

Diffuse Pollution from Agriculture In the UK

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2nd UK ADAPT Workshop Notes
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Introduction

Review of Database Entries:

1. Monitoring water quality
2. Direct farmer involvement
3. Modelling
4. Monitoring ecology
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What Next? Future Actions

Introduction

A brief summary of what took place in the 1st workshop was given, for the benefit of those who had not attended (notes from 1st workshop available on the UK ADAPT website)

The purpose of UK ADAPT was summarised as:

- Review of catchment research in the UK
- Driven by the Water Framework Directive, also the Bathing Waters Directive and the Defra 'Diffuse Water Pollution from Agriculture' (DWPA) Strategy.
- Rational approach: Diffuse water pollution from agriculture as a whole, involving many different organisations
- Aim to develop thinking and stakeholder involvement

Progress since the last workshop – Peter Costigan, Defra

- The Environment Agency are now formally involved with the project and will contribute to the UK ADAPT Steering Group.
- Defra DWPA review paper published on Defra website – currently online version only but formal review will be published later this year
- More projects have been added to the website database – there are currently over 60 projects

There seems to be a general awareness of the fact that lots of research into DWPA is taking place, but not everyone is aware of individual projects and therefore opportunities can be missed – the UK ADAPT initiative aims to improve this situation.

Useful discussions took place at the 1st workshop, however only preliminary suggestions were put forward. There is now the need to improve awareness of the ADAPT initiative and increase catchment coverage and knowledge on the database. In particular:

- How can we best exploit the opportunity that ADAPT provides?
- What format will future meetings take?
- Will documentation need to be produced or can the initiative continue as a web based format?

Input is needed from everyone at the workshop in order to carry the project forward

Is the focus only on diffuse water pollution?

No, focus is on real catchment studies. Opportunity exists for pilot studies to be recognised that might not otherwise find a way into the literature.

ADAPT objectives and the way forward - Andrée Carter, ADAS

ADAPT evolved on a voluntary basis with the support of Defra

Objective 1: Provide a resource for all involved in DWPA in the UK

- This will help with the implementation of the Water Framework Directive
- Research point of view: vast range of studies, no overview, no knowledge of gaps etc

Objective 2: Review the resource and ID gaps

- provide recommendations for further work and better co-ordination
- ADAPT is trying to address various directives

Objective 3: Improve networking and knowledge sharing between stakeholders

- Need to avoid research duplication
- Potential to gain additive value through integration with other projects/researchers

Toolkit Development:

- Currently 62 projects, potential for at least 100-150 (anticipate awareness of database will increase over next month)
- Possibility of UKWIR report, article in Water Policy magazine or similar, conference and review in order to increase awareness of UK ADAPT.
- Upgrade website – keyword search and discussion forum could be added
- Currently projects are divided into 6 different categories – whether or not these categories are suitable needs to be discussed.
- ADAPT will only work if stakeholders continue to contribute

Rural Economies and Land Use — Lisa Hill, ESRC

RELU is funded collaboratively by ESRC, NERC and Biotech Councils. The initiative is in its early stages and evolved through recognising the need to integrate socio-economic and environmental research for the purpose of understanding and managing rural land use. £20 million has been allocated to spend on research in this area and will be overseen by a strategic advisory committee consisting of stakeholders and researchers from both academic and non-academic organisations.

There are **four key themes** within RELU:

- 1) Environmental basis of rural economies and regeneration
i.e. business location, quality of environment, biodiversity vs industry
- 2) Integrated food chain analysis and integration (i.e. 'farm to fork' monitoring, disease packages)
- 3) Non agricultural business in rural areas (i.e. tourism)
- 4) Integrated land and water management (i.e. inclusion of different pollutants)

The main emphasis is on looking at the rural environment through an holistic/interdisciplinary approach i.e. inclusion of environmental, social and economic research. Various approaches will be used to achieve this, e.g. community action schemes through to modelling scenarios

The key aim is to integrate the social aspect of research with environmental and biological factors. It is therefore anticipated that research proposals will involve at least 2 different research councils.

- Defra may also become involved with this initiative
- Full research proposals will be called for in September this year and funding should be allocated by April 2004
- Funding eligibility is restricted to the usual research council criteria, although multi-organisation projects are welcomed which can include profit making organisations.
- There will be the potential for PhD studentships and fellowships to be funded

A consultation phase is currently underway and further details about RELU can be seen on their website: www.esrc.ac.uk/relu

Review of Database Entries

1. Monitoring Water quality

Stephen Bolt, Anglian Water

- For the first time in UK, we are now seriously starting to look at water quality in an integrated way – the WFD has provided the catalyst for this.
- There has been a move towards achieving ‘good status’ of water quality/ecology, rather than ‘end of pipe’ standards.
- Issues of ‘zero priority substances’ – is this achievable?
- Need to remember that drinking water quality is important.
- Diffuse vs point source management – will this lead to over-control?
- EA gap analysis is currently the most up to date review of water quality (examined existing info on water quality pressure and found few areas complied with all three levels of water quality criteria).

Water Industry Perspective

Who has responsibility?

EA identified as competent authority – but what role does water industry have in land management?

Use of taxpayers money needs to be considered.

2 scenarios possible:

- 1) Define → monitor against definitions → ID gap → try to rectify ‘at all costs’
- 2) Monitor current position → ID where we want to be → define → rectify using sustainable criteria

Rectifying water quality problems ‘at all costs’ is financially unachievable and therefore unsustainable.

Review of UK ADAPT projects

- Better quality data is available for rivers rather than lakes
- There are no dedicated studies on water quality monitoring – is this important?

Richard Williams, CEH Wallingford

Comments on the UK ADAPT website database:

- It is difficult to know what each project is about because there are so many of them – need for more detail?
- Only 3 of the modelling projects mention real data sets.
- There are only 2 projects focusing on groundwater studies.
- All the projects refer to diffuse agricultural pollution
- There is a real need for more projects
- Many projects are multiple pollutant studies and these also tend to be the most recent research
- Most projects are from English case studies – need UK wide research.
- Most projects focus on nutrients such as N and P
- Multiple pollutant studies are common
- There are no projects on non-agricultural diffuse pollution
- Groundwater studies are under represented.

What have we learned?

- 1) Sampling Frequency determined by individual pollutants/pathways
e.g. high (sediment, pesticides in surface water)
low (nitrates in groundwater)
Implications for EA monitoring of diffuse pollution for WFD
- 2) Sediment Quality Sampling – needs to become more routine
- 3) Mitigation
 - Can we monitor water quality to show effects at WFD scale i.e. catchment?
 - Do we have sufficient experience to make predictions? (empirical knowledge vs modelling)
 - Optimising mitigation methods

Discussion: Monitoring Water Quality

The following comments were made by various people:

1. One obvious gap in the database is lack of studies examining water colour. There are thought to be at least 50-60 studies on this subject which were done over a decade ago – could they be included in the database?
2. There is a need for more historical projects as opposed to only recent/ongoing ones as these will provide better information
3. There is a need for all the projects to be thoroughly reviewed.
4. Database problems: it is not always obvious what each study is looking at – perhaps have ‘tick boxes’ on the website for different pollutants e.g. N, P, pesticides etc
5. Water Industry Archives are substantial and could be very useful as they provide real data (especially for coastal areas)
6. Need to balance extra information/projects against possibility of swamping the database.
7. Need to consider how to obtain info from water industry and get it added to database
8. Extra projects could also be obtained from Environmental Change research.
9. There seems to be some confusion over exactly who the website is aimed at
 - perhaps need to target specific groups/interact with other relevant websites?
 - Generic resource for everyone vs specific resource for developing future research collaborations
10. Need appropriate links to other websites – act as a ‘one stop shop’ for catchment studies
11. Define terminology properly on website

End Note:

- Now need to start promoting the ADAPT initiative better
- Recognise deficit in information exchange
 - More funding → bigger project?
 - ID specific responsibility for website maintenance

- Need for more info on monitoring (analytical methods, costs etc)
- Studies do exist on this but are not targeted by ADAPT remit.

2. Direct Farmer Involvement

Tanya Olmeda-Hodge, CLA

What is being done?

- Not obvious from abstracts – web format too rigid/constrained?
- Few projects mentioned direct farmer interaction – for those that did, it would be useful to learn about successful methods used as questionnaires, surveys etc are often difficult to get co-operation with
- Need for more projects dealing with voluntary initiatives (CLA promote this)
- Stakeholder groups only work if people who farmers trust are involved – difficult to organise
- Need to keep message clear and simple for farmers but backed up with science
- Need to be aware of resource constraints and provide incentives
- Who is the messenger? First contact has influence

Gaps

- Mechanism for getting farmers involvement
- Confusion over Decision Support Systems

Where Next?

- Produce documented processes

Bob Breach, Severn Trent Water

‘Voluntary Initiative’ arose to avoid pesticide tax

- Need to do something, ‘nothing’ is not an option
- Compliance needed for WFD and pesticides directive

The VI Water Project

- 6 pilot supply catchments with known pesticide problems
- 4 rivers, 1 groundwater, 1 upland
- National steering group

Practice Measures

- Excellent examples in UK and Europe, but something isn’t working as pollution problems still bad
- Need right product, right place, right time and right way to make good practice effective
- We know the answers but need to ensure consistent adoption (is this realistically achievable?)
- Agronomists have respect from farmers – able to translate science and effect changes
- Effective communication needed – perhaps via mobile phone text messages telling farmers when it is safe to spray?

Proposed Model

- You don’t get anywhere unless farmers believe there is a problem
- No generic approach, local variations
- Incentives for good → best practice, many farmers want to change practice but can’t afford to
- Need ‘one stop shop’ for farmers advice
 - Make use of available technology in a simple way e.g. text messages
 - Convert research findings into simple advice via good communication
 - Whole farm management plans, holistic approach for future sustainability

Discussion: Direct Farmer Involvement

1. Potential to eventually ban the use of some substances. Three key processes needed to effect change: farmer advice, banning certain substances and getting supermarkets to encourage best farming practice.
2. Level of financial incentive needed?
3. Proper recognition of which are the good practices to use, is information about them easily accessible?
4. Decision support Systems (DSS) need to be focused on farmers day to day working pattern e.g. DSS for waste plan, crop watering etc that fits in with existing routine and is simple to use.
5. There is a need for action on behalf of researchers to properly engage farmers participation – this isn't being done yet.
6. DSS for whole farm that has sections for nutrients, pesticides etc rather than having 6 different CDs that will inevitably not be used.
7. Need to target people such as spray operators and people deciding which crops to grow as they can invoke change (need specialised approach for each)
8. Real need for local advice centre for all catchment issues that agronomists (and consequently farmers) will use and trust.
9. Supermarkets need to be involved more through initiatives similar to the Red Tractor logo – such schemes are mutually beneficial.

3. Modelling

Louise Heathwaite, Sheffield University and Adrian MacDonald, Leeds University

The real issue in terms of modelling is that there is often a coincidental agreement between theory and observations – for the wrong reasons.

Comments:

- Some projects on ADAPT database have been put in the wrong category, for example some claim to use models but don't, or perhaps they use conceptual models.
- Need for data requirements of models to be specified, e.g. EA water quality data, MAGPIE etc
- Need to know exactly how models work e.g. GIS/process based
- Scale of model output is often unclear → confusion
- Purpose of Decision Support Systems unclear
- Policy requirements not mentioned

Suggestions:

- Proper criteria needed for definitions of models
- Need further review of projects, re-categorise existing projects
- Different categories/more categories needed on website database as many people chose wrongly
- Need to ID modelling needs in context of diffuse pollution policy

Discussion: Modelling

1. There is an obvious gap in projects on groundwater modelling
2. Need for balance between quantity and quality of projects on the database – don't want to discourage people from submitting entries.
3. Need links to individual project websites if possible for further information.
4. Boxes on website too small for text of objectives etc
5. Need to dissociate model outputs from policy implementation to a certain extent.
6. There is a gap between where research ends and policy starts - level of involvement of risk assessment components in models.
7. Need to ID questions that model is trying to answer
8. Need to be sensitive to issues – specific projects are being put into very broad database and attracting unnecessary criticism. Writing out project objectives properly and explaining categories should greatly reduce this problem.
9. There are some practical/technical faults with the website:
 - Need for links to further information i.e. other websites, so as not to over complicate ADAPT website.
 - Potential for message board facility – would it really be used?
 - Need specific information on general issues e.g. definitions of sub catchment scale, decision support system etc
 - Hotlinks to PDF files of finished project reports/summaries would be useful – however this would probably take up too much room on the website server (website links not a problem)
10. Need for quality checks? Only basic webmaster/admin checks done at the moment. Not possible to determine the integrity of the science.
11. Outputs of models not obvious – 'a tool' is a very vague description
12. Gaps exist in ecology targets
13. Most projects would only need very slight alterations.

4. Monitoring Ecology

Ecological Impacts of Diffuse Pollution – Ruth Davis, RSPB

- Ecological impacts projects not covered by ADAPT database at the moment
- Need to be aware of key issues i.e. which elements are sensitive, e.g. invertebrates not greatly affected by slight elevation in nutrient levels whereas plants can be.
- River focused projects will potentially ignore lake ecology i.e. miss some of the problems
- Ecology tends to be studied in isolated patches e.g. a certain stretch of channel, whereas water quality is studied at catchment scale – need to study ecology in relation to flow regime
- Flow levels are critical to impacts on ecology – links to hydrology needed.
- Need to consider habitats and land use beyond channel/floodplain/catchment as this can affect ecology in actual watercourse

The National Picture - What do we know?

- Many programmes are site specific, or if run at national scale they are often species specific
- Need for longer studies to show proper ecological response (time lag)
- Potential resources include references such as the New Plant Atlas
- Lots of NGO projects have been carried out but are not on the database – e.g. the RSPB work on Norfolk Broads can be added
- The Pond Monitoring Network could be a useful source of info – WFD covers all surface water and pond ecology has been very well studied
- Ecologists do not seem to be taking an interest in the ADAPT initiative – this needs to change

Next Steps

- Need to agree a key set of information needs (in relation to the WFD and DWPA)
- Need to seek new partners for ADAPT
- Need to synthesise database information to: draw conclusions about evidence base, ID priorities for further research and influence national programmes
- Consider how ADAPT could help with EA annex response to WFD – currently only 3 out of 36 required data sets are available.

Discussion: Monitoring Ecology

1. There is a need to consider the scale at which ecological data is collected – site specific vs national level. Should we be trying to change ecological monitoring in line with the UK definition of catchments? This is not thought to be necessary - ADAPT has not defined catchments as river catchments, therefore any scale can be considered e.g. pond scale catchments.
2. Water monitoring points are usually downstream of discharge points – this does not focus on ecological issues, therefore there is a need to find ecologically significant monitoring points as well.
3. The surveillance-monitoring element of the Water Framework Directive needs to be looked in to – further long term studies can develop from existing projects. However, projects focusing on source to ecological impacts would take 10-15 years – this would be too expensive and come too late to influence policy decisions.
4. Are European projects definitely excluded from ADAPT? Potentially comparable ecosystems exist in Europe which could act as a benchmark for the UK in terms of achieving ‘good’ status. However the science behind EU studies is not necessarily the same as we would use in the UK. There are also 1000’s of projects available on the US EPA database, but it is difficult to select those that would be relevant to the UK. The ideal situation would be for all countries to have project

databases similar to UK ADAPT. The forthcoming Diffuse Water Pollution conference in Dublin would perhaps be a good opportunity to see how other countries collate their research.

5. The ADAPT database has fairly loose criteria surrounding agriculture, diffuse pollution and the UK. It is recognised that these criteria could be greatly expanded into more detail, however this would render the purpose of the website useless.
6. We don't have the necessary experience in holistic management at the catchment scale

5. Socio-economics

Jacob Tompkins, Water UK

Not many projects on the database are listed in the socio-economic category, however many do seem to have a socio-economic component.

Pressures and Impacts

- Problems and people are linked together – need to consider anthropogenic inputs to catchments and how to manage them
- Need to consider issues surrounding 'ownership' of pollution problems
- Need to consider how people can be used to improve situation, for example increasing employment in environmental protection jobs

Methods

- Need to know WHY farmers choose to grow particular crops or choose particular land management practices, as opposed to simply knowing which they use – such questions could easily be incorporated into questionnaires/surveys.
- Political issues are rarely based on cost alone. Socio-economic projects need to take this into account.
- Policy effectiveness: most projects ID policy and do research, but don't say whether it is effective
- Catchment scale: work at this level does not involve farmers – some would benefit from catchment scale change, others would lose out. Need to examine effects of e.g. banning a particular pesticide on individual/community/society (flow through of policy decisions).
- Justification of scenarios: assumptions about future scenarios are made and not justified/risk assessed.
- Need for integration: policy → science → delivery → policy

Discussion: Socio-economics

1. The lack of socio-economists and ecologists involved with ADAPT highlights an obvious gap. This leads us to look towards overseas examples, for example there has been lots of work done on farmer involvement in developing countries – is it possible to learn from such examples?
2. There is a need to get researchers thinking more about socio-economic issues. Very little work is being done on the social aspects of water research. Need to understand human perception of 'good' and 'bad' water quality/ catchments
3. There is a need for more projects which link water quality and hydrology – for example 'Moors for the Future' links in with flooding issues.
4. There is the potential to learn from past mistakes – diffuse pollution has been a problem for a long time, therefore we can turn negative impacts into positive lessons.

5. National policy needs to be implemented sensitively at local level – the actual science behind policy decisions is often soundly based, but the way it is implemented is not. Many people working at field level have little or no concept of catchment scale issues.
6. Joined up, relevant research can potentially result from getting physical scientists and social economists on board together – the SRC has a searchable database which may be beneficial: www.regard.ac.uk
7. There is perhaps a need to start including Best Management Practice projects in the database, though it is important not to get too concerned with different categories – a keyword search would be more beneficial.
8. There is a danger of focusing socio-economic impacts around water and catchment issues only – it is important to include rural land use and community issues as well.
9. Pilot studies for Entry Level Schemes could provide a potential source of useful information.
10. There is a need to identify the social and economic skills needed for effecting change in rural communities – do such projects exist and where do we find them? Socio-economic organisations could perhaps be approached as a starting point for this.

6. Monitoring Mitigation

Kit Macleod, IGER

- Some project entries are more complete than others
- Database only reflects current research
- Timescales unclear
- Approximately half the projects in the database relate to mitigation methods
- Control options include source → pathway → receptor
- Most projects focus on catchment scale e.g. Whittle Dene, River Itchen, Tarland catchment
 - This is important but smaller scale studies underpin these and increase knowledge
- Predominance of physical and chemical pollutants, growing number of multi-pollutant studies but need more.
- Do we require more comprehensive studies?
- Most projects focus on pollutant transfer from land to surface water
- There are more groundwater studies on database than first apparent, but still not enough?
- Most projects focus on water quality rather than ecology – there is lots more to add.
- Need to link fluxes with impacts
- Need for practical nature of projects
- Need to get indication of costs to individual farmers
 - More integrated studies required, not necessarily within one catchment but links between projects, driven by funders
 - Ecological impacts
 - Involvement of farmers and farmer advisors

Discussion: Monitoring Mitigation

1. Do we need to consider specific mitigation measures? For example hard engineering options are more suited to point source pollution.
2. The concept of 'honesty of outcome' is perhaps missing from many mitigation solutions. Need to be aware of timescale for mitigation to work and understanding of risk assessment is needed. Danger in implementing long term changes that may not work - is this too drastic?
3. There is a gap between actually doing mitigation measures and modelling what might happen if we theoretically did them.
4. Element of trial and error is needed.
5. The context of spatial vs temporal scales in terms of mitigation needs to be considered e.g. yearly variation in rainfall can override mitigation options – balance of risk is needed.
6. There is a need to fully convince farmers that diffuse pollution is a problem and show them solutions that will actually work.

Plenary Session

Peter Costigan, Defra

In general, everyone seems to find the ADAPT initiative very useful, but the database seems to be failing in a way due to website technicalities.

- Is the website the be all and end all of UK ADAPT?
- How much data should be on the website?
- Should we produce hard copies of projects?
- How should future meetings be structured e.g. larger conference or smaller meetings further apart?

Is the use of agricultural sources only too constrained?

At the moment ADAPT focuses on diffuse water pollution from agriculture, using real data from the UK. ADAPT's objectives are only to include agricultural pollution, but this can be examined in conjunction with sources from sewage effluent and mining etc.

Is this hindering the concept of integrated catchment management?

No, ADAPT should be seen as a tool under Defra's DWPA programme and within DWP in general.

Why is the term 'real data' used?

To try and link projects with real life practical situations and exclude purely theoretical models. 'Real Data' is key – it can be used to validate models which in turn can influence policy.

Suggestions

- Add category for projects focusing on Best Management Practices.
- Change the word 'mitigation' to something more user-friendly
- Aim to make website more inviting – convince people to take the time to enter projects
- Put a map to show where studies are being done on the website.
- Register of people and their expertise – not necessarily project leaders but people who are or who could be involved in UK ADAPT (this is especially important for socio-economic expertise).
- Advertise ADAPT at conferences (posters/leaflets – possibly for Dublin conference?)
- Fund someone to analyse the gaps in knowledge – also potential for more funding in general?
- Small paragraph on website to outline Defra policy processes and where DWPA strategy fits in (for benefit of academics who may not be aware of this)
- 2 day ADAPT conference – short presentations on individual projects (selected projects, not all 60)
This would help clarify details of projects as many are not clear on the website.
- Future potential for funded review of projects?
- Better guidance on involvement of stakeholders.

General Comments

Example from France: target agricultural colleges i.e. young farmers of the future who have more environmental awareness.

Need to bridge gap in science between empirical research and policy implementation (clarify message)

Need to consider scope for more funding to run UK ADAPT and potential need for proper structure / organisation.

Conclusions and Actions to be Taken:

- The website is very much a repository for projects. There is a balance between requesting too much information (so that people won't populate it) and not enough.
- Its main purpose is to at least inform what is being done.
- Extra synthesis of the information held within the database would be time consuming and, if done, would have to be a separately funded project.
- Web based initiative is the right way to go (no hard copies necessary)
- Better quality control of Auto-Input required.
- Knowledge of ADAPT needs to be advertised much more widely by the end of the summer.
- Need to target relevant magazines and release a couple of promotional articles – perhaps in 'water policy' and socio-economic publications?
- Need for future workshop/conference – perhaps link in with Defra meeting?
- Annual ADAPT meetings thought to be sufficient once database is fully established.
- Need for realistic timeframe once website has been upgraded, especially if over 100 more projects exist that need to be collected – review by August/September.
- PowerPoint presentations from today's meeting to be put on website.
- Re-work database – add links to other relevant websites
- Need for more projects on: groundwater, ponds, wetlands, water colour, organic matter, different scales, socio-economic issues.