



This project is part funded by the European Regional Directive (ERDF) as part of the South East ERDF Competiveness Programme 2007-2013

# ERDF 'WATERR' Project

## Soft Fruit Workshop : 22<sup>nd</sup> July 2015

### Irrigation Business Review Findings: Irrigator Performance / Financial Impact, Opportunities, Challenges and Support Needs



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# 'WATERR' Project Objectives



**To support South East irrigators to improve their profitability and competitiveness by improving water availability and use efficiency**

- Improve irrigation productivity / returns by identifying and promoting irrigation 'Best Practice' and leading technologies to:
  - Increase yields
  - Improve produce quality / prices
  - Reduce irrigation costs
- Identify opportunities to improve water availability and collaboration to optimise catchment water management
- Improve the environmental footprint of South East river catchments



# 'WATERR' Project Irrigation Business Reviews

## Irrigation Business Review Objectives

In depth interviews involving 100 + growers (20% of South East irrigators) to :

- Assess current irrigation water availability and use efficiency
- Impact on production / yields, pricing and financial returns
- Identify 'Best Practice' technologies and techniques
- Improvement Opportunities / Barriers
- Grower Support Needs, and Priorities
- Confirm 'WATERR' Project Support Programme



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# 'WATERR' Project Irrigation Business Reviews



## Growers involved in IBR Interviews by Catchment / Region

<b>Kent :</b>	<b>Medway</b>	<b>13</b>
	<b>North Kent</b>	<b>13</b>
	<b>Stour</b>	<b>21</b>
	<b>Romney Marsh</b>	<b>5</b>
	<b>Kent Total</b>	<b>52</b>
	<b>Sussex</b>	<b>8</b>
	<b>Hants/ IOW</b>	<b>13</b>
	<b>Arun</b>	<b>15</b>
	<b>Chichester</b>	<b>7</b>
	<b>Thames</b>	<b>6</b>
	<b>South East Total</b>	<b>101</b>



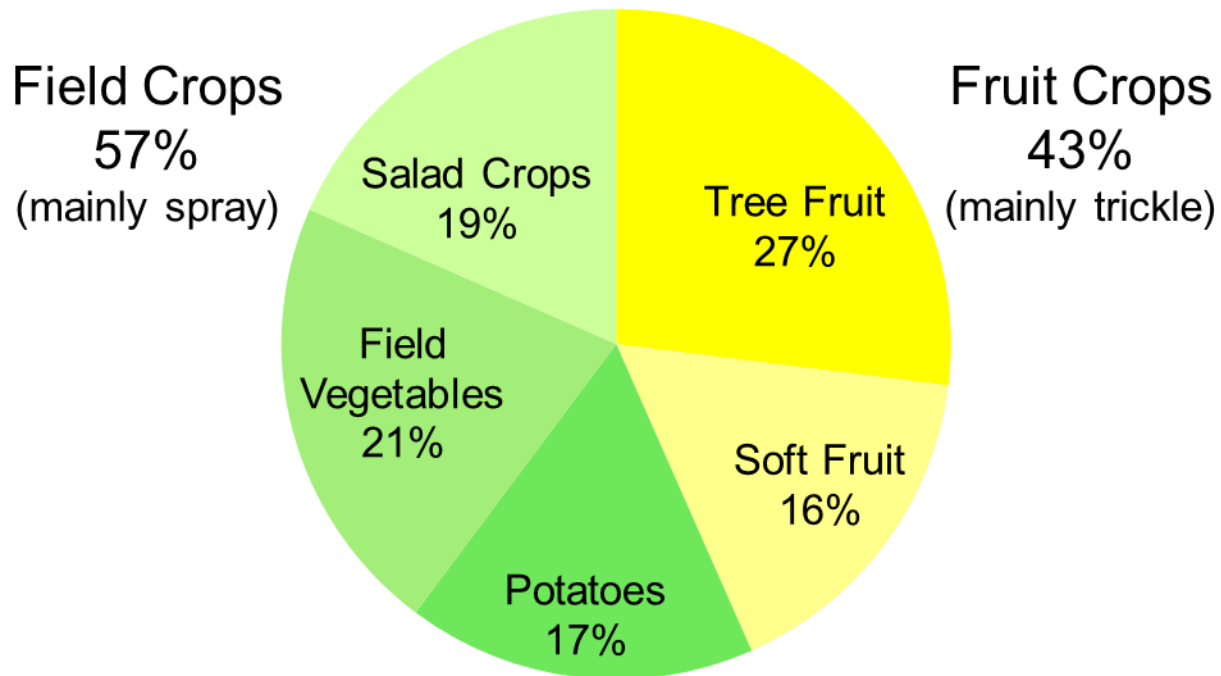
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# 'WATERR' Project Irrigation Business Reviews



## South East Growers – Main irrigated crops % area irrigated (Total 4500 hectares)





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# 'WATERR' Project Irrigation Business Reviews



## Tree and Soft Fruit Growers involved in IBR Interviews

<b>Kent :</b>		
	<b>Medway</b>	<b>11</b>
	<b>North Kent</b>	<b>9</b>
	<b>Stour</b>	<b>9</b>
	<b>Kent Total</b>	<b>29 ( 13 Tree, 10 soft, 6 T &amp; S)</b>
	<b>Hants/ IOW</b>	<b>2</b>
	<b>Arun</b>	<b>2</b>
	<b>Chichester</b>	<b>1</b>
	<b>Thames</b>	<b>1</b>
	<b>South East Total</b>	<b>35 ( 14 Tree, 15 Soft, 6 T &amp; S)</b>



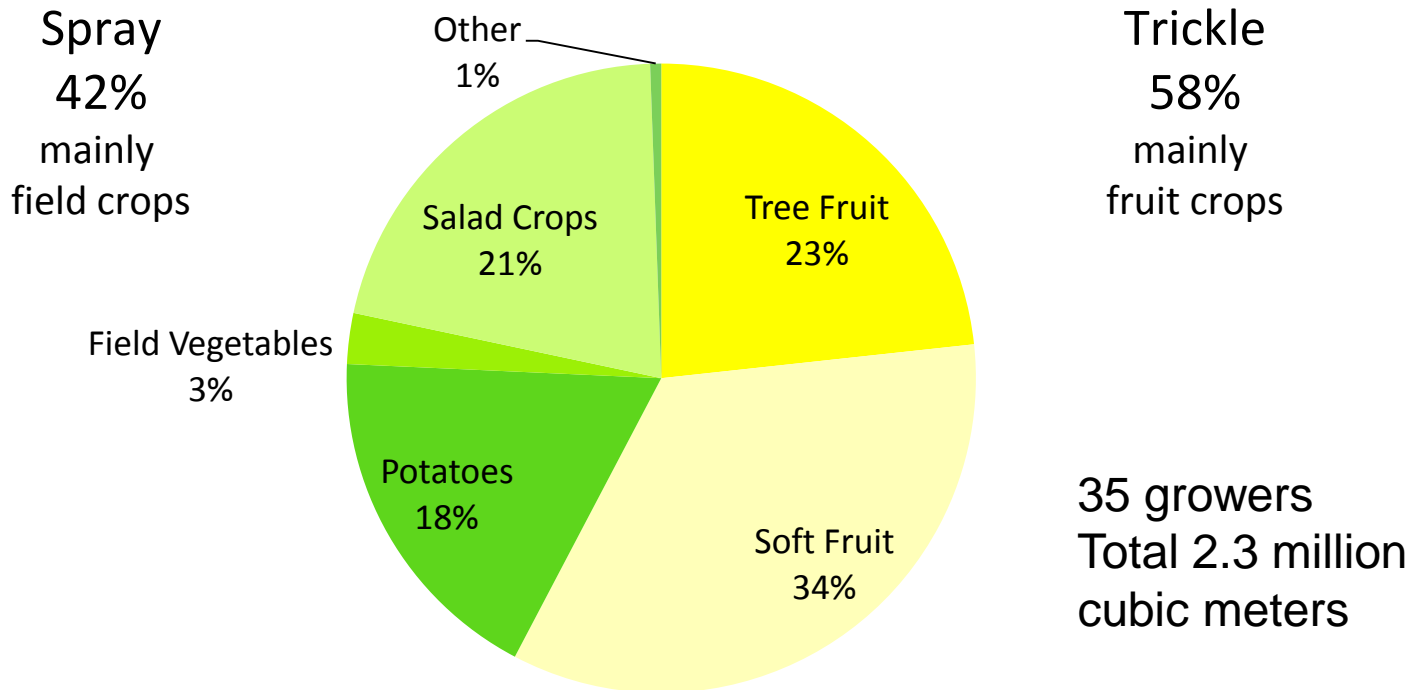
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# 'WATERR' Project Irrigation Business Reviews



## Kent Growers – Main irrigated crops % irrigation use (by volume)





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## Irrigation Business Reviews



### IBR Performance Data Base :Tree and Soft Fruit

	<b>Growers</b>	<b>Data Provided</b>	<b>Total Irrigated Crops (2011 – 2013)</b>
<b>Strawberries:</b>	<b>16</b>		
Field		<b>6</b>	<b>15</b>
Substrate		<b>8</b>	<b>21</b>
<b>Raspberries:</b>	<b>9</b>		
Field		<b>5</b>	<b>12</b>
Substrate		<b>4</b>	<b>10</b>
<b>Apples / Pears</b>	<b>16</b>	<b>10</b>	<b>24</b>
<b>Cherries</b>	<b>7</b>	<b>6</b>	<b>12</b>





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# 'WATERR' Project

## Irrigation Business Reviews



### Irrigator Performance Summary - Water Use Efficiency : 2011–13

	<b>Water Applied</b>		<b>Crop Yields</b>		<b>Irrigation Productivity</b>	
	<b>(M3 / Hectare)</b>		<b>(Tonnes / Hectare.)</b>		<b>(M3 /Tonne )</b>	
	<b>Average</b>	<b>Range</b>	<b>Average</b>	<b>Range</b>	<b>Average</b>	<b>Typical Range</b>
<b>Potatoes</b>	<b>886</b>	<b>115 - 1,775</b>	<b>41</b>	<b>20 - 56</b>	<b>22</b>	<b>12 - 34</b>
<b>Lettuce</b>	<b>784</b>	<b>281- 2,142</b>	<b>20</b>	<b>7 - 34</b>	<b>41</b>	<b>22 - 60</b>
<b>Strawberries :</b>						
<b>- Field</b>	<b>1,437</b>	<b>244 - 2,400</b>	<b>19</b>	<b>5 - 34</b>	<b>79</b>	<b>58 - 99</b>
<b>- Substrate</b>	<b>2,495</b>	<b>1,275 - 3,942</b>	<b>32</b>	<b>18 - 45</b>	<b>82</b>	<b>49 - 108</b>
<b>Raspberries:</b>						
<b>- Field</b>	<b>1,080</b>	<b>543 - 1,523</b>	<b>10</b>	<b>7 - 17</b>	<b>114</b>	<b>87 - 134</b>
<b>- Substrate</b>	<b>1,509</b>	<b>650 - 2,600</b>	<b>13</b>	<b>10 - 20</b>	<b>111</b>	<b>43 - 166</b>
<b>Apples / Pears</b>	<b>197</b>	<b>22 - 860</b>	<b>25</b>	<b>13 - 40</b>	<b>7</b>	<b>3 - 14</b>
<b>Cherries</b>	<b>315</b>	<b>104 - 771</b>	<b>7</b>	<b>3 - 12</b>	<b>66</b>	<b>38 - 94</b>



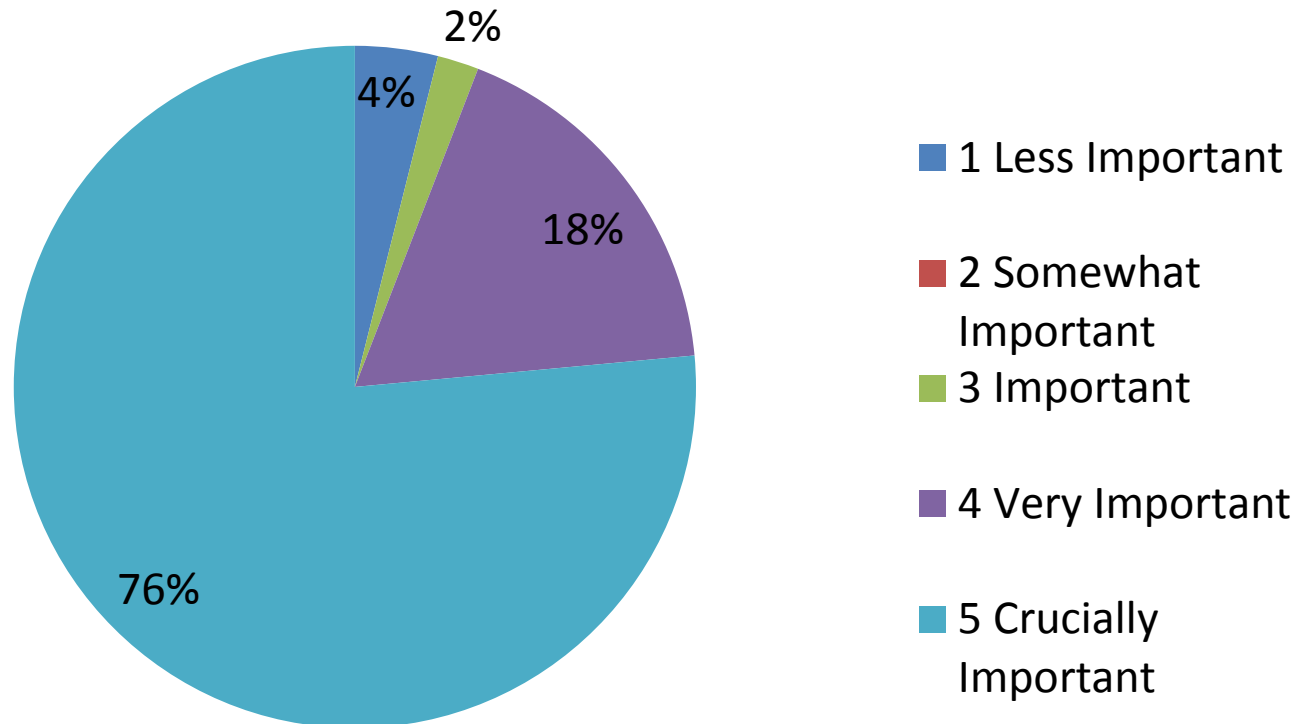
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# 'WATERR' Project Irrigation Business Reviews



## Importance of Irrigation to Business Performance Kent Irrigators





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## Irrigation Business Reviews



### Irrigator Performance Summary - Financial Returns : 2011–13

£ per Hectare

	Irrigation Cost		Gross Proceeds	Net Financial Benefit (Est.)	
	Average	Range	Average	Average	% of Proceeds
Potatoes	791	108 - 3,636	8,084	3,904	48%
Lettuce	632	138 - 1,542	11,450	10,682	93%
Strawberries :					
- Field	1,024	209 - 1,860	74,371	31,368	42%
- Substrate	2,867	970 - 5,282	106,383	103,516	97%
Raspberries:					
- Field	1,138	554 - 1,800	66,464	51,291	77%
- Substrate	2,527	840 - 5,014	74,091	71,564	97%
Apples / Pears	327	33 - 1,789	15,334	2,257	15%



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## Substrate Strawberries : Irrigator Performance : 2011–13

	Yields	Water Applied		Irrigation 'Gross Margin'
		Tonnes / Ha.	M3 / Tonne	M3 / Hectare
<b>2011</b> Top Quartile	42	65	2,681	£ 140,000
Bottom Quartile	22	111	2,477	£ 72,000
<b>Ratio</b>	<b>1.9</b>	<b>0.6</b>	<b>1.1</b>	<b>1.9</b>
<b>2012</b> Top Quartile	41	55	2,214	£ 140,000
Bottom Quartile	31	77	2,106	£ 75,000
<b>Ratio</b>	<b>1.3</b>	<b>0.7</b>	<b>1.1</b>	<b>1.9</b>
<b>2013</b> Top Quartile	36	64	2,185	£ 120,000
Bottom Quartile	21	101	2,042	£ 62,000
<b>Ratio</b>	<b>1.7</b>	<b>0.6</b>	<b>1.1</b>	<b>1.9</b>



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## Irrigation Business Reviews



### Field Strawberries : Irrigator Performance : 2011–13

	Yields	Water Applied		Irrigation 'Gross Margin'
		Tonnes / Ha.	M3 / Tonne	M3 / Hectare
<b>2011</b> Top Quartile	26	98	2,387	£ 80,000
Bottom Quartile	14	97	1,355	£ 45,000
<b>Ratio</b>	<b>1.9</b>	<b>1.0</b>	<b>1.8</b>	<b>1.8</b>
<b>2012</b> Top Quartile	30	66	1,948	£ 121,000
Bottom Quartile	13	80	1,020	£ 48,000
<b>Ratio</b>	<b>2.3</b>	<b>0.8</b>	<b>1.9</b>	<b>2.5</b>
<b>2013</b> Top Quartile	27	79	2,042	£ 122,000
Bottom Quartile	15	83	1,226	£ 55,000
<b>Ratio</b>	<b>1.8</b>	<b>0.9</b>	<b>1.7</b>	<b>2.2</b>



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## Irrigation Business Reviews



### Field Raspberries : Irrigator Performance : 2011–13

#### Irrigation 'Gross Margin'

	Yields	Water Applied		Irrigation 'Gross Margin'
	Tonnes / Ha.	M3 / Tonne	M3 / Hectare	(Proceeds minus Irrigation Costs) £ per Hectare
<b>2011</b> Top 50%	14	91	1,256	£ 88,000
Bottom 50%	8	110	960	£ 50,000
<b>Ratio</b>	<b>1.7</b>	<b>0.8</b>	<b>1.3</b>	<b>1.8</b>
<b>2012</b> Top 50%	14	56	788	£ 94,000
Bottom 50%	12	94	1,130	£ 62,000
<b>Ratio</b>	<b>1.2</b>	<b>0.6</b>	<b>0.7</b>	<b>1.5</b>
<b>2013</b> Top 50%	11	120	1,271	£ 63,000
Bottom 50%	6	187	1,077	£ 36,000
<b>Ratio</b>	<b>1.8</b>	<b>0.6</b>	<b>1.2</b>	<b>1.7</b>



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## Irrigation Business Reviews



### Substrate Raspberries : Irrigator Performance : 2011–13

	Yields	Water Applied		Irrigation 'Gross Margin'
		Tonnes / Ha.	M3 / Tonne	M3 / Hectare
<b>2011</b> Top 50%	14	151	2,050	£ 85,000
Bottom 50%	11	129	1,338	£ 62,000
<b>Ratio</b>	<b>1.3</b>	<b>1.2</b>	<b>1.5</b>	<b>1.4</b>
<b>2012</b> Top 50%	17	74	1,266	£ 84,000
Bottom 50%	13	93	1,102	£ 69,000
<b>Ratio</b>	<b>1.3</b>	<b>0.8</b>	<b>1.1</b>	<b>1.2</b>
<b>2013</b> Top 50%	12	165	1,992	£ 65,000
Bottom 50%	11	91	1,135	£ 62,000
<b>Ratio</b>	<b>1.0</b>	<b>1.8</b>	<b>1.8</b>	<b>1.0</b>



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# 'WATERR' Project

## Irrigation Business Reviews



### Soft Fruit IBR Findings : Performance Summary

- 2 to 3 fold difference in water use efficiency / productivity between growers
- In Strawberries the top performing growers in terms of yield and financial returns tend to be the most water efficient, typically using 10 to 40% less per tonne .
- However, they also tend to use more water per hectare overall, particularly in field crops where they use up to 90% more water than other growers.
- In Field Raspberries, top performing growers typically use 20 to 40 % less water per tonne than other growers, but also tend to use more water per hectare
- Growers of Substrate Raspberries use up to 80 % more water per hectare than other growers and are often not so water efficient .
- Conclusion : optimising water volumes is as important as water use efficiency / productivity per se in maximising yields and financial returns :

*'It's about getting the right amount of water to where it's required at the right time'*





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## Irrigation Business Reviews



### Soft Fruit Growers : 'Best Practice' Ranking ( % Rating Important or Very Important )

- 1 Use scientific tools to monitor moisture and schedule irrigation (92%)
- 2= Regularly check equipment condition / operation (83%)
- 2= Take account of cropping status / weather conditions (83%)
- 2= Check irrigation water quality (83%)
- 5 Use meters to monitor water usage by crop / field (67%)
- 6 Monitor field water distribution / uniformity (56%)
- 7 Provide irrigation training for staff (50%)

# 'WATERR' Project

## Irrigation Business Reviews

### Soft Fruit IBR Findings : Best Practice – Grower Uptake

- Top performing growers are using most of the 'Best Practices' identified in the IBR survey.
- Irrigation is complex, time consuming and labour intensive : optimisation requires careful management of all the variables.
- Soil / substrate moisture monitoring to improve scheduling / define water requirements seen as key to optimisation.
- Extensive use of probes / computerised tools to support scheduling, but there is a need for simplification and better equipment integration / standardisation
- Equipment malfunction can significantly impact performance : need to use latest systems and undertake regular monitoring and servicing
- Need to be able to monitor performance more easily : lack of meters an issue.



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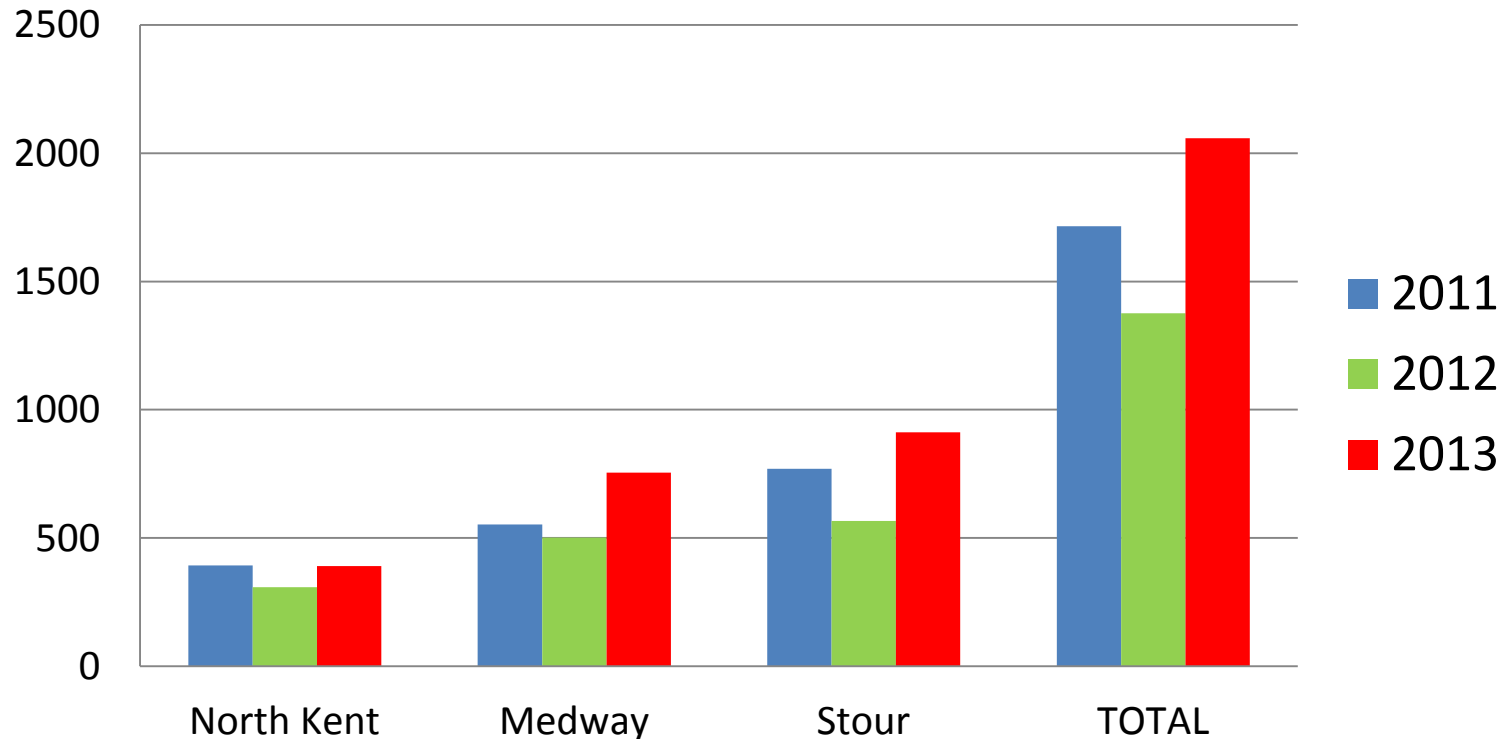
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# 'WATERR' Project Irrigation Business Reviews

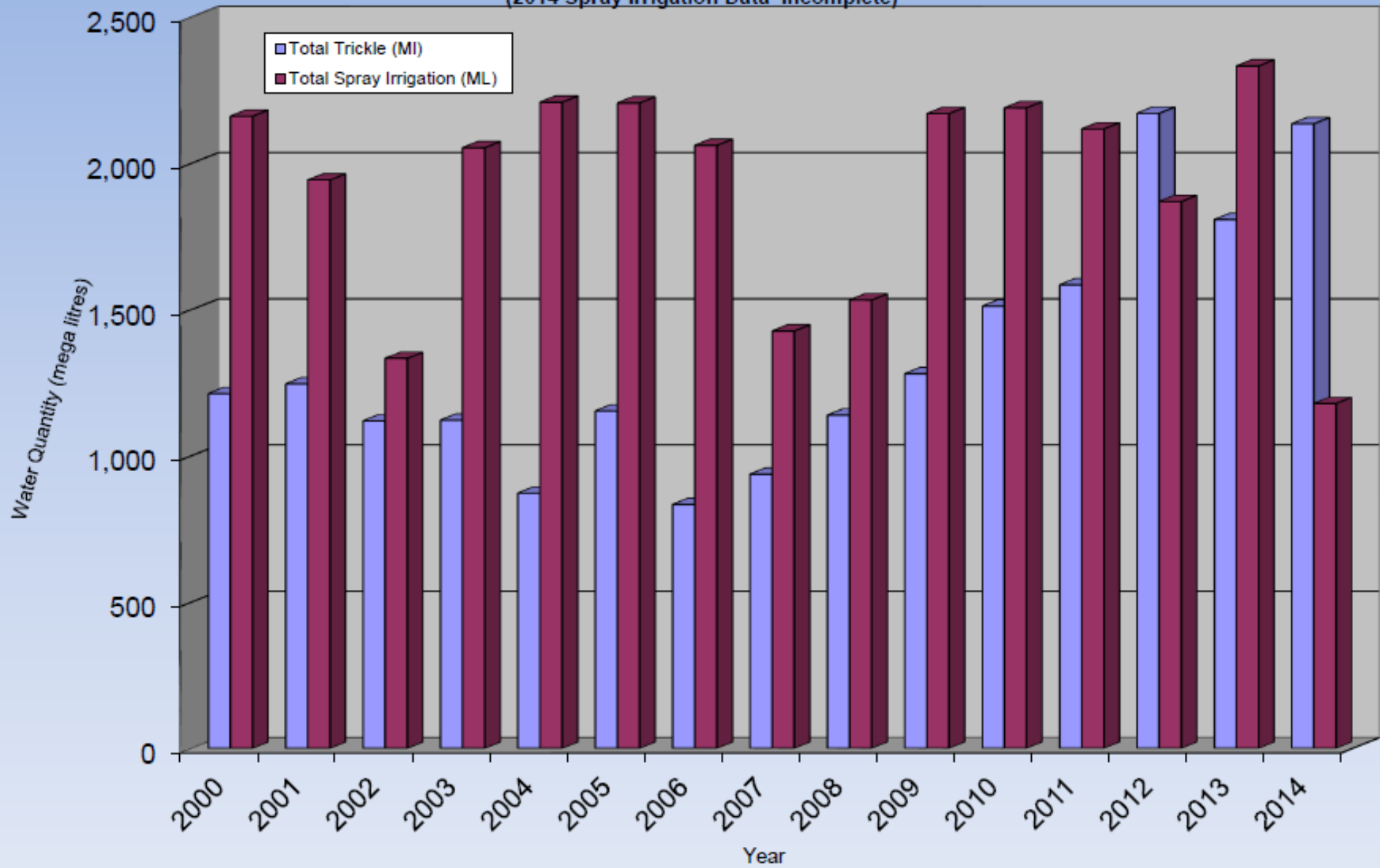


## Kent IBR findings: Water Use 2011-2013

'000s cubic meters – total for 32 growers



Trickle & Spray Irrigation Trend Comparisons  
(2014 Spray Irrigation Data Incomplete)





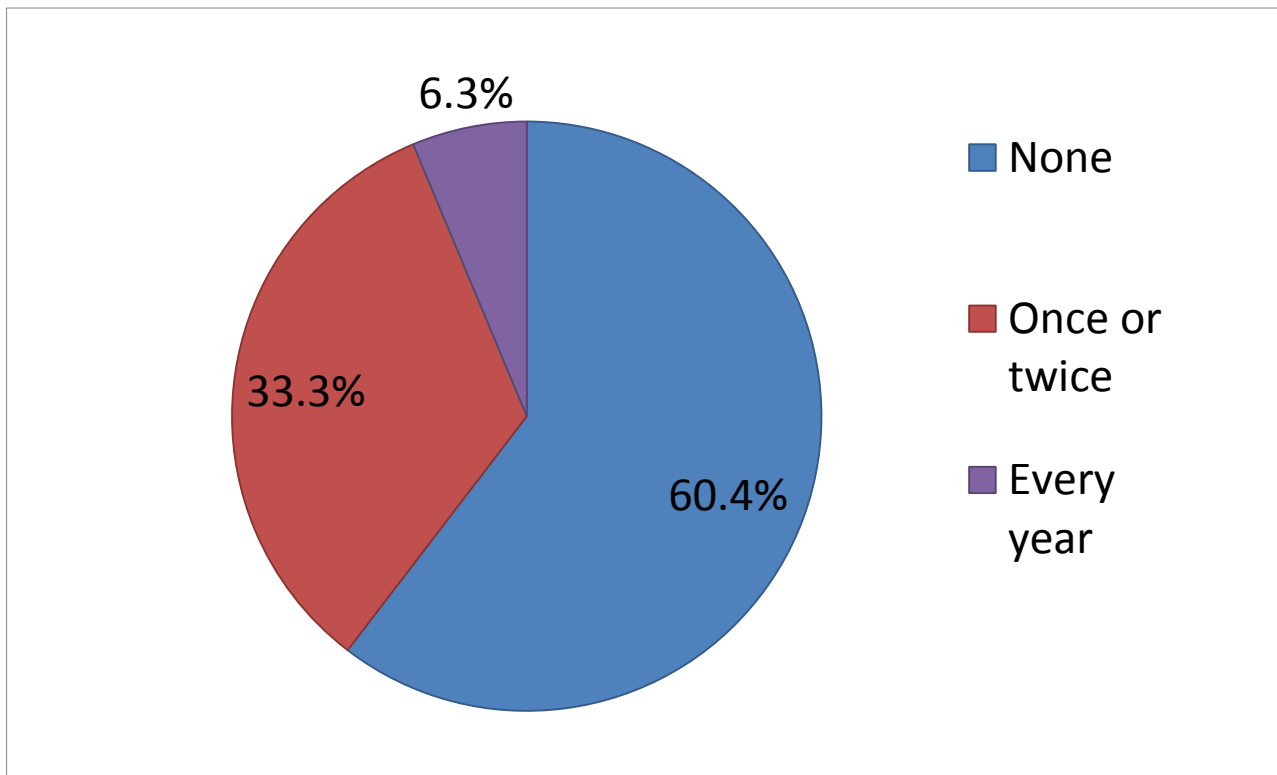
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# 'WATERR' Project Irrigation Business Reviews



## Impact of Limited Water Availability on Irrigator Businesses in Past 5 Years – Kent Irrigators





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# 'WATERR' Project

## Irrigation Business Reviews



### Soft Fruit IBR Responses : Issues and Challenges

- The sector is growing rapidly : trickle irrigation water use in Kent has doubled in the last 10 years resulting in overall irrigation water use growing by a third.
- Removal of the trickle license exemption is a major concern as most licensed growers are already being impacted by water restrictions .
- Abstraction Reform poses similar threats to availability : if future licenses are not fixed / for limited periods only, future investment decisions will be very difficult .
- Many growers are using mains water to supplement abstractions during peak periods (typically 10 to 15% of water use) but water costs are 2-3 times higher.
- Many growers are planning to increase capacity through reservoirs, rainwater harvesting and new boreholes but EA / planning constraints are a problem.
- Diffuse pollution is also an increasing issue and the need to reduce nutrient run off is a further driver for growers to optimise water use .



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# 'WATERR' Project

## Irrigation Business Reviews



### Soft Fruit IBR Responses : Irrigation Advice and Support Needs

- More information is needed on planned changes to the Abstraction Licensing system , particularly concerning removal of the trickle exemption.
- Given the increasing complexity of irrigation operations , more staff training is needed but there is a lack of suitable courses
- Many growers mentioned the need for more crop specific information / advice and the need for local 'on the ground' support
- In the absence of government support, many growers use equipment and service providers for advice, but more integrated support is needed
- Many growers work closely with research organisations such as EMR , but there is a need to translate this knowledge into practical, commercial use



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# 'WATERR' Project

## Irrigation Business Reviews



## Irrigator Support Needs / Priorities

### Ranking / % of Irrigators Rating Important or Very Important

1. Learning from the experiences of other irrigators ( 77%)
2. Learning about planned changes to Abstraction Licensing System (72%)
3. Understanding which technologies/ techniques have the most impact on irrigation water use efficiency and financial returns (67%)
4. Visits to sites which demonstrate irrigation Best Practice ( 67%)
5. Understanding how own water use efficiency compares with other abstractors (58%)
6. Direct 1:1 support from irrigation specialists ( 58%)
7. Collaborative opportunities to improve catchment management and water demand / supply balance (52%)





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# 'WATERR' Project Planned Support Programme



## 1. IMPROVING IRRIGATION PERFORMANCE

### IBR Follow Ups (May - July)

- Individual briefings for all IBR participants to highlight IBR findings, provide crop specific productivity / financial impact data , compare growers' own performance , highlight further planned project support and agree which would be of most benefit .

### Crop Specific Workshops / Best Practice Demonstrations

- Hardy Nursery Stock: West Sussex - August
- Lettuce / Salad Crops : Chichester - September
- Potatoes : TBC pending outcome of Follow Up interviews

### 1: 1 Grower Support by EMR irrigation specialists

### Best Practice Guides and Case Studies

# 'WATERR' Project Planned Support Programme

## 2. WATER AVAILABILITY

### 1. Abstraction Reform Workshop : 28<sup>th</sup> September at EMR

in conjunction with NFU Horticultural Board to cover :

- Update from Defra Consultation Team on latest government plans for Abstraction Reform .
- Latest information from the Environment Agency concerning the removal of the license exemption for trickle irrigation .
- Opportunities for closer EA / grower collaboration to improve catchment management .

### 2. Opportunities to improve water supplies

- 1:1 or Group meetings with the Water Companies to discuss opportunities to access untreated water and / or licence trading
- New Reservoir Guide

# 'WATERR' Project Future Plans

## New Project Proposal

### UK Centre for Water Efficient Technologies at EMR

#### Objectives

Bring together leading irrigation researchers, equipment and services providers at EMR to:

- Research, develop and commercialise an integrated portfolio of technologies and systems for the tree and soft fruit sector
- Deliver a step change in irrigation water use efficiency, productivity and financial returns .
- Promote and support business growth throughout the supply chain.



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# Proposal : EMR Centre for Water Efficient Technologies



## Project Strategy

- Create an Irrigation Centre with the research, development and commercialisation infrastructure and critical mass required for suppliers to locate in Kent
- Engage directly with growers, Producer Organisations and Retailers to ensure technologies developed meet the needs of the horticultural fruit sector / supply chain
- Develop integrated / compatible products and systems
- Support commercialisation by raising awareness of the commercial benefits of these new technologies and systems through grower trials, crop specific workshops, demonstrations, training and 1: 1 support .



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# 'WATERR' Project Irrigation Business Reviews



## Soft Fruit Grower Comments

***'Water is the biggest issue . We are totally dependent on it.'***

***' Any restrictions as a result of licensing trickle could have a massive impact'***

***'Better communication with the Environment Agency is fundamental'***

***'We have to draw information from many sources. It would be very helpful if it could all be in one place .'***

***' It's all about getting the right amount of water to where it's needed at the right time'***