

Collaboration to secure new sources of water

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Range of supply options

- Advantages and disadvantages
- Costs (where possible)
- Barriers and issues
- Need for collaboration with other irrigators
- Need for organisation by irrigators

Summary



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Introduction

Kent Water Task Group partners:

Kent County Council
South East Water
Environment Agency
National Farmers Union
East Malling Research
Country Land and Business Association
Campaign for the Farmed Environment

ERDF WATERR project



Introduction

Water use efficiency should generally be considered ahead of trying to secure new water resources as it can also give other benefits:

- Improving yields;
- Improving the efficiency of fertilizer use;
- Improving labour productivity;
- Controlling nutrient-rich runoff.

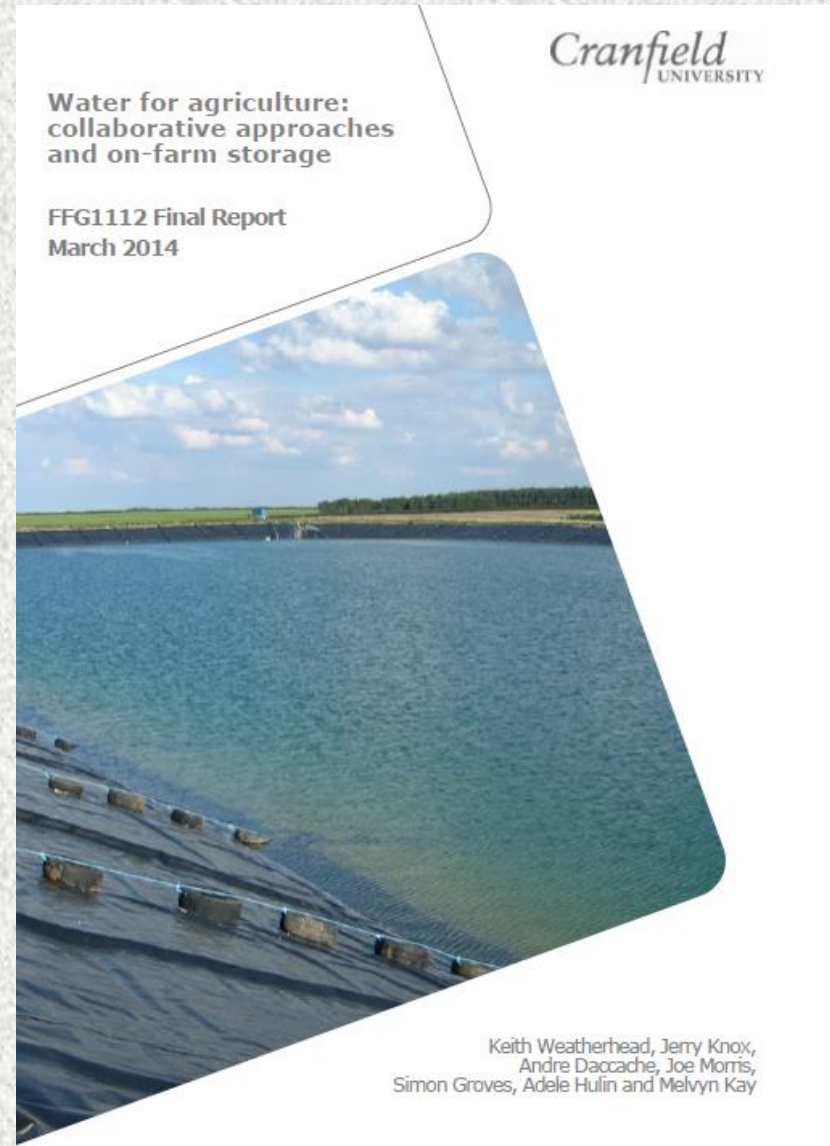
Water efficiency will be the focus of future, crop-specific WATERR project workshops.

Background

Extensive reference to:

*Water for agriculture:
collaborative approaches
and on-farm storage.*

(Cranfield University, 2014)

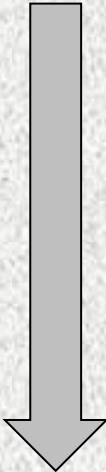


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Supply options

- Individual water storage reservoirs
- Connections to water company pipelines
- Connection networks with neighbours
- Share in water company infrastructure
- Share in multipurpose (FRM and WR) structures



Increasing
need for
collaboration
and
organisation

KCC, EA, NFU and other partners are trying to support all of these options.



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Why reservoirs?



Reason for reservoir investment	Major reason	Minor reason	Average score
Improved security of supply	8	1	7.8
Expansion of existing irrigated area	8	1	7.5
Increased water supply to existing area	7	1	7.0
Threat of future loss of existing summer abstraction licence	6	2	6.4
New, first time, irrigation investment	4	1	4.2



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Reservoirs - challenges

Challenge to reservoir investment	Major reason	Minor reason	Average score
Overall cost / obtaining the capital required	3	5	5
Cost of technical studies and engineering design	3	4	4.1
Finding a suitable reservoir site on the farm	1	6	3.9
Obtaining planning permission	2	6	3.9
Obtaining an abstraction licence	1	5	3.7
Environmental – cost of environmental studies and surveys	2	5	3.7
Obtaining an electricity supply for the pumps	2	3	3.4
Archaeological – cost of archaeological studies and surveys	1	5	3.1
Environmental – overcoming any environmental restrictions	0	6	2.9
Justifying the investment within your business	2	2	2.4
Finding a reliable water supply	0	5	2.3
Getting permission/paying for railway/road easements etc.	0	4	1.7
Archaeological - overcoming any environmental restrictions	0	2	1.6
Getting permission/paying for land easements	0	2	1.2
Other	2	0	1.0



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Reservoirs - Planning permission

LPA policy varies across the Kent:

Tonbridge & Malling Borough Council -

Policy CC4

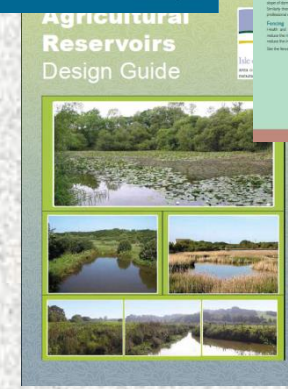
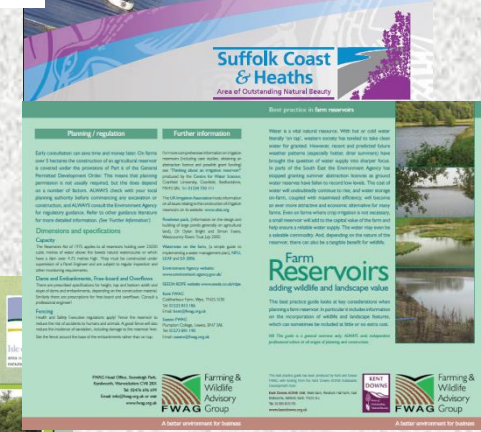
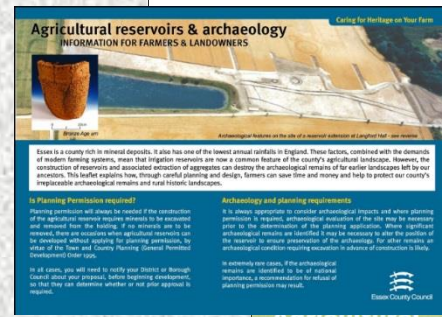
1. The development of winter water storage reservoirs and other forms of water harvesting will be encouraged, particularly on farms, as a means of reducing summer abstraction from existing water resources.

2. Reservoirs should be designed, where appropriate and practicable, to incorporate wildlife and landscape features including permanent deep water, shallow berms and islands and include marginal planting, hedges or shelter belts and embankments sown with traditional grass and wildflower mixes.

- Has this policy prevented some reservoirs from going ahead?
- New Local Plan in preparation.

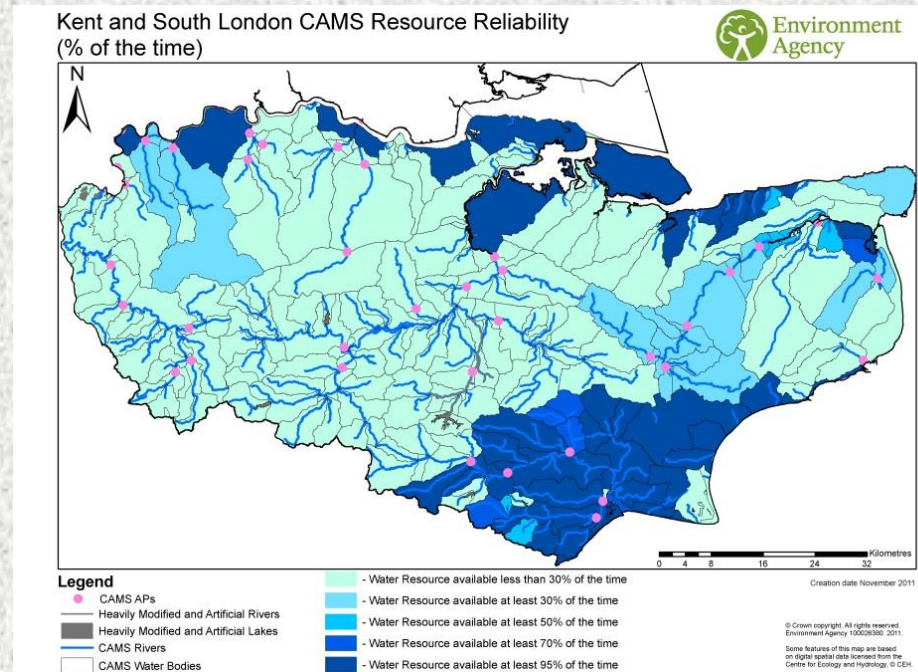
Reservoirs - planning and design issues

- If reservoirs can deliver net environmental benefits then it is better that they are built.
- Need effective, practical environmental features that are consistent with the primary function – providing water for irrigation.
- Kent irrigation reservoir design guide with EA and other partners. Will also include land suitability maps.



Reservoirs – water availability

- More reservoirs being constructed.
- Water availability in winter may be becoming a constraint in some sub-catchments.
- Climate change may increase winter rainfall but also give rise to more extremes.
- What does this mean for reliability?
- Multi-season reservoirs?
- Could rainwater harvesting increase reliability?

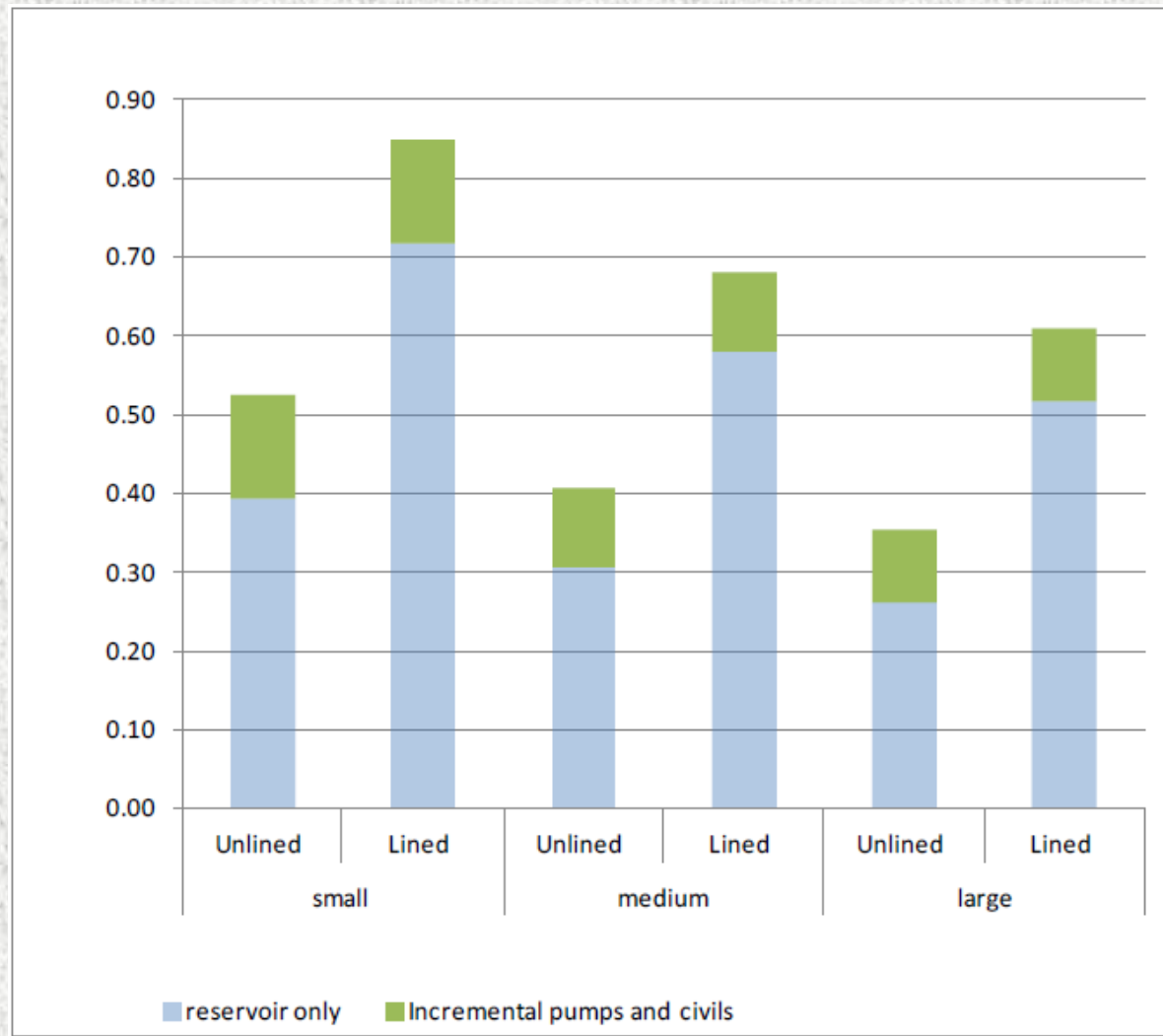


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Reservoirs - costs

- Cost per m³ of water delivered (2012 prices).
- All costs included (reservoir (20yr life), maintenance, pumping costs, revenue foregone...)
- 'Small' means 47,000m³
- For <25,000m³ some cost are eliminated.



Connections to water company pipelines

- Could be individual connection for one irrigator or shared branch pipeline for delivering to a group of irrigators
- Might supply water to locations not previously considered for irrigation.
- Supply might be winter only or summer too(?)

Advantages:

- Simple management
- Relatively low upfront cost if close to pipeline
- Reliability of supply?
- Might be alternative to new reservoir

Disadvantages:

- Cost per m³ (but maybe more competitive for untreated supply)
- Reliability of supply?



Shared infrastructure - Interconnections with neighbours

Pipelines to connect water storage reservoirs (example in Medway catchment)

Advantages:

- Provides an element of water security and flexibility (especially if water sources and cropping patterns are different).
- Relatively simple to manage.

Disadvantages:

- Costs of pipelines and additional pumping.
- Trust (and/or water sharing agreement) required.



Shared infrastructure - Interconnections with neighbours

Example: Heronhill LLP in West Norfolk

Physical:

- 3 farms + a potato grower who rents land and water.
- 2 reservoirs
- A pipeline ring main

Organisational:

- Limited Liability Partnership which holds abstraction licence.
- Partnership leases the reservoir sites from the land owners.
- Each farm has a fixed share of the water but flexibility too.
- Set up in 2011 and working well.
- Gone on to form Nar Water Resources Group



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Shared infrastructure – Larger reservoirs

Large irrigation reservoir shared by a group of irrigators

Advantages:

- Allows selection of more favourable sites and clay lining
- Would give economies of scale

Disadvantages:

- Introduces additional costs (Panel engineer, annual inspections...)
- Additional water distribution costs
- Formal agreements would be required



Cost per m³ could be 35 - 40% of those for very small lined reservoirs

Share in water company infrastructure

Water companies are developing new water resources –

- New transfer pipelines and imports from outside Kent
- New reservoirs and operational modifications to existing reservoirs
- New water reuse schemes

A very small percentage increase in capacity could provide significant supplies for irrigation.

Cost? Distribution?



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Share in multi-purpose FRM and WR structures

- Flood risk management infrastructure might be able to also provide a water resources function – especially off-line flood storage reservoirs.
- Water companies and FRM authorities have greater powers for easements etc. so piggy-backing on these could be beneficial.
- Quantities of water could be very large.
- Lead-in time would be long.
- How could a group of irrigators benefit from this?

Shared infrastructure: possible options for piggy-backing on other organisations

- 1/ The lead organisation makes the investment and recovers costs through charges to water users. (Risks are carried by lead organisation)
- 2/ Irrigators form a company or partnership that makes their share of the capital investment. Members share the capital cost in proportion to their share of the water. (Risks are carried by water users)
- 3/ An asset finance deal provides the capital. Irrigators pay a fixed annual charge plus a water charge. (Risks are carried by finance provider)

Joint water company and farmer financing



Source: Cambridge University, Institute for Sustainability Leadership, 2014.

Shared infrastructure: piggy-backing on other organisations

Benefits

- significantly increased water availability
- share in the resource may be a valuable asset

Barriers?

Financial

- upfront commitment to a share of the capital cost
- finding an acceptable finance arrangement

Organisational

- shared management, maintenance systems, allocation and water sharing systems.

Physical

- conveyance system, distribution system.

Legal

- ownership agreements, distribution agreements.

Next steps for supply options

Break-out groups with water companies after lunch.

Things to consider:

Demand

Quantity?
Timing?
Reliability?
Quality?

£

Upfront
costs?
£/m³?

Supply

Quantity?
Timing?
Reliability?
Quality?



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Next steps for supply options

Initial investigations may be needed for some options to -

- Identify all the potential water users
- Assess any mismatch in supply and demand requirements
- Estimate the scheme costs and the unit cost of water
- Understand and explain the organisational implications

Is the scheme worth more detailed feasibility studies?

- LEADER funding bid by KCC and NFU on behalf of groups of irrigation businesses for initial investigations of water supply schemes.

Summary

- Water use efficiency first
- Small reservoirs – baseline but localised water availability?
- Connections to water company pipelines – simple over short distance
- Interconnections with neighbours might bring some benefits
- Large shared reservoir – economies of scale and siting
- Share in water company infrastructure
- Multi-purpose infrastructure
- Next steps

Thanks

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