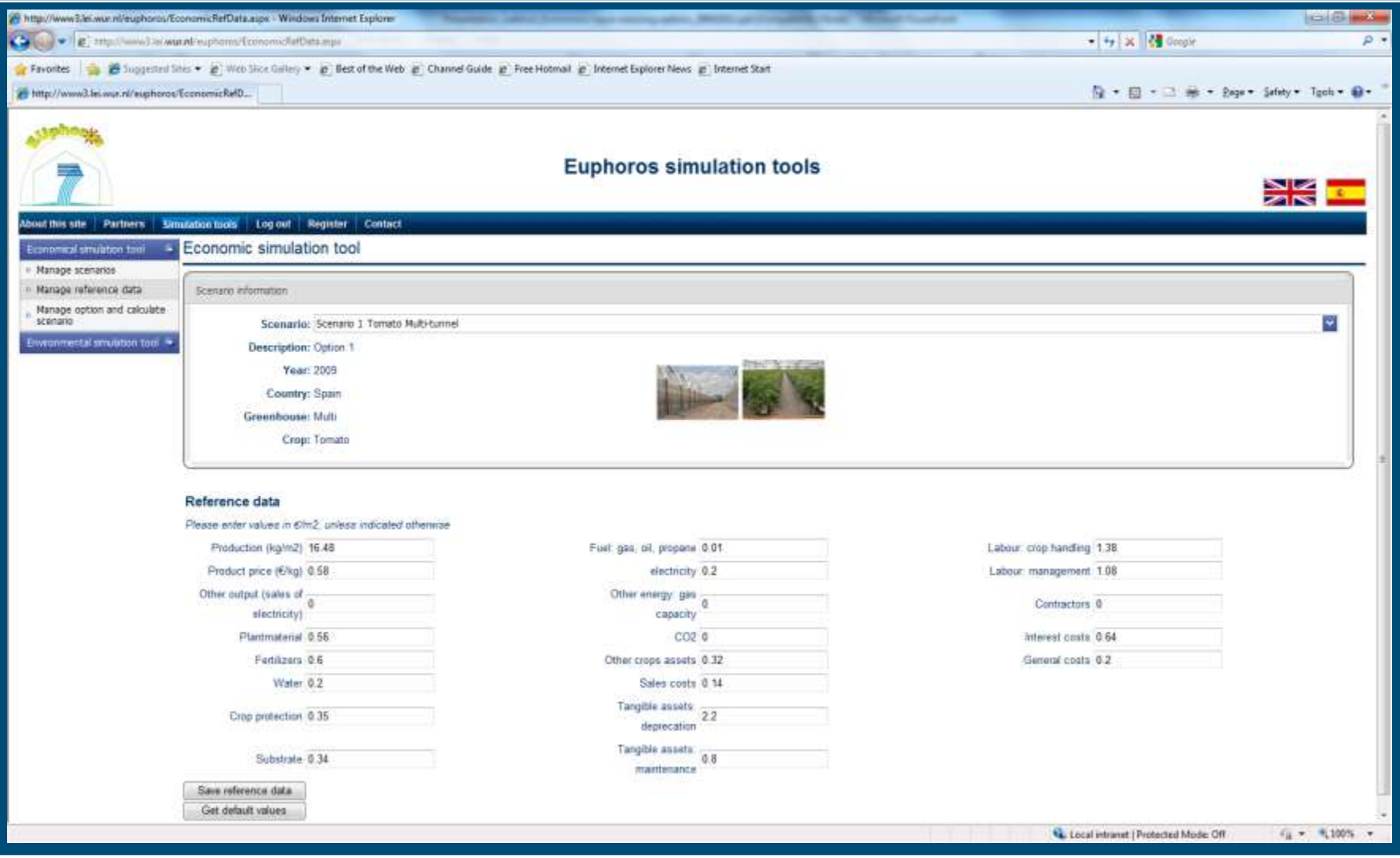
Webtool – About this site

Webtool – Economic simulation tool



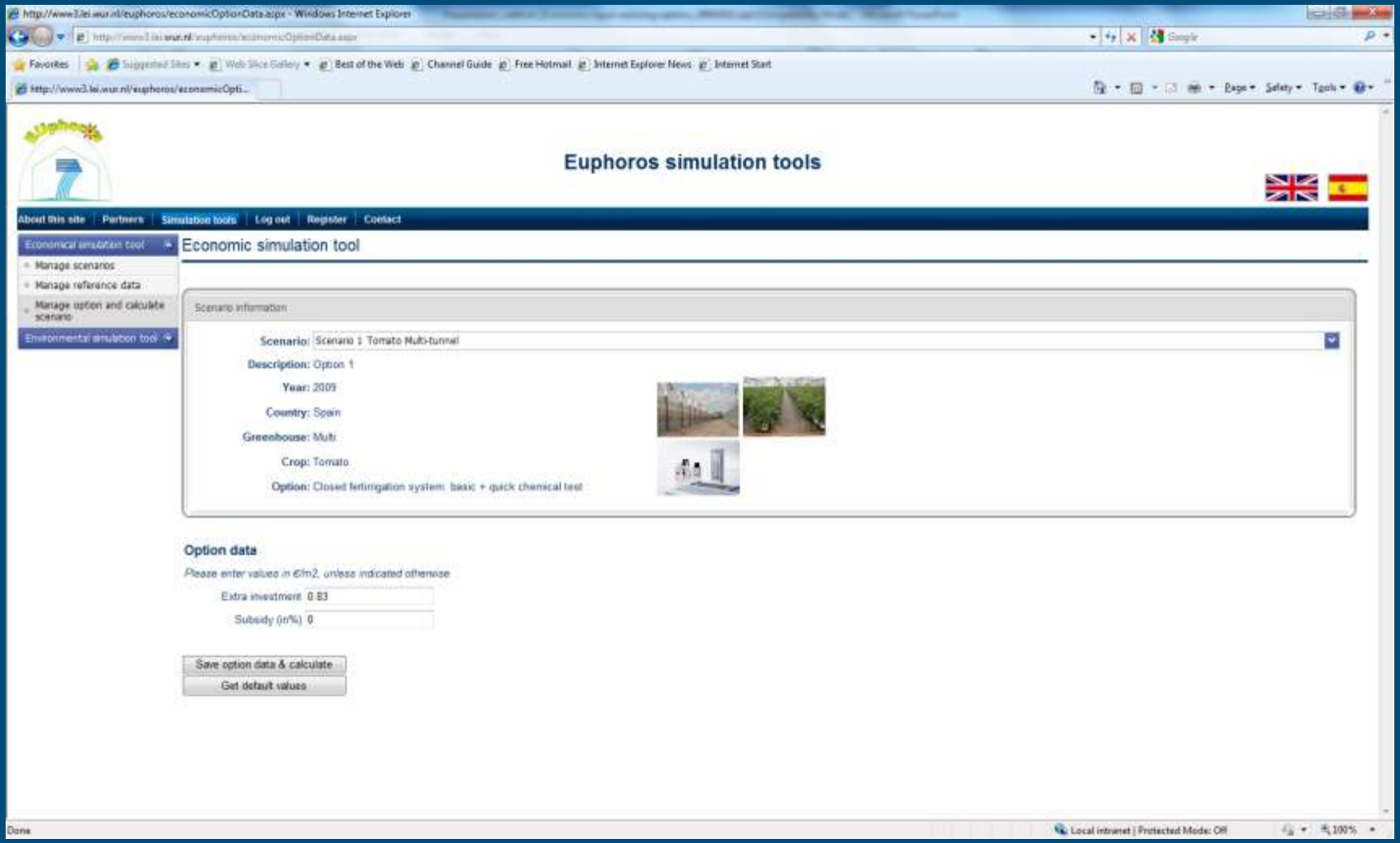
Webtool - Login

Webtool – Economic simulation tool



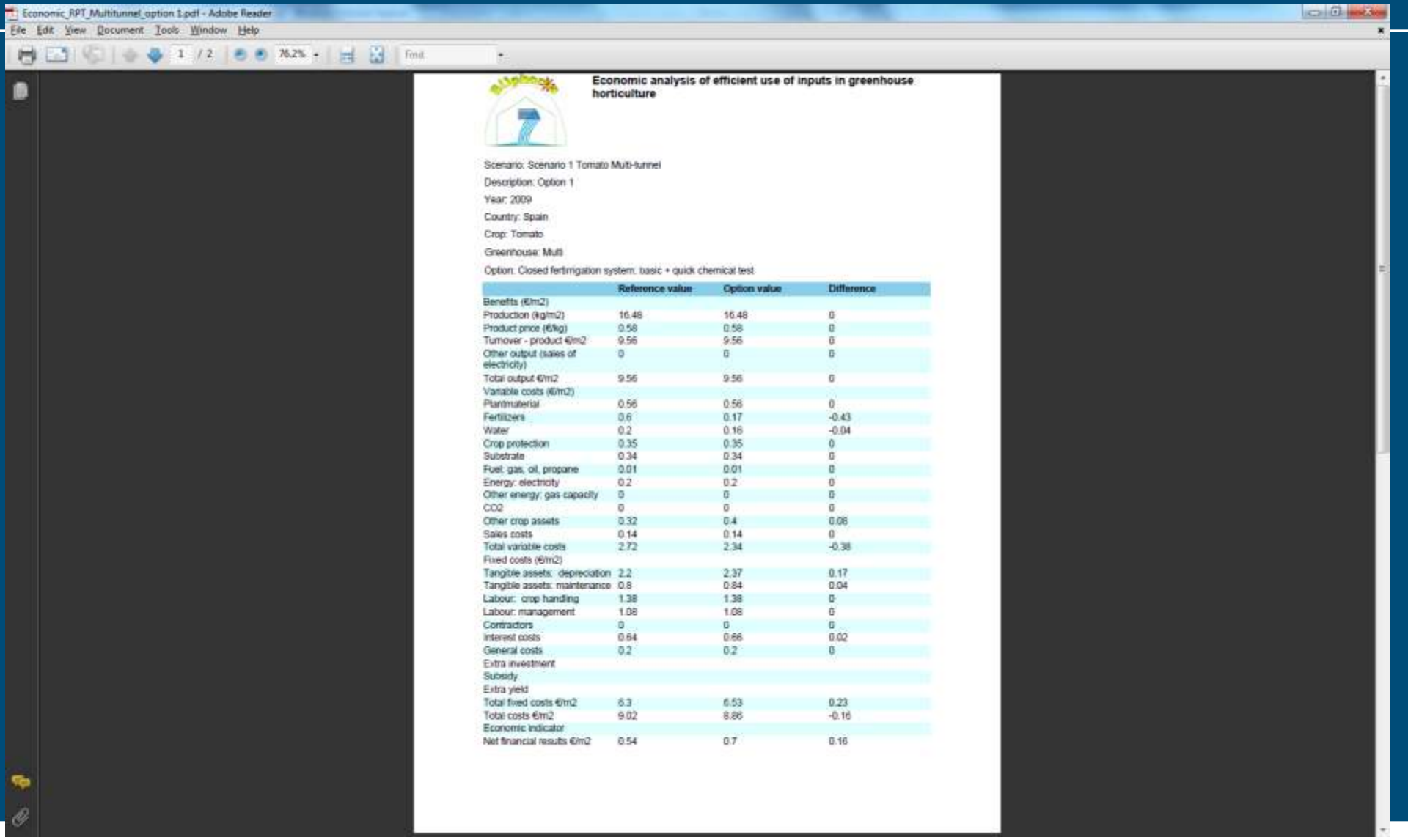
Economic simulation tool – reference data

Webtool – Economic simulation tool



Economic simulation tool – option data

Webtool – Economic simulation tool



Economic analysis of efficient use of inputs in greenhouse horticulture

Scenario: Scenario 1 Tomato Multi-tunnel

Description: Option 1

Year: 2009

Country: Spain

Crop: Tomato

Greenhouse: Multi

Option: Closed fertirrigation system: basic + quick chemical test

	Reference value	Option value	Difference
Benefits (€/m2)			
Production (kg/m2)	16.48	16.48	0
Product price (€/kg)	0.58	0.58	0
Turnover - product €/m2	9.56	9.56	0
Other output (sales of electricity)	0	0	0
Total output €/m2	9.56	9.56	0
Variable costs (€/m2)			
Plantmaterial	0.56	0.56	0
Fertilizers	0.6	0.17	-0.43
Water	0.2	0.16	-0.04
Crop protection	0.35	0.35	0
Substrate	0.34	0.34	0
Fuel: gas, oil, propane	0.01	0.01	0
Energy: electricity	0.2	0.2	0
Other energy: gas capacity	0	0	0
CO2	0	0	0
Other crop assets	0.32	0.4	0.08
Sales costs	0.14	0.14	0
Total variable costs	2.72	2.34	-0.38
Fixed costs (€/m2)			
Tangible assets: depreciation	2.2	2.37	0.17
Tangible assets: maintenance	0.8	0.84	0.04
Labour: crop handling	1.38	1.38	0
Labour: management	1.08	1.08	0
Contractors	0	0	0
Interest costs	0.64	0.66	0.02
General costs	0.2	0.2	0
Extra investment			
Subsidy			
Extra yield			
Total fixed costs €/m2	6.3	6.53	0.23
Total costs €/m2	9.02	8.86	-0.16
Economic indicator			
Net financial results €/m2	0.54	0.7	0.16

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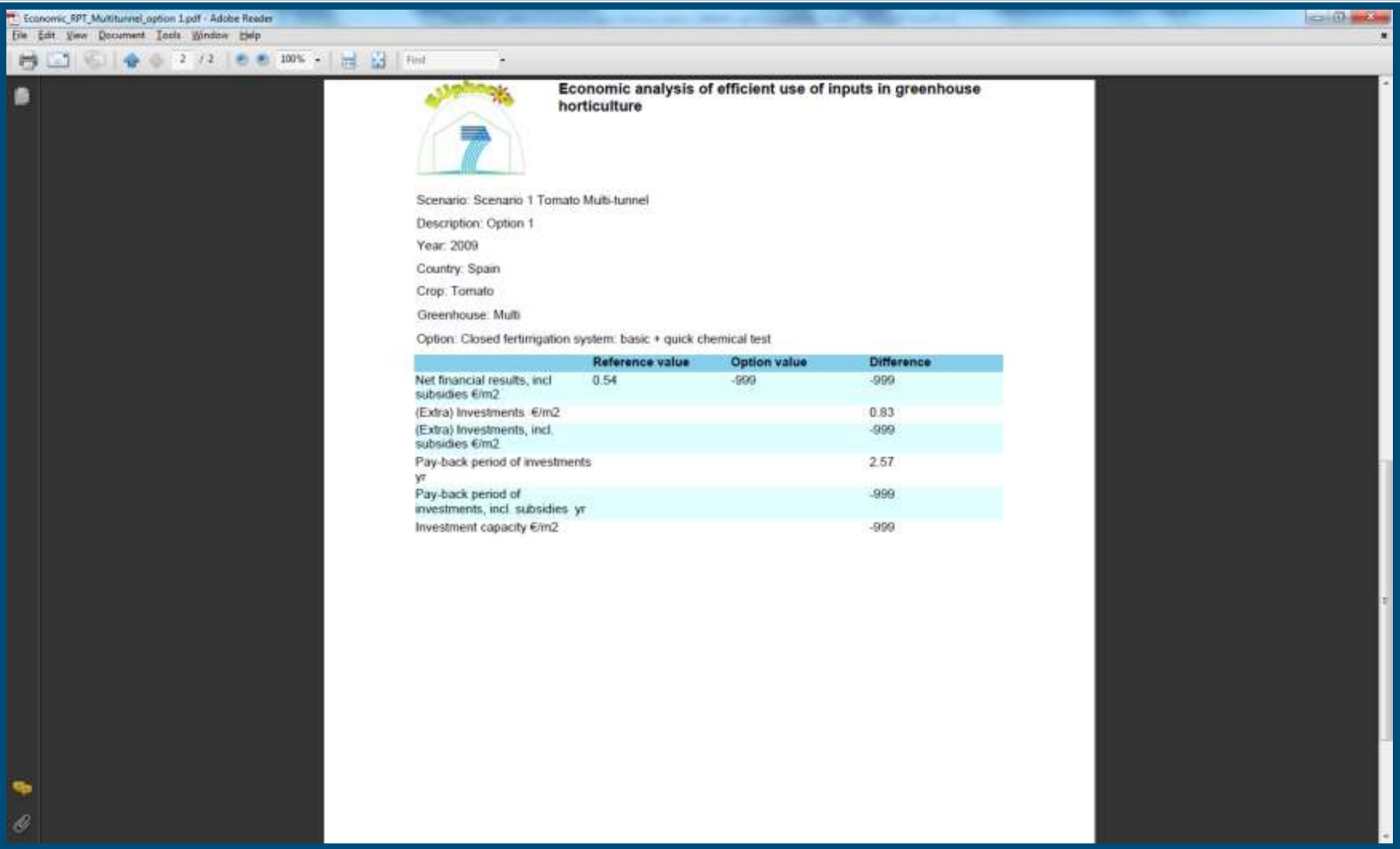
Economic simulation tool – results page 1

Webtool – Economic simulation tool



Economic_RPT_Multitunnel_option 1.pdf - Adobe Reader

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Economic analysis of efficient use of inputs in greenhouse horticulture

Scenario: Scenario 1 Tomato Multi-tunnel

Description: Option 1

Year: 2009

Country: Spain

Crop: Tomato

Greenhouse: Multi

Option: Closed fertirrigation system: basic + quick chemical test

	Reference value	Option value	Difference
Net financial results, incl subsidies €/m2	0.54	-999	-999
(Extra) Investments €/m2			0.83
(Extra) Investments, incl. subsidies €/m2			-999
Pay-back period of investments yr			2.57
Pay-back period of investments, incl. subsidies yr			-999
Investment capacity €/m2			-999

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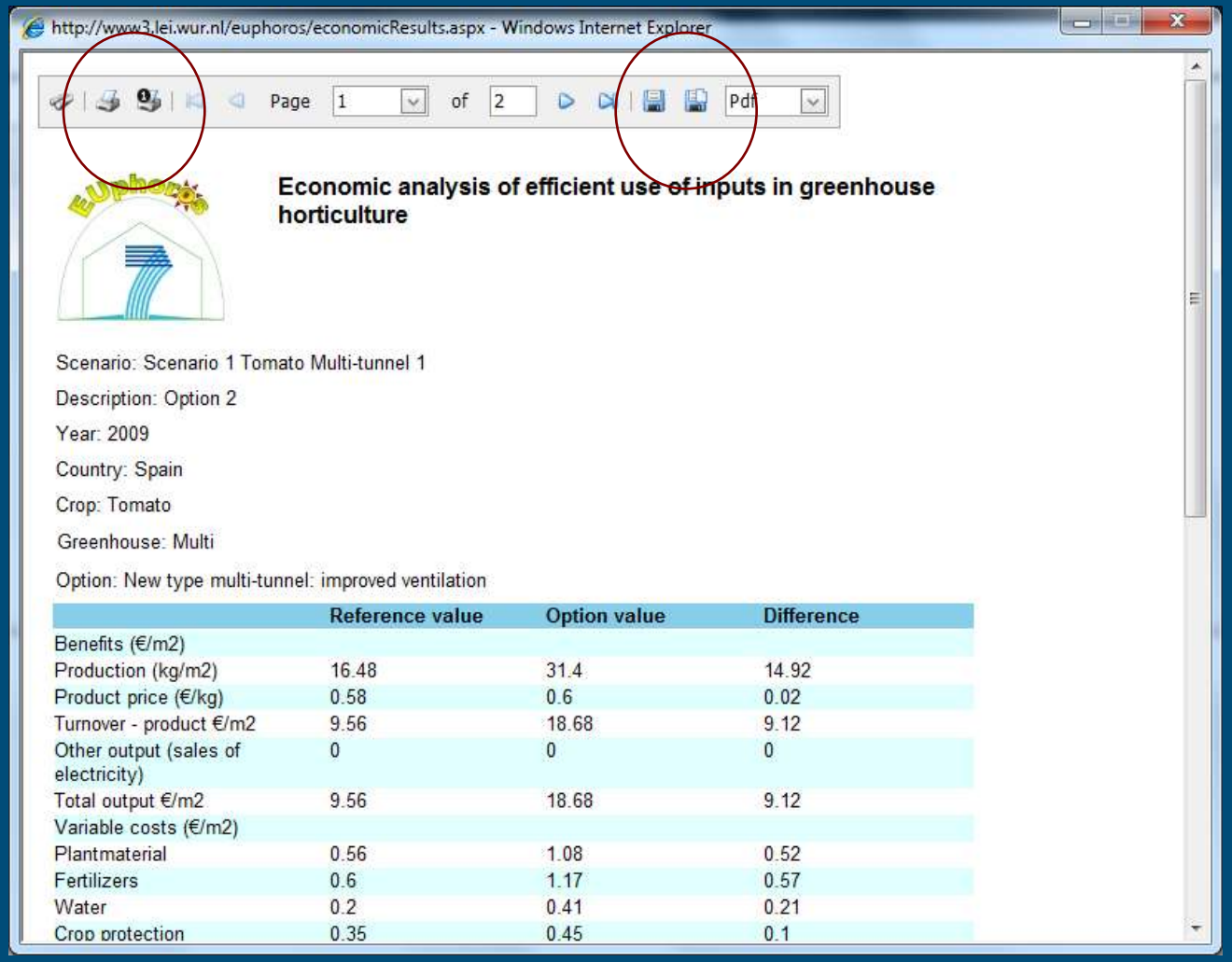
Economic simulation tool – results page 2

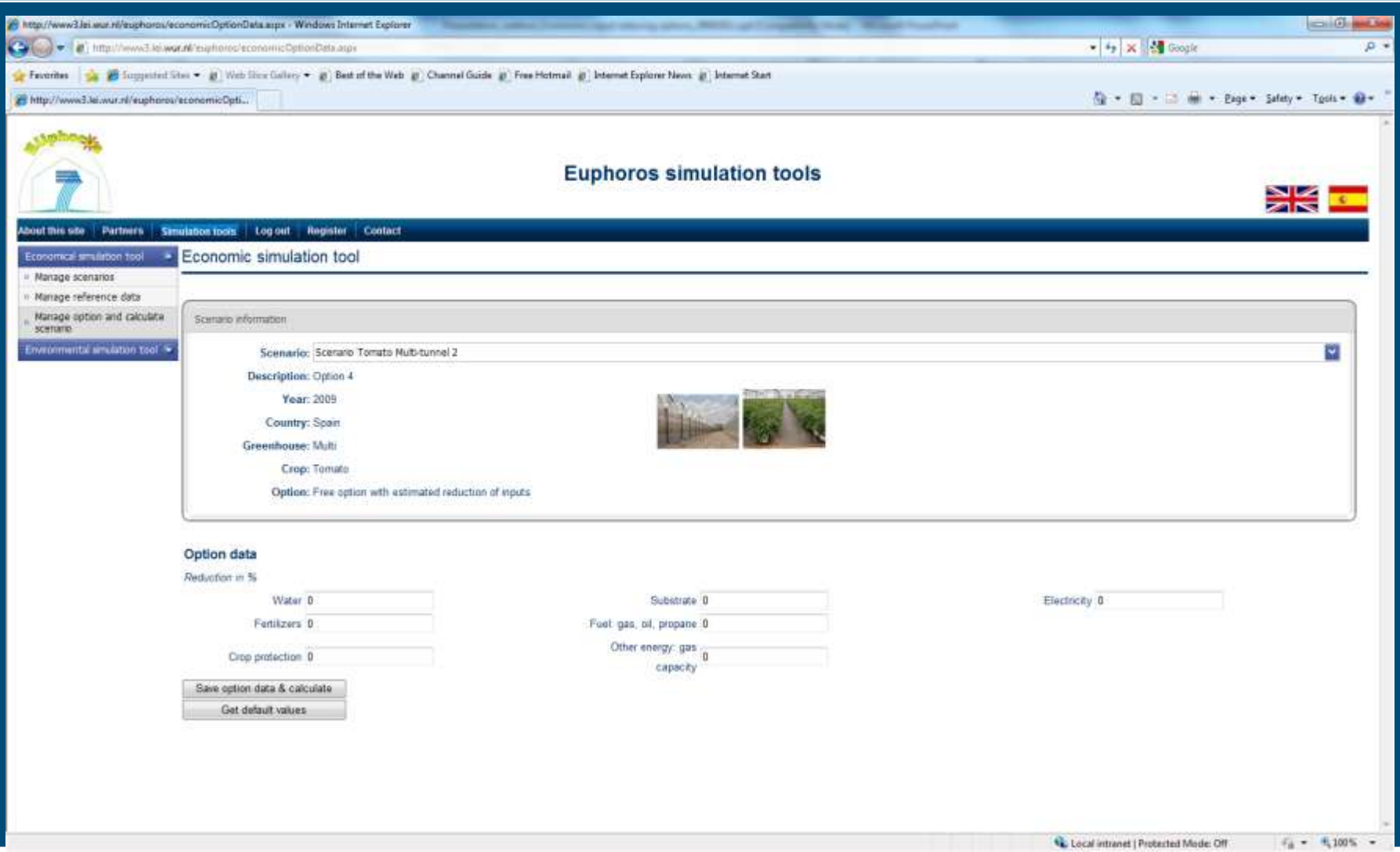
Webtool – Economic simulation tool



	Reference value	Option value	Difference
Benefits (€/m2)			
Production (kg/m2)	16.48	31.4	14.92
Product price (€/kg)	0.58	0.6	0.02
Turnover - product €/m2	9.56	18.68	9.12
Other output (sales of electricity)	0	0	0
Total output €/m2	9.56	18.68	9.12
Variable costs (€/m2)			
Plantmaterial	0.56	1.08	0.52
Fertilizers	0.6	1.17	0.57
Water	0.2	0.41	0.21
Crop protection	0.35	0.45	0.1

Economic simulation tool – results – save - print

Webtool – Economic simulation tool



Economic simulation tool – Free option

Webtool – Economic simulation tool

- Other scenarios and options

- Scenario 2: Tomato crop in Venlo greenhouse (NL)
  - Energy saving cultivation method
  - Double glazed greenhouse (3x AR, 1x low energy coating)

- Scenario 3: Rose crop in Venlo greenhouse (NL)
  - Diffuse glass and AR coated greenhouse
  - Reduced growing media (SPU rock) and new plantmaterial (plugs)

Webtool – Environmental and economic simulation

- Webtool will be operational in 2012
- Versions in Spanish, Italian, etc?

Thank for your attention

Are there any questions?

For more information:

- www.glastuinbouw.wur.nl
- www.lei.wur.nl

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