SLIM Case Study Monograph

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SLIM CASE STUDY MONOGRAPH 11

SLIM-UK Catchment Cases: The Ythan and Eyebrook

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Incorporating:

The Ythan Case Study

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The Eyebrook Case Study

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About SLIM

SLIM stands for *S*ocial *L*earning for the *I*ntegrated *M*anagement and Sustainable Use of Water at Catchment Scale. It is a multi-country research project funded by the European Commission (DG RESEARCH – 5th Framework Programme for research and technological development, 1998–2002). Its main theme is the investigation of the socio-economic aspects of the sustainable use of water. Within this theme, its main focus of interest lies in understanding the application of social learning as a conceptual framework, an operational principle, a policy instrument and a process of systemic change.

Social learning in recent years has attracted interest as another way of conducting public business, alongside regulation, compensation, stimulation and the operations of the (free) market. It has also been promoted as essential for the management of complex natural resource dilemmas and a key process in adaptive management. The SLIM project investigates these claims and expectations. A premise of SLIM is that it is very useful to view sustainability as an emergent property of stakeholder interaction, and not a technical property of the ecosystem. The introduction into national law of the Water Framework Directive, and the requirement for public participation in its implementation, adds relevance to the research.

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Further information about SLIM is available at http://slim.open.ac.uk

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INTRODUCTION AND OVERVIEW

Case Study Monograph 11 contains two independent studies conducted in the UK. Both studies focus on the relationship between social and biophysical dynamics in catchment situations. Nether catchment is large by European standards. One, the Ythan in the east of Scotland, has perhaps the most intensively researched estuary, in ecological terms, in Europe. However, the existence of a large amount of scientific data does not appear to have always helped local stakeholders in moving towards integrated catchment management. The other catchment, the Eyebrook, in south-eastern England is predominantly a rural micro-catchment.

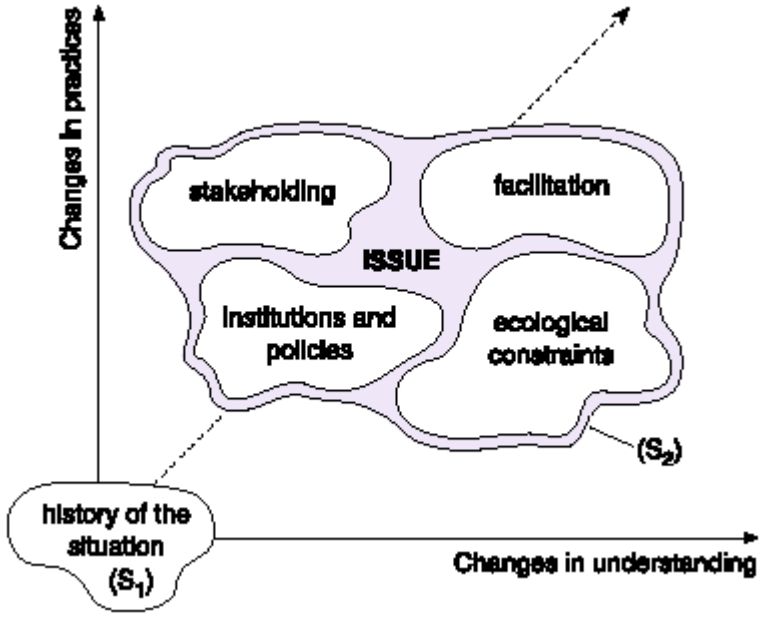


Figure 1. The SLIM 'variables' that have been examined in terms of changes in understandings and practices (Source: SLIM Framework 2004).

The case studies provide insights into possible trajectories towards concerted action (Figure 1). The situation in the Ythan was very much shaped by historical factors some of which appear to have been inimical to moving towards social learning seen as concerted action. On the other hand the Eyebrook case study grew out of existing relationships and provides a vivid picture of how the circumstances for moving towards concerted action can be initiated. In this case people came together out of sense of unease, rather than a clearly formulated issue and began to explore and construct the issue together. Together the case studies reflect some of the temporal dynamics of trajectories towards concerted action.

YTHAN CASE STUDY

1. ABOUT THE CASE/CATCHMENT

1.1. Location of the Catchment

The catchment of the river Ythan lies in the North-east Lowlands of Scotland, with the river reaching the sea some 20km north of the city of Aberdeen. Table 1 lists some relevant features of the catchment

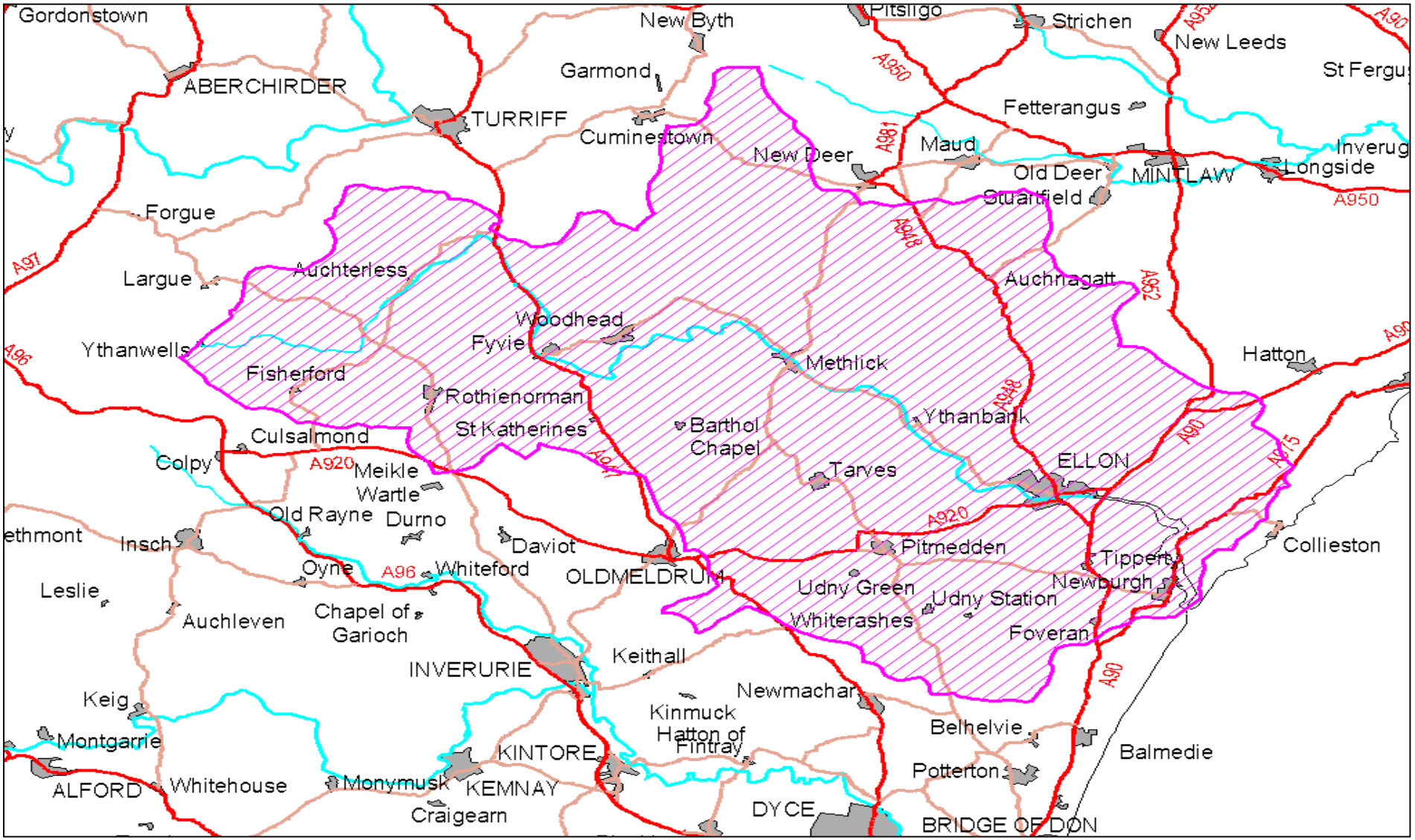
Table 1 Characteristics of the Ythan Catchment

Characteristic	Figure
Area (ha)	68,500
River Length (km)	60
Rainfall (mm/annum)	770-950
Effective runoff approximately (mm)	400
Mean discharge are Ellon sewage treatment works (m3s-1)	7.00
Estuary length	8
Estuary area (ha)	27.6
Maximum elevation at source (m)	300

Physically, the underlying rocks of the area are Dalradian schists (greatly metamorphosed shales). The glaciers and ice sheets of the ice ages ground this rock down into a rolling plain of low altitude topography that covers much of what is known at the Buchan Plain, while simultaneously greatly deepening selected river valleys. One of these created the current course of the River Ythan.

Land management is dominated by agriculture but the combined effects of climate and soils limit the range of crops that can be grown to a few such as barley, oats, potatoes, oil seed rape and grass although good yields of these can be obtained.

Culturally, the area has a distinct identity. Prior to the agricultural improvements of the 19th century, agriculture in the area was largely confined to the coastal areas and the more sheltered river valleys. During the agricultural improvements of that century, a massive effort cleared large areas of scrub and trees, many millions of tonnes of rocks and stones were lifted from the land, extensive drainage systems were established, and a distinctive farming system with high standards of husbandry developed. This relatively recent history of "hard won" advantages still marks the culture of the farming community, which also still speaks Broad Scots, developed from an amalgam of Anglo-Saxon, Gaelic, French, and Dutch and other influences. Hence, the North-east lowlands, which include the entire Ythan catchment, preserve a distinctive culture and identity although this is now being impacted upon both by the educational system and strong in-migration to the area as a result of developments stemming from North Sea oil discoveries.


Gordonstown
ABERCHIRDER
TURRIFF
New Byth
Garmond
Cuminestown
Pitsligo
Strichen
New Leeds
St Fergus
Fetterangus
New Deer
Maud
Old Deer
Stuartfield
MINTLAW
Longside
Inverugie
Forgue
Largue
Auchterless
Woodhead
Fyvie
Ythanwells
Fisherford
Rothienorman
St Katherines
Methlick
Barthol Chapel
Ythanbank
Auchnagatt
Hatton
Culsalmond
Colpy
Meikle Wartle
Old Rayne
Durno
Tarves
ELLON
Pitmedden
Udny Green
Udny Station
Whiterashes
Foveran
Tippert
Newburgh
Collieston
Daviot
OLDMELDRUM
Whiteford
Oyne
Insch
Leslie
Auchleven
Chapel of Garioch
INVERURIE
Keithall
Newmachar
Kinmuck
Hatton of Fintray
Belhelvie
Balmedie
Potterton
BRIDGE OF DON
DYCE
KINTORE
KEMNAY
Monymusk
Craigearn
ALFORD
Whitehouse
Montgarrie
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A920
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1.2. Values and Uses of the Catchment

The area is dominantly rural and sparsely populated. Approximately 95% of the land in the catchment is now in agricultural usage. The only sizeable settlements are at Ellon (population 8757) which lies at the upper limit of the tidal part of the estuary and lowest bridge point, and Newburgh (population 1392) which lies near the mouth of the estuary and was originally a small port (see map).

The sediment laden meltwaters of the glaciers of the ice ages laid down thick deposits of gravels and clays widely over the area, partially filling in the trench at the mouth of the river and helping create the shallow estuary of today. The meltwaters also carried down vast amounts of sand that were deposited at sea. Falling sea levels then exposed this sand to onshore wind erosion and it began to advance on land as a series of migrating sand dunes engulfing as it went a complete history of human occupation of from about 2,000 BC to a medieval village. The half buried ruins of the 12 century Forvie church remain visible but by the 15th century the entire area was buried by moving sand. It is this buried human landscape, covering a very long period of human occupation and partially revealed from time to time as the sand dunes roll along, that confers a considerable archaeological importance on the area.

The dune areas also form important vegetation complexes typical of different stages of instability and stability of sand migration and are graded of international importance from the point of view of their habitats and geomorphology.

The main area of importance to wildlife and scientific research is the estuary which is highly productive biologically. Although there are several designated Sites of Special Scientific Interest (SSSIs) within the catchment, the only real focus of concern lies on the highly protected estuary and its associated complex of sand-dunes. The estuary is part of the Sands of Forvie and Ythan Estuary National Nature Reserve (NNR). Table 2 lists the protective designations associated with the NNR.

Table 1 Protective Designations Accorded to the Sands of Forvie and Ythan Estuary National Nature Reserve

Date	Designation
1959	Declared Site of Special Scientific Interest(SSSI) Under the National Parks and Access to the Countryside Act (1949) Dune system declared a National Nature Reserve (NNR) at the same time
1979	NNR extended to include the Ythan Estuary
1984	Re-notified as an SSSI under the Wildlife and Countryside Act (1981)
1991	Declared a Biogenetic Reserve due to the scientific value of its heathland vegetation, under agreement with the Council of Europe
1998	On 28 March approved as a candidate Special Area of Conservation under Natura 2000 legislation. Still being reviewed as at September 2003. On 30 March, "Ythan Estuary, Sands of Forvie and Meikle Loch" designated a Special Protection Area under Natura 2000 legislation. On the same date recognised as a Ramsar Site.
2000	Ythan catchment designated a Nitrate Vulnerable Zone in May

The limited range of invertebrate species that thrive on and in the mudflats and dense beds of mussel (Mytilus edulis) of the estuary are extremely productive biologically. For example, Corophium vultator, a burrowing shrimp, is found at densities of up to 60,000 per square metre in the mudflats and the mussels at up to 70,000 per square metre in the mussel beds. These dense populations enable the mudflats in particular able to support high levels of predation by birds.

Over 250 species of birds have been recorded in the NNR and up to 25,000 birds may be present at one time. The estuary is best known for its population of eider duck (Somateria mollissima), shelduck (Tadorna tadorna), and three species of tern (Sterna spp). The first two have been the subject of long term studies. The mussels support the populations of eider duck and the mudflat species large numbers of wading birds during their annual northerly and southerly migrations. The dunes also harbour important nesting areas for species of terns and for eider duck.

The estuary is relatively small by UK standards. It is only about 8km in length with an average width of only 300m - 600m at its widest point. However, it has been continuously studied from single species to ecosystem level by biologists at the University of Aberdeen Field Station nearby at Culterty on the banks of the estuary since it was founded in 1957. The result of this combination of relatively small area, species rich ecosystem, and longterm intensive study has been that the Ythan is not just one of the best understood estuary ecosystems in the world. The Ythan foodweb is one of only a few thoroughly documented foodwebs in the ecological literature and has shed new light on the way foodwebs are organized. Further, the studies have accumulated considerable data over nearly forty years on nutrient concentrations, algal abundance, invertebrate densities and numbers of shore birds. Such long term detailed data sets are unusual and hence particularly valuable scientifically. The fact that the estuary has never been heavily industrialised, and that such industrialisation as there was has gone, leading to the cessation of dredging for the port, also means the estuary is in a largely natural form.

Lastly the estuary is also used extensively for recreation. It supports an important recreational fishery of sea trout (Salmo trutta), and much windsurfing, walking and nature study.

1.3 Relevant Issues Within the Catchment

It is principally in the estuary that the conflicts associated with eutrophication exist.

Basically, over several decades, agriculture within the catchment has moved towards more cereal production and hence fertilizer application, together with more intensive livestock production. In particular there has beeṇ a large increase in the area under winter crops, which receive N inputs at a different time and at higher rates that for spring sown crops. The more intensive patterns of livestock production involve increased concentration of animals in particular sites, leading to more focused problems of slurry production.

Researchers at the Scottish Agricultural College have been collaborating with the Macaulay Institute on working with farmers to draw up nutrient budgets on 100 farms in the Ythan catchment. This work was triggered by the EU Nitrate Directive of 1991 which asked for the identification of nitrate vulnerable zones (NVZ). The NVZs consist of areas where nitrate concentrations exceed 50mg/litre, or those in which there is a significant degree of eutrophication due to nitrate pollution from agricultural sources. The Ythan was designated as an NVZ in May 2000, but it is as yet unclear how this i[k1]s affecting the management of farms. The current status of the nutrient budget programme is unclear. The population of the larger settlements within the catchment, at Newburgh and Ellon has tripled or more since the developments associated with North Sea Oil, thus increasing the outputs from sewage works. There has been significant change in the nitrate status of the river over the last forty years.

Nitrate levels have risen to 8 mg/litre. Phosphate levels have also risen. By the late 1990s, it was measured that approximately 5,000kg of nitrogen and 50kg of phosphorous entered the estuary from the river per day. Two percent of the nitrogen and 48% of the phosphorous are held to derive from sewage discharges. The nitrate in particular has been linked to the growth of mats of algal species of Enteromorpha, Ulva and Chaetomorpha over the mudflats(1). As a cautionary note, one researcher at least has warned that this might paint too simple a relationship between these two factors. Below these algal mats, it has been shown that populations of invertebrates that are the main food source of wading birds in the estuary mudflats drop dramatically, hence potentially affecting important bird populations. Since the bulk of the nitrate is held to derive from agriculture, a key issue has been identified as the need to reduce pollution by nitrates from agricultural sources. It is estimated that 30-40% of the estuary's area is now affected by such algal growths.

This fairly simplified picture of the situation has to be seen within the limits that the complexity of any ecosystem imposes on our insights. General relationships between aspects like nitrogen loading and agricultural systems can be discerned However, at a more detailed level, even of overall models of the system, such factors as diversity of soil types, variation in rainfall and other factors between and within seasons, and differences in farming practices between upper and lower areas of catchments and even between neighbouring farms prevent the development of neat models of nutrient flows and sources within the catchment.

Other problems exist more widely in the catchment such as the loss of riverine woodland, and bank erosion caused by livestock grazing and trampling bankside vegetation. Such problems are believed to damage fisheries within the catchment.

1.4 Focus of SLIM Research Within the Catchment

The focus of SLIM research within the catchment has been on the attempts to gather diverse interests within the catchment together to develop and apply remedies to the problems described above through the creation of a "platform" of major stakeholders

2. RESEARCH METHODOLOGY

The approach was for SLIM staff to co-research with the steering group of the Ythan Project (See section 3 below). Initially, two SLIM researchers made a field visit to the Ythan Catchment. One researcher attended a large farmers meeting that considered the designation of the Ythan and other catchments as a Nitrate Vulnerable Zone (NVZ) as this provided much important background to the whole situation. Interviews carried out with the project officer, and several members of the YP Steering Group (SG) to explore the approach and needs of the project. As a result, four problem areas within the project were identified as offering scope for successful co-research through the intervention of the SLIM project. A meeting was then held with the SG to explain SLIM's approach and what it might offer and agree cooperation between the YP and SLIM.

The research activities consisted of (i) desk study; (ii) participant observation (iii) qualitative research using semi-structured interviews and (iv) co-research in the form of participative workshops and community consultation.

3. HISTORY OF CATCHMENT MANAGEMENT

Concern about the growing levels of pollution of the Ythan and its potential impacts on the estuarine wildlife had been growing for decades. A report commissioned by the North East Scotland River Purification Board (The predecessor of the Scottish Environmental Protection

Agency (SEPA)) and funded by Scottish central government showed nitrate concentrations had increased significantly over the 13 year period 1980-1992. On the basis of such evidence, the catchment was considered for designation as a Nitrate Vulnerable Zone. This proposal was not acted on for political reasons that remain unclear but probably related to opposition by farmers.

Nonetheless, the threat of designation induced the then local government authority, Grampian Regional Council, to initiate a partnership based catchment plan in which the main partners were the Council itself as co-ordinator, Scottish Natural Heritage, and the Scottish Agricultural College. This resulted in a project called "Farmers Will Embrace" and crystalised as an application for funding to the EC Life Programme under the title of "The Ythan Catchment Project" in 1994.

The Ythan Catchment Project offered the following problem analysis within the catchment in that year:- Viz:-

1) "The River Ythan is undergoing nutrient enrichment or eutrophication. This is resulting in the growth of algae which are causing damage to the ecology of the river.

2) Substantial levels of nitrates (N) are being measured in the River Ythan, at significantly greater levels than ever before.

3) There are high levels of phosphate (P) in the river as it nears its estuary.

4) With so much of the catchment under intensive agriculture, the biodiversity of the area is low.

5) Agriculture is poorly integrated with the environment, and environmental concerns are a low priority with the farming community."

The overall aim of the project was:-

"To demonstrate that novel approaches to the reduction of nutrient run-off in an enriched river catchment can be introduced and that these will effect water quality and encourage improved management and expansion of water and water margin habitats." In a sense, the project aimed to "head off" designation as an NVZ by pioneering a voluntary approach. It selected a sub-catchment for "treatment" and selected another for "non-treatment" as a control comparison. Methods to be used included the use of TIBRE (Targeted Inputs for a Better Rural Environment) which employed a range of on-farm measures aimed to improve the sustainability of intensive agriculture. These methods were developed under a project sponsored by Scottish Natural Heritage(SNH), the Scottish wildlife protection agency. The project also included the use of "green cover" crops to reduce runoff and leaching on bare ground, the construction of wetlands for denitrification, and riverside habitat improvement. A project officer was to provide advice and channel special grant aid for the project as well as taking advantage of standard grant aid. The project was to be very much farmer lead rather than community focused, drawing on local farmers' traditions of cooperative action through marketing cooperatives etc to form almost a "land-management cooperative".

It is worth noting that the research approach was not, at this stage, participative. It was research on people rather than with them.

This project was blocked at ministerial level in Scotland, it is believed because of historical distance from this past political process and the lack of access to written records of the decision making process however makes it impossible to confirm or refute this belief..

The catchment of the Ythan was designated as Scotland's first large scale Nitrate Vulnerable Zone under the Nitrates Directive in May 2000. This stimulated considerable local debate and controversy, especially among local farmers. At this point a local development organisation called the Formartine Partnership stepped in. This partnership started in 1997. It is a grouping of the twelve local Community Councils, environmental and community based voluntary groups and central and local government agencies aiming to instigate a community-based approach to sustainable rural development. The historically ancient area of Formartine has very similar boundaries to the Ythan catchment and hence the fate of the river and of the Ythan valley are of importance to the people within the area.

The Partnership prepared a Catchment Plan for the Ythan and submitted a successful funding application to the European Commission Life Programme to be managed by a group called the Ythan Project (YP) set up by it and consisting of those stakeholders most directly concerned with the river and contributing directly to the project's work. The YP membership consists of Aberdeenshire Council (The Local Government Council), the Macaulay Land Use Research Institute (MLURI), the Forestry Commission (the state forest service), SNH, the Scottish Environmental Protection Agency (SEPA) the Ythan Fisheries Board (a legally constituted organisation to care for freshwater fisheries), the Formartine Partnership, and the River Restoration Centre.

The project runs from August 2001 until February 2005. As a large part of the European Funding is paid only after the project is complete, the Formartine Partnership could not finance the work during the Project's life. Aberdeenshire Council, the main local government body since the abolition of Grampian Regional Council, therefore took responsibility for managing the finances and also chaired the Steering Group formed from the contributing bodies. The European Union contributed 357,617 Euro and Scottish government agencies and the MLURI jointly £220,000 (Aproximately 371,885 Euro).

The Ythan Project aims to develop the sustainable management of the Ythan catchment and to explore ways to fund or develop:

- nutrient budgeting for farmers,
- small scale river restoration work,
- monitoring of water quality and
- dissemination of findings.

The intention was to involve the community (albeit undifferentiated at this stage) in improving the river, but there was an issue of how to evaluate their role(s). Matching funding for projects was available from the main agencies eg SEPA. [k2]

Under the aegis of the Ythan Project, the MLURI developed a baseline study for assessing the involvement of the community in the Ythan project and whether this changes understanding and behaviour of individuals and organisations during the life of the Ythan Project. So far, this activity has resulted in posting a questionnaire to 2675 households in the catchment and nearby companion catchments.

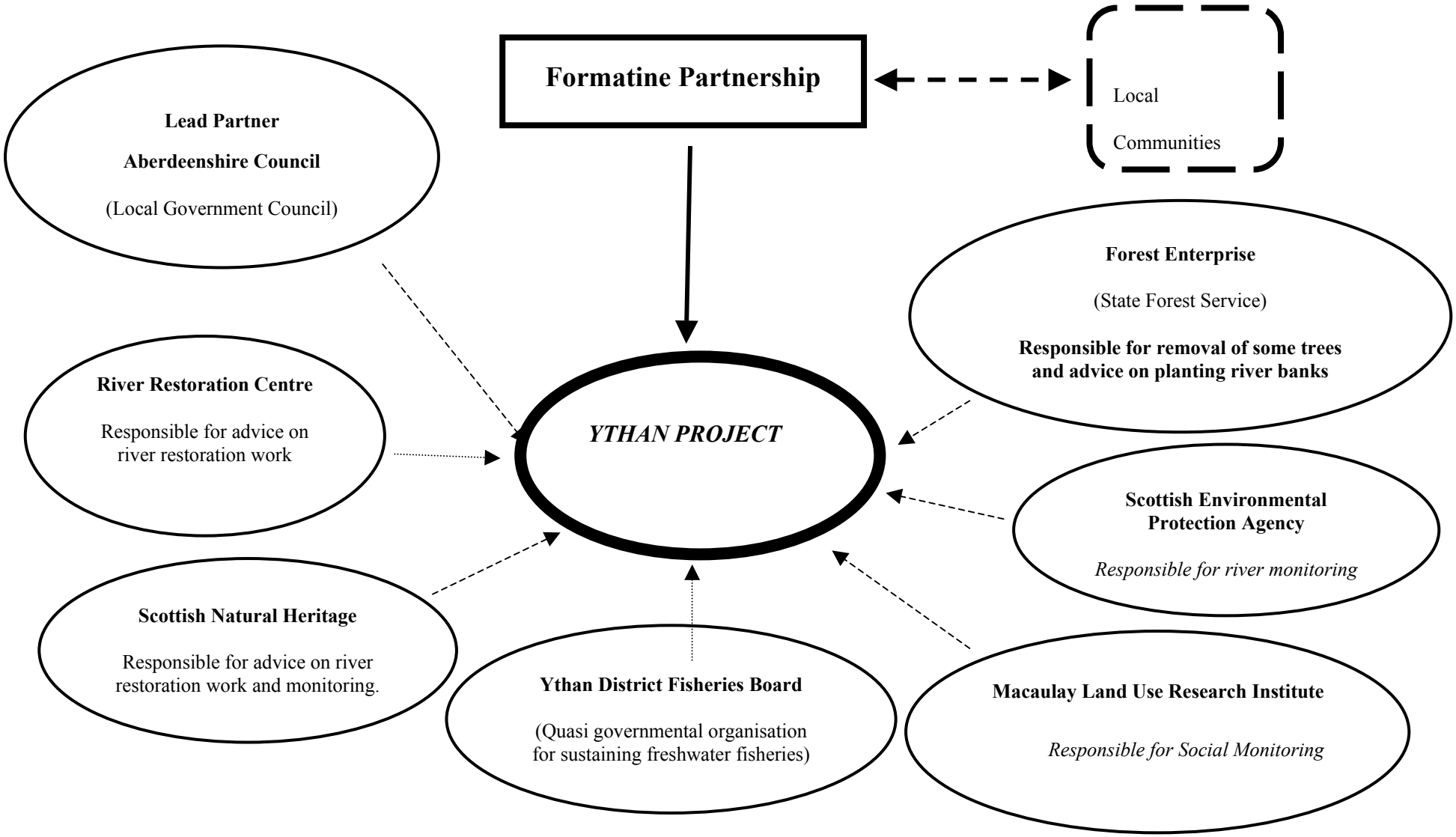

Figure 3 The structure of the Ythan Partnership

4. INTERVENTIONS BY SLIM RESEARCHERS

4.1. Exploratory Meetings

During July 2002 SLIM researchers discussed the project with project staff and with a member of the SG. A further meeting was held later the same month with a separate SG member. These interviewees identified several problems within the project, as laid out in Table 3.

The main concerns that arose from these discussions were:-

1) The performance of the SG, particularly with regard to its capacity to function as a group in an integrated manner towards a shared vision.

2) The experience of members of the SG in running a project of this kind.

3) The problems of getting members of the general public to relate to the catchment as an ecological or social unit and understand what the YP was about (It was frequently confused with the designation of the area as a Nitrate Vulnerable Zone)

4) The importance of the personal qualities and skills of the project staff.

5) Problems being experienced by project staff in engaging farmers in activities like improving river bank management.

Table 3 expands on these problems. These early findings were substantiated by later SLIM co-research into the project. From these topics, the lack of cohesion within the SG was selected as a key problem and a workshop was organised for the SG by SLIM researchers to consider the SG's performance and ways to enhance it. At a later date, meetings were held to explore ways in which SLIM could aid in the development of community consultation workshops.

Table 2 Identification of Issues Within the YP by Interviewees

General Issue	First SG Member	Project staff officer	Second SG Member
Structure and functioning of the Steering Group.	SG is not really integrated. It is structured around a series of deliverables on the ground with separate member organisations responsible for separate deliverables.	Organisations are not good at partnerships. They have a poor understanding of the changes in attitude and working practices that are necessary to develop a partnership approach to catchment management. A lack of engagement with various staff in the 'real' problems faced by the farming community. Too many staff are desk bound. Criteria for spending money and budgets are set/strongly influenced by the larger organisations in the Steering Group. Therefore, money can only be spent in ways which have official sanction or meet with institutional expectations. This limits the ability of the various actors to channel resources into areas as circumstances or experience requires.	Some SG representatives poor communicators. Better leadership is needed for the SG
Experience and skills of the SG in developing a project like an Integrated Catchment Plan	The SG has no exit strategy for after the end of the project. The SG never discusses the broad picture and has no shared vision. It has focused on doing things physically on the ground but neglected to create a sustainable social legacy that will ensure continued action after the project ends.		
Developing the relationship of the wider public to projects like the Ythan Project	There are few things the wider public can directly do to improve the Ythan Catchment other than through the wider democratic process. The public have difficulty in relating to catchments. They lack an "ecological address" that permits them to relate their actions such as waste disposal to the river. They also confuse the YP with other catchment based activities such as NVZ designation	The public have difficulty in relating to catchments. They lack an "ecological address" that permits them to relate their actions such as waste disposal to the river. They also confuse the YP with other catchment based activities such as NVZ designation	
Abilities of the Project Officer	Project staff must have both organisational abilities and a good capacity to work with people face to face.		Project staff must have both organisational abilities and a good capacity to work with people face to face.

4.2. Study of Farmers' Meeting on Designation of the Ythan NVZ

On 13 February 2002, a SLIM researcher attended a meeting of farmers at the Thainstone Centre, near Inverurie, on the designation of catchments in northeast Scotland as NVZs. The meeting was called and chaired by the Scottish National Farmers Union (SNFU) and was attended by 288 farmers in the auction ring of the local cattle market. The main functions of the meeting were to explain how scientific and other studies led to the designation being created and to enable farmers to air and discuss their views. It was the thirteenth and last meeting of its kind conducted over several months and organised and run by the National Farmers Union.

After an introduction by the representative from the Scottish Environment and Rural Development Department (SEERAD) on the designation, two research scientists presented the research that underpinned the reasons for designation and a soil scientist explained the implications for farm practise. Questions were then accepted from the floor. Both presentations involved mainly the overlaying of GIS maps of various kinds of data on rock types, soil types, farming systems, nitrate analysis of well water, and integrating this with other factors to create a picture of where "high" levels of dissolved nitrate were already creating river pollution or probably were doing so, or were predicted to occur. The second presentation made a more visible effort to make the data and its significance clearer to the audience than the first. The SLIM researcher with long experience in agriculture and extensive education in the science of that and of environmental management, could not fully follow the logic and methods used. For farmers lacking that scientific and environmental background it must have been an impossible task.

The questions from the floor were aggressively critical and the statements almost entirely hostile. A broad sample of the contributions from the audience is given in Box 1. Although it cannot be proved, to the researcher, a significant part of that aggression seemed to stem from the frustration at that lack of understanding. At the end of that process it was deemed the meeting had passed a motion unanimously opposing the imposition of a compulsory code of practise under the designation.

Box 1 PARAPHRASED RESPONSES OF AUDIENCE TO RESEARCHERS' PRESENTATIONS

The Chairman's Response to Presentations by Science Researchers

Nothing I have heard tonight has changed by opposition to designation of NVZs. Actions like this must be based on FACTS not PREDICTIONS! Less than one quarter of the samples taken had been over the limit and this seems a doubtful basis for blanket designations! Everything that it was stated had to be done was already being done, so why more paperwork for farmers? Now who would like to ask questions?"

Independent Crop Consultant and representing the Association of Independent Crop Consultants

NVZs have been on the horizon for years and farmers had been doing all they could to clean up their act and avoid pollution. I am a scientist too! Some of the science in the report was bad science *"There are lies damn lies and statistics"* Accused one researcher of simply acquiring/creating results to suit the organisation (Scottish Executive) who had paid for it *"He who pays the piper alls the tune."* Read out a long list of prepared questions attacking the research. *"Is the map worth more than pretty wallpaper?"*

Farmer 1 Questioned the validity of the data very aggressively

Farmer 2 Doubted if Scottish Executive had adequately represented Scottish farmers' interests in Brussels. Would the Grant scheme associated with NVZs be adequate to pay for the new slurry tanks necessary?

Farmer 3 You have generally failed to convince people of the need for the designations and your data have been questioned. Therefore why not have a well-used voluntary code of practice? Thus you will not add a burden to farmers who are already almost out of business.

Anonymous speaker Some livestock farmers could not afford the slurry tanks that would be necessary. This would have several effects. They would have to reduce their cattle numbers, and hence pay off agricultural workers. The reduced need for pasture meant that more land would be turned over to arable, and would mean both the loss of wildlife habitats, and also increased nitrate leaching, since most leaching took place from arable land.

Farmer 4 Who dreamt up this figure of 50mg/L? UK is leading the world in the quality of drinking water, so why are we bothering with the problem? The whole thing has been dreamt up by self-seeking ------! The 18% of Scotland to be designated contains most of Scotland's arable land, and the implications for agriculture are serious.

Farmer 5 Recent results suggest that nitrate is good for human health, so why should it be removed from the water. The WHO figure of 50mg/L has little credibility regarding impacts on human health.

Farmer 6 This is called a consultation, but there is an inevitability about it. But little said about how the cost is to be met for slurry tanks when there is little money in farming. There will also be increased costs in paperwork which would take time farmers no longer have. Therefore perhaps they should just focus on making sure that grant provision is adequate to cover costs. Noted that much of the expense is in the startup and minister should make a scheme to help there.

Farmer 7 He has heard that there is no guarantee that Nitrate levels will go down after the regulations are introduced. What regulations will be introduced if these ones fail?

To the SLIM researcher, this meeting seemed to bring out important issues about situations that can promote or hinder Social Learning in the resolution of not only Catchment Management Issues, but more generally in the management of complex problems of natural resource management. Those that arose on this occasion divide into three general areas, although in practise they are inextricably mingled:-

a) Issues concerning specifically the structure and function of meetings in which dialogue on such problems occur.

b) Issues focused on the problems of communication.

c) Issues concerning basic rules of evidence and social responsibility and which underlie questions such as the place of risk in environmental management.

a) Structure and Function of Meetings

Four points stand out here. Firstly, agricultural auctions are essentially theatre, sited in a theatrical setting of an arena with tiered surrounding seating, with a strong adversarial nature embedded in competitive bidding. This meeting took place in just such a setting and recreated much of these characteristics. Statements by the chairman immediately following the presentations by the speakers, and the "dialogue" which followed, were adversarial in approach, even impugning the honesty of the presenters. The subsequent discussion thus did not explore the issue in a cooperative manner. Secondly one farmer pointed out that the NVZ designation and accompanying compulsory code was probably inevitable and that it was therefore probably more profitable to focus on ensuring costs of meeting the code were met by government and not by farmers, raised a basic point that was unclear about the meeting - what was the meeting about? What was already decided and what still open to negotiation? Lastly, in this meeting the inputs by researchers explaining their work took up most of the meetings time. This produced an imbalance between the amount of information delivered and time available to the participants to analyse its implications.

Simple lessons can be drawn from these observations that are significant when promoting Social Learning. Selection of venue and the fundamental approach to meetings are important. It is doubtful whether adversarial approaches are effective in stimulating social learning directed towards cooperation and mutual education. There has to be a time balance between inputs to a meeting and the audience's time for reflection and discussion. Scale of formal input of information to a meeting has to be proportionate. Finally, the function of a meeting and what it can achieve, what is open to negotiation and what is not, need to be thought through and made explicit.

Such issues on the structure and function of meetings are commonplace, but that does not alter their importance regarding their effect on Social Learning. They are part of the wider problem of the generally low level of skills in process management that are found in most sectors of the population and which becomes of central importance in situations where social interaction among interdependent stakeholders is the core activity in managing a natural resource.

b) Issues Focused on the Problems of Communication

Complex problems of natural resource management necessarily involve many stakeholders with separate skills, disciplinary based bodies of knowledge and associated languages of technical terms. Building a common body of knowledge and shared models of the catchment requires clarity of communication so that stakeholders with very different perspectives and knowledge bases can exchange these diverse bodies of knowledge. This ability must be an important aspect of Social Learning.

To the SLIM researcher, the two scientific presentations at this meeting probably created more problems than they solved due to the lack of effective communication. Due to the language used and speed and complexity of scientific methods presented, there was a failure to communicate both the scientific methods and the underlying rationale effectively. Powerpoint was misused as often happens. The ensuing discussion showed that these presentations seemed to have at least two effects on the audience. The farmers were not only left unconvinced of the rationale for NVZ designation, they seemed to be antagonised by an explanation that failed to speak to them in a language and logic they could follow, and perhaps left them feeling inadequate. The result of this seemed to be to make listeners feel excluded from the process.

Hidden in the presentations may also have been an issue on the terms of communication. Was there, for example, an underlying approach of government or government scientists saying "What is in this black box is very difficult to understand, but it is called science and therefore you must accept and believe it"? Whether it reflected a conscious logic on behalf of a speaker or speaker(s), an unexamined logic implicit in their approach, or simply an accidental implication of a poorly thought through approach to communication, was unclear. Either way, it made little difference regarding its effect. The opportunity for a clear presentation of the rationale for NVZ designation was lost, as became apparent from questions from the floor. If this was the thirteenth meeting of its kind, how much damage had been done to relationships between farmers and government nationally in various catchments? Was this an example of Social Unlearning?

Such basic problems of communication will keep arising in resolving of complex problems of natural resource management where fairly complex scientific method must be communicated to a lay audience. This raises questions such as what language do we use (jargon versus plain English) and who should communicate the information? Scientific researchers are often poor communicators to lay audiences. Where diverse stakeholders within stakeholder groups, from different disciplines and occupations, must exchange bodies of diverse knowledge, this problem could be greater.

c) Issues concerning basic rules of evidence and social responsibility

Some strongly stated comments that came from members of the audience.

> *" Nothing I have heard tonight has changed my opposition to designation of NVZs. Actions like this must be based on FACTS not PREDICTIONS!"*
>
> *"This is all based on theory –give us the facts!"*
>
> *"Who dreamt up this figure of 50mg/L?"*
>
> *"I have heard that there is no guarantee that Nitrate levels will go down after the regulations are introduced. What regulations will be introduced if these ones fail?"*

Underlying these objections seem to be important issues that will occur in most, and perhaps all dialogues on complex natural resource management. There is often a considerable timelag between a human action and the resulting environmental impact such as pollution of groundwater. The environmental impact may occur far from the source of pollution, such as far downstream. The aim of the NVZ Directive and hence associated national legislation is preventative and not just the "clean up" of already polluted waters. Management of environmental damage from farming has, until now, often focused on the remediation of established damage, except within designated sites such as Sites of Scientific Interest (SSSIs) or National Nature Reserves. Preventative action through management of agricultural practices, across the broader landscape, is relatively new to farmers, and intervenes directly into everyday farm practice. The principal is apparently not entirely accepted by farmers and

perhaps resented even by many who have reluctantly accepted it. Also, there is a strong element of prediction, about which waters will become polluted. This predictive element comes into the equation when farmers others react to such a proposal. Prediction involves a degree of uncertainty; a risk that the prediction is wrong. Should "polluters" have the right to insist on clear evidence they have caused pollution, or are certain to do so, before action is taken against them? What are the levels of acceptable and unacceptable environmental risk? What level of predicted environmental risk is unacceptable and should trigger action by the polluters and what degree of reliability can they rightfully expect in such predictions? Have those affected by proposed preventative measures a right to *"facts"* rather than predictions, and *"facts"* rather than "theories"? By "*facts"* speakers from the audience seemed to mean almost unchallengeably established connections between such things as farming practices and pollution levels, or pollution levels and ecological impacts. Most importantly, is there agreement between stakeholders on the answers to such questions?

These are underlying issues that come up repeatedly in the management of complex natural resource problems such as what are the social groundrules on levels of acceptable risk and on levels of adequate proof of these. Most will arise irrespective of whether measures for limiting environmental damage are anticipatory or post hoc. The extent to which such standards are agreed between stakeholders with different perspectives is also critical and points to the need for such questions to be resolved at societal levels. If these can only be resolved at a societal or sectoral level, then this probably says something important about what is needed regarding conducive policies (and associated practices?) at a political level.

4.3. Workshop with Steering Group of Ythan Project

It was arranged for two SLIM researchers to facilitate a workshop with the YP Steering Group (SG) on 25 September 2002 so that the group could evaluate its work and progress to date. Eight partners on the project and two project officers attended. In the opinion of the SLIM researchers, two important partners, the Ythan Fisheries Board and the National Farmers Union for Scotland were not represented. The full report of the workshop is in *Appendix 2*.

The evaluation was done in two stages.

In the first, the whole SG drew a timeline onto which it inserted key events in the progress of the Project. These included such things as the launch of the Project, completion of a farmer and local household survey, and a day meeting of a farmers group. Participants were then invited to state what progress had been achieved through the event or activity but little information was offered in answer to this question. This appeared to reflect a lack of evaluation of the significance of events within the Project.

Participants were then divided into two groups and invited to assess the Project's work under the headings of *What Had Been Done Well and Why*? and *What Could Have Been Done Better and Why Was it Not Done Better*? The joint output listed public engagement exercises, attracting new volunteers, publicity through press and media, and monitoring and planning as tasks done well. It was noteworthy that, in assessing what had been done well, there was remarkably little information produced on why it had been done well. However, when prompted by the facilitator on just one item, the successful launch of the project, four different reasons were quickly advanced. This appeared to confirm the lack of evaluation of the projects performance by the SG.

The responses of the two subgroups to the next two questions were merged through discussion in plenary and the results are in Table 4. It is noteworthy how three of the aspects identified focus on the lack of engagement of the SG and of members' inability to take collective responsibility for the overall project and that this is at least partly related to the style and conduct of meetings.

Table 3 What Could Be Done Better and Why Has it Not Been Done Better?

What Could Have Been Done Better?	Why Was it not Done Better?
Poor engagement and involvement of the SG	Time pressures
Lack of autonomy for project officer	
Poor ownership of project by partners, especially lead partner.	Currently drive for project is all with project officer Multi agency working is difficult
Project targets should have been more realistic – more cautious	
Low ownership and awareness of individual elements of the project	SG meetings dominated by procedure and no site meetings.
Method of conducting meetings	Lack of diversity in format of meetings, timing on Friday afternoons. Need more visual presentations, and public acknowledgements and thanks to partners and to named individuals. Need to separate monitoring and evaluation component of meetings.

Thereafter, the workshop assessed the performance of the SG. Two subgroups listed the objectives of the SG and then did a simple SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis. The results are in Table 5. Items appearing under Weaknesses such as lack of Terms of Reference for the SG, and lack of delegation of decision making to project staff indicate another feature that might inhibit Social Learning in such groups – that is limited experience of joint project management by such platforms of stakeholders. In general participants expressed dissatisfaction with the functioning of the SG and felt that it has to perform better as a group.

Table 4 Results of SWOT Analysis of the Delivery of the Ythan Project

STRENGTHS	WEAKNESSES	OPPORTUNITIES	CONSTRAINTS/THREATS
Enthusiastic individuals	Individual workloads	Unique project sets precedents	Legislative change and other surprises
Project staff committed	Lack of priority of project within member organisations	Legislative change is supportive	Lack of a high degree of autonomy of SG reps and their inability to make decisions while at meetings.
Broad representation on SG	Lack of Terms of Reference	To initiate a process of change in which we are working for positive environmental benefit	Internal operating procedures of partners.
Regular meetings	Lack of full representations at meetings	Develop better understanding of partners.	Lack of key stakeholder involvement –SEERAD and local communities
Decisions by committee encourages joint ownership	Lack of delegation of decision making to project staff	Good practice in community involvement.	Cynicism – lack of belief in being able to make a difference.
Positive group dynamics	Lack of SG leadership	Scope for education	Project fatigue – frustration re (lack of) progress
	Decisions by committee are time consuming		
	Possible lack of commitment to all elements of the project		

In the final part of the workshop, participants set down what they believed to be important measures for the SG to take to improve its functioning and delivery of the project.

These were:-

1) Establish clear Terms of Reference for the SG

2) Develop strategies for the conduct of meetings.

3) Address issues of:-

   a) Delegation of project delivery to project staff

   b) Degree of autonomy of project staff.

4) Investigate reasons for non-attendance of SG members at SG meetings.

5) Improve communication both internally and outside the local area.

6) Review Monitoring and Evaluation procedures – Systemic approach needed?

7) Review SG membership – examine skills and interests.

8) Consider time scales.

It was recognised by participants that this list did not constitute a plan, as it lacked clear objectives and priorities but it formed the basis from which one could now be developed.

SLIM researchers noted that, while the project was successful in much of its work, there were key weaknesses in the SG's management of itself and of the project. In particular, the lack of any time devoted to overall critical reflection by the SG on its performance and the development of the project was noted. The researchers summarised recommendations to the SG for improvement in both areas that also point to factors that might inhibit social learning if neglected. These were:-

Have Better, More Productive and More Enjoyable Meetings

These would help provide greater insight into each SG members problems and activities and into planning to solve problems etc. Suggestions here were:-

1) Meet in each partner's offices to up the profile of the project with partner agencies (Invite senior staff of the agency into part of the meeting to meet the group, after some discussion among SG members as to what points might most impress the senior staff). Does the local NFU have an office where you could meet?

2) Have some farm level SG meetings. Rotate the chairmanship of meetings to help bring in different perspectives. There seems no reason why the fact that Aberdeenshire Council is Lead Partner means the burden of chairing meetings should always fall on them.

3) Meet in pleasant surroundings. Surroundings have a subtle but profound impact on the conduct and value of meetings. The room presently used for meetings is dark, with no external views and lacks room and basic facilities for good meetings.

4) SG should use part of its meetings to evaluate its progress as a group and towards its objectives and the quality of process within the meeting. Doing this would

take time and require careful management of time within the meeting but encourage better progress of the project as a whole and help develop even better working relations with the SG.

5) The SG should consider the at least occasional use of facilitators in difficult meetings and even the option in obtaining training in facilitation.

Organisation of Management Within the Project

In agreement with several points participants made about the organisation of management within the project, the SG should:

a) Set Terms of Reference of SG

The SG should quickly sets itself Terms of Reference as to its functions and purpose

b) Clarify Division of Autonomy Between SG and project staff

Revise and clarify the division of autonomy between SG and staff both to reduce unnecessary bureaucracy and ensure integration between the TOR of the SG and the staff work plan.
Monitoring of the Project

a) Internal monitoring of the project

Monitoring needs an integrated systemic approach. To achieve this, the SG would need to discuss criteria for assessing progress – both qualitative and quantitative and agree what would be key indicators of progress towards the project's goals.

b) External Monitoring of the Project

Arrangements for external monitoring of the project leave the SG and the project vulnerable to poorly founded criticisms. The external audit process as set up was very unusual and should be altered if at all possible. For example, there should be a link person within the audit group who also works in the project who can counter any factual or clearly misconceptual errors the external auditor makes. If this is not possible, then the internal strengthening of the monitoring and evaluation procedures become even more important.

4.4. Responses of the Steering Group to the Outcomes of the Day and the Recommendation of the SLIM Researchers

At a later date, enquiries by SLIM researchers revealed that the SG had made some changes to their practices in response to the intervention by SLIM researchers. Some meetings had been held in the offices of other partners and SEPA and SNH had sent more senior staff to these by invitation to become more familiar with the project. The SG has considered its terms of reference and referred back to them on occasion during meetings. There was therefore a wide range of recommended practices that were left unchanged after this intervention.

4.5. Involvement of SLIM In Community Consultation Workshops

A series of remedial actions on sites on the Ythan or its tributaries, such as tree planting along eroded banks or fencing off of eroded banks were part of the stated deliverables of the YP. More sites in need of remedial action had been identified than the budget would allow. SLIM researchers were invited by the project officer to advise on the design of community consultation workshops aiming to assess communities' preferences for which sites should receive action and discussions were held with the project officer to this end. These

discussions revealed a series of difficulties in the structuring and management of these proposed workshops that pointed to lessons about social learning.

The YP is funded as a "community led" project which, it should be emphasized, would be innovative in its approach. As stated in page 16 of the funding application (2):-

"The key aspect of this proposal is the innovative way in which it will focus on ensuring that many sectors of the local community share ownership and development of the project. This will include farmers, anglers, walking groups, school groups and residents. Representatives of these groups have been uniquely drawn together to develop the ideas for this proposal and will continue to be involved in the project."

This general approach inevitably leads to two important issues that are implicit in all approaches of this kind:-

1. Communities generally take a broad approach when consulted on such a topic as environmental management, in this case more specifically river management. When consulted, they raise different issues to that from agencies with specialist expertise, outwith agencies' restricted focus and, in this case, the focus of the deliverables of the YP. Hence, the approach to the programme of actions on the ground or among the community needs to be open ended. If the work of any such project is to stay true to its stated aims of being community led, it has to follow this community agenda even if, through learning, this eventually leads over time to the same agenda that expert bodies has identified earlier.

2. In Life Project funding, as with many projects, funds are pre-tied to specific outcomes, eco-physical and otherwise, and that failure to produce these "deliverables" can mean a refusal to supply the funding. However, the project states it will be 'innovative', but it is not possible to be innovative without taking the risk of failure, since innovation involves, by definition, employing new and untested approaches and methods. If funding may be refused if a deliverable is not produced, attempts to innovate are strongly discouraged as they put the project at risk.

3. This negates strongly against the stated basic ethos and approach of theYP. It firstly presets the agenda, forcing issues raised by communities during consultation to be set aside, if only through lack of funds or powers to address them within the consulting party. This is a counterproductive situation that has negative effects. Even if the agenda of actions funded by the project and listed in its funding application derive broadly from consultation with community representatives, the issues raised when a community is directly consulted at public workshops are almost always different in some measure.

4. Hence the design of the YP had within itself a basic conflict between its deliverable aims and its stated approach and this would inevitably lead to problems in the execution of the project.

SLIM researchers found that these and other factors came strongly into play in the series of proposed local community consultation workshops that were part of the YP programme. In these it was proposed that local community members would be invited to community meetings at which they would be asked to state vote for six out of a maximum of 12 potential small scale worksites within the catchment. The proposed work at these sites would focus on improvement of fish and other habitats through such measures as bankside planting of trees and shrubs, invasives species control, exclusion of livestock from riverbanks to stop bank erosion, or creation of a spawning bed.

This format presented several difficulties:-

a) To obtain good attendance at community meetings it is usually necessary to ensure the content is fairly broad ranging, and concerns issues that are perceived as directly affecting the lives of people within the community. As indicated above, there has to be a relatively open ended approach so that the issues identified can be "taken on board" and that there is scope to act upon the issues raised. The restricted focus and largely preset agenda of the project leads to a double bind for the organisers. If the scope of the agenda is not broadened out then it is difficult to attract a good attendance and it is not possible to begin any dialogue starting where the public perception is, a situation that limits learning severely. If the agenda is opened out, then the issues and requests for action raised may either lie outwith the project's budget or remit or both, with no sister organisations available to take on such requests. This situation could be managed if catchment management projects like the YP are nested within the other planning processes for the area from the start!

b) Presuming a suitable audience is obtained, there are further difficulties. The ecological relationships between the actions proposed on site, such as control of bank erosion and subsequent increase in fish populations are not immediately obvious to a lay public. These relationships, after all, have only recently become clear to a part of the angling public. Therefore the relative merits of the different proposals cannot be assessed by those at the workshop. This might be got over by an interesting prior discussion on the night but there are more intractable problems in this situation as pointed out below.

c) Even given an appreciation of the ecological relationship between the actions at sites and fish populations, ranking the merits of the different proposals in any sort of realistic manner seems impossible because the only parameter by which this could be done is by forecasting and quantifying the consequent impact on fish populations at different sites resulting from restoration measures taken and grading this against the level of remedial effort and resources used at each site. This is an extremely complex issue. One might try and relate the merits of each through a simple system of logic that worked along the lines of "There is no use protecting a spawning bed if a culvert downstream prevents fish reaching it, therefore rank improvement of the culverts above creation of a spawning bed." However, the situations to which such logic might be applied are likely to be particular to locales such as very local subcatchments whereas the choice being placed before the public at the workshops would be whole catchment focused.

d) d)More fundamentally, the measurement of even roughly how the impact of work at one site on fish populations would compare with work at eight others seems one of those questions that, even when applied at a very local level, plunges into the complexity of ecological interactions that even fish ecologists find almost impossible to answer, far less the general public.

e) e) Also, when such questions are posed at a very local level on a river, the answer is even more uncertain. Major natural events such as large spates occur in rivers. Such events infrequently change the character of a whole river system, but particular small many questions in modern ecology on the ground when asked to be predictive, the uncertainties within the local but still complex System of Interest are considerable, but they are dwarfed by the uncertainties caused by the impact of major external events.

In short, which site-works among the 12 are likely to give the greatest benefits and should therefore be selected seems to be an unanswerable question. It might be argued that at least asking people is more democratic, even in such difficult circumstances. But asking people questions they cannot rationally answer is not democratic or participative. It does not empower them in any real sense, or provide a way to improve their environment through their choices. Many members of the public are insightful enough to understand that they cannot answer such questions and the resultant situation within a workshop could be counterproductive.

Skilful process management or workshop design and facilitation do not offer ways out of such situations. For this and the above reasons SLIM researchers recommended these workshops should not be held. By arrangement with project staff, SLIM researchers sent a resume of these points to the SG. The general reaction of the SG was to find the resume helpful in developing its insight into the situation and the constraints imposed on the YP project by the factors identified. As a result,

consultative workshops were workshops were not held with the broader local community groups. Instead, two were held with two groups with specialist knowledge. One was held with approximately 20 local anglers. The second was held with 10 local volunteers on the project, bird watchers, biodiversity volunteers and other interested parties. At each, after a general introduction on the background to 12 sites where intervention was proposed on the river, every participant was asked to vote six. Suggestions for further suitable sites for intervention were welcomed and several were made. Thus consultation was switched from local geographic communities to communities of interest with greater background knowledge relevant to the situation.

5. EVIDENCE OF SOCIAL LEARNING

This study can only comment on possible SL within the SLIM researchers involvement with the YP and not on the possibly extensive SL that took place within the SG and project staff through the other project activities, which were extensive.

The SWOT analysis produced by the SG and project staff during the workshop facilitated by SLIM researchers plus the recommendations for action produced by them within the same event, demonstrated that this period of critical reflection enabled members to identify, share and develop insights into their performance. Also, they moved on to produce a list of actions for improvement to the project and its management. The SG's subsequent actions in acting on some but apparently not all of the recommendations produced at the workshop and/or stated in the SLIM researchers feedback to the SG demonstrated both that the such interventions by co-researchers can be effective, but also that a more prolonged period and greater frequency of intervention may be necessary to activate many of the benefits of SL.

Similarly, the reaction of the SG on design of the consultations with local geographic communities indicates that members could absorb the insights offered and apparently respond by avoiding potentially unsuccessful actions such as inappropriate engagement with stakeholder groups.

6. DISCUSSION POINTS IN CROSS CASE COMPARISONS

In drawing conclusions from this brief piece of research, certain clear constraints need to be identified. The limited scope of the research means that the conclusions can only be indicative of strengths and weaknesses within this and other similar projects. The conclusions and interpretations drawn are solely those of the SLIM researchers except where they are also identified by YP project staff and/or members of the SG in interviews or the workshop. Some stakeholders within the project might offer different interpretations based on their perspective. Mch was achieved by the YP through activities that were not the subject of co-research with SLIM workers, such as open days for the public, work with school children, and practical work with volunteers on the river and its surrounds. Notwithstanding these constraints, the authors would contend that the limited research showed clearly some useful pointers on where to focus future research and which also merit attention when further projects of this kind are formulated.

Project staff and SG members identified problems of stakeholder engagement. Stakeholder engagement is at the heart of successful ICM and all the issues raised below converge in contributing to its success or failure. The "learning points" focus around the following:-

1) Issues Associated With the "Environment" Within Which the Project Functions

"Environment" in this situation covers both the socio-economic and the biophysical environment. The farmers' responses to the evidence for the designation of the catchment as an NVZ pointed to the difficulties encountered in any dialogue with or

between stakeholders in a natural resource where prediction of environmental impacts in complex situations, uncertain timelags between actions by stakeholders and their environmental impacts, and unclear lines of responsibility for actions are found. The absence of clear agreed social norms on problems of uncertainty in the management of complex problems of natural resource management, levels of acceptable risk and standards of proof, and rules regarding social and economic responsibility for environmental impacts can make stakeholder dialogue tortuous and difficult to lead to constructive conclusions.

The presence of other initiatives in the same area, such as NVZ designation with its associated code of enforced environmental protection measures, can confuse the issue.

Other activities such as, in this case, highly adversarial meetings held by the NFU characterised by poor communication, can have detrimental background impacts on the efforts of voluntary projects to engage stakeholder groups such as farmers.

The SLIM meeting attended by a SLIM researcher also revealed the problem of the communication of complicated scientific research and findings to a non-scientific stakeholder group. Since Social Learning in Integrated Catchment Management involves in part the exchange of specialist knowledge between stakeholder groups this is likely to be a widespread problem.

2) Issues Associated with the Structure of the Project

The research brought out two issues that may have implications for such projects.

One is that the YP was structured around a set of precisely identified deliverables, with different stakeholders responsible for different deliverables, apart from those to be directly delivered by project staff, but with nor apparent overall vision or integrated plan for the catchment. This discouraged the development of a strong sense of group identity and sense of joint responsibility within the SG, especially in the face of the often-divergent pulls of the agendas of the organisations and agencies SG members worked form

Another is that, although the YP project was presented as a innovative, and therefore experimental, project, its funding, and hence payments, were tied directly to the completion of a set of clearly predefined deliverables. Since experiment and innovation risk failure, and hence threatened the financial support of the YP, such a structure discouraged innovation. Apart from the hazard of incorporating, in one project, mutually exclusive aims and approaches, there is a wider issue here. All ICM projects must “live with” the problem of complexity of ecological systems, such that the outcomes of human interventions are often uncertain. On the Ythan for example, despite lengthy research on the pollution by nitrates, the most experienced researchers find themselves reluctant to predict reliably the impact of alterations in farming practices on pollution levels in the river. Such projects should probably avoid tying themselves to precise deliverables either social, economic or environmental. Further, in most situations, stakeholders do not necessarily know the solution to the problems of sustainable, integrated water management that they face and could not obtain funding from sources that demanded predefined deliverables. What platforms or stakeholders need to commit themselves to in such situations is a process of working towards a common goal and a willingness to share and build knowledge of the issue and experiment to seek solutions.

3) Issues Associated with the Functioning of the Steering Group

Project staff and SG members, in becoming involved in the YP, were embarking on an entirely different kind of work from that previously experienced by them and the strengths and weaknesses identified by them are probably little different from those encountered by people in many similar projects and therefore offering general insights. That is what made their contribution and cooperation so valuable. The SG had the strengths of a wide representation of stakeholder groups on it, the support of enthusiastic individuals, the practice of shared decision making at regular meetings, and the support of committed project staff. Despite this, participants in the SG workshop noted several weaknesses. These included lack of clear Terms of Reference for the SG, lack of delegation of tasks and authority to project staff, and inadequate arrangements for monitoring and evaluation. These are characteristic of situations where there is a lack of experience of project management and point to the need for this kind of aid where stakeholders launch into this kind of project for the first time.

In addition, participants expressed dissatisfaction with the way they were conducting their regular meetings. To the SLIM researchers, this was due to the very common problem of low skill levels in process management that are common in many areas of professional life within the UK. There was, for example, no time set aside for critical reflection by the group on the progress of the YP or its performance as an SG and such a process is vital for Social Learning.

An important questions also arises as to whether interventions of outside parties in the process management as co-researchers can lead to more effective functioning of such projects. The SG acted on a very limited number of the suggestions for improved performance identified by its members at the workshop facilitated by SLIM researchers and additional ones identified by those researchers. Interventions might therefore be useful, but probably require a more ongoing and closer relationship between the parties to the co-research.

4) ***Issues Associated with the Functioning of Project Staff***

Since so much of the work of project staff focuses not on direct environmental management but with securing the engagement and active support of the general public and stakeholder groups such as farmers. The skills of project staff in “people management” are key to the success of the project. Good process management is a key skill and knowledge of non-coercive methods, as applied in modern extension practices, are important. This therefore needs attention in the selection and training of staff.

7. REFERENCES

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EYEBROOK CASE STUDY

Key points

- The Eye Brook Case study is one of SLIM's smaller case studies. It took place in few days spread over several months in 2002 and 2003 but it built on an existing research relationship.

- The study did not arise from a specific problem focus or from an existing catchment management initiative, but from one stakeholder's sense of unease about, and increased awareness of, issues at the sub-catchment rather than farm level.

- Engagement by the SLIM team arose from previous contacts with this stakeholders, and the initial engagement took the form of research *on* the case study. This developed into a short period of researching *with* other stakeholders, followed by research *on* the case study to review developments.

- The researchers involved in this study included three SLIM researchers and their original stakeholder contact.

- Although the Eye Brook was taken as the focus, the majority of the stakeholders were more interested in issues of land use rather than water *per se*

- Stakeholder mapping and aspects of Soft Systems Methodology were used among the researchers to identify actors and root definitions of several possible systems of interest

- The main interaction with the wider group of stakeholders occurred during a one-day workshop iniated by the researchers.

- There was some evidence of social learning during the workshop carousel process, and this was followed up by a change in the remit of one active group of stakeholders

- Apart from this active group, we were not able to find evidence of much change in relationships among other stakeholders over the short period of the case study. However interactions among stakeholders at the sub-catchment level continue to some degree which may have significance in the longer term if urgent concerted action were to be required

- The original stakeholder contact is continuing as a participant researcher in the catchment.

- It is unlikely that the same amount could have been achieved in this short period without the existing contact as more time would have been needed to develop the understanding of process and situation.

1. Introduction

SLIM's research is about social learning as a complementary policy approach for sustainable use of water at catchment scale. Our research suggests that an adaptive, learning based model of resource management could contribute to more satisfactory and sustainable results than purely science-based fiscal or regulatory policies and practices. Our research results not only apply to water and associated 'catchment management' but to other natural resource management issues in which multiple stakeholders are likely to be involved.

The SLIM approach focuses on co-construction by interdependent stakeholders of a resource management issue and how the issue may be resolved or improved. This is a dynamic process involving many interacting factors. This process, seen as a transformation of a situation towards concerted action, entails changes in practices and behaviours as well as changes in perceptions and understandings. Drawing on earlier research, SLIM researchers have chosen to focus on a set of factors interacting with each other to understand and act in relation to a common issue. These include the history of the situation (including cultural factors), ecological constraints and practices, stakeholders and stake-holding, institutional framework and policies and facilitation.

The case studies undertaken within SLIM vary as to the methodological position of the researcher. We recognized three researcher-positions, namely (i) Observer, as in traditional case study research; (ii) Researcher-facilitator and (iii) Co-researcher, as in systemic action research.

This case study examines these aspects in the context of a short period of engagement with a small catchment in England.

2. About the Case

The Eye Brook is a tributary of the River Welland, in Leicestershire in the English midlands. The catchment occupies about 6750ha and land use is primarily agricultural, with only three main villages. As such, it is probably typical of many lowland catchments in England. The brook was dammed in 1940 to create the Eye Brook Reservoir, intended to supply water for the Corby steelworks. Loddington Farm lies within the catchment; here the Allerton Research and Educational Trust conducts research and provides information on environmental management of farmland, often relevant to game management interests of farmers. Their Senior Ecologist, Dr Chris Stoate, who had established contacts with the Open University, believed that while water use in the catchment appeared sustainable, this impression could be misleading. He suggested that the SLIM approach could usefully institute social learning, to identify relevant concerns of stakeholders, and possibly initiate concerted action to pre-empt problems. The mission of the Allerton Trust appeared to coincide with possible concerns of stakeholders about sustainable management of the land within the catchment .

This research focused on using social learning in a case study where there was not an urgent, pre-existing driver for change, to complement more problem-focused UK examples.

3. History of the Case study area

3.1 Land use in the catchment

At least part of the Loddington Estate within the catchment was being cultivated in the eleventh century. A larger area was probably in pasture then than now, although ridge and furrow features on what is now pasture indicate that arable land sometimes predominated. Those fields that are currently pasture are heavy clay and difficult to cultivate. Prior to the plague the population of the area was probably higher than at present, and a large cultivated

area would be required to provide for this. Loddington was enclosed between 1607 and 1640, changing the landscape and forcing many of Loddington's inhabitants to seek work elsewhere.

Loddington Estate was bought in 1880 by Lord Aberdour, whose interest was mainly in hunting. The area of pasture in the surrounding area doubled prior to 1914. After 1918, the national decline in farming recommenced and even pasture was grazed only by relatively low numbers of animals. However, grey partridge thrived, providing valued shooting opportunities.

Government support for farming post 1939 meant that the arable area doubled, and the cropping rotation incorporated a two-year grass ley which was grazed by sheep or cattle so that all fields on the farm were grazed in rotation. Livestock drinking points in the form of small ponds and water troughs remain as evidence of this. Several hedges were removed during the 1970s when the estate became the single farm it is today and arable crops became the main focus. The 1940s and '50s also saw the establishment of new woodland plantations, comprising sycamore, oak, ash, cherry, Scots pine and larch.

The number of people involved in farming at Loddington dropped between 1956 and 1971, and smaller farms were amalgamated. The value of houses was low in such a rural area, with few prospects for employment. Subsequently, improved roads have made rural houses in the area desirable for commuters and for weekend use. House prices have soared and the social structure of local villages has changed dramatically.

Arable nutrient inputs, particularly nitrogen, have declined from a peak in the 1980s, probably resulting in reduced transport to watercourses. Arable area also decreased with the advent of set-aside. Since 1996, farm incomes have been relatively low, leadng to some diversification and changes in technology. Minimum tillage has been practised on some farms within the catchment. Some farms have adopted grassed field boundary strips under the recent Countryside Stewardship Scheme.

A few farms are now selling meat from the farm gate and some have diversified into recreational activities (eg Bed &Breakfast, farm trail, fishing, caravan park). Other income generating activities have included contract work, or off-farm employment such as haulage.

3.2 Eye Brook Reservoir

This was designed to provide approximately 18000 m^3 day^{-1} of water for the steelworks in Corby, but these now take only about 2000 m^3 day^{-1}. Waste water from Corby flows south into the separate Nene catchment. Eyebrook reservoir is a SSSI on account of its use by migratory duck and wading birds. It supports a wide range of fish species, but fishing is only for trout, "trickle-stocked" since 1941 - initially with brown trout, but more recently almost all rainbows. More than 11,000 rod days were sold in 2002, and there are 25 boats, equipped with outboard motors. Anglers are asked, but not obliged to return caught brown trout. There is thought to be a small wild brown trout population in the reservoir, spawning in the Eye Brook, and/or in ditches feeding directly into the reservoir, but nothing is known about spawning areas or numbers. Pike have recently appeared in the reservoir. They are thought likely to have minimal impact on fishing, but could have a greater impact on wild fish, especially in the stream. There are no other water sports.

Conversion of grass to arable in the 1970s and 1980s resulted in transport of silt to the reservoir. This has not been a major concern because of the low yield required, but is likely to affect the capital value of the reservoir. There have been no major alagal blooms since the mid '80s and water quality is relatively good. Aquatic plants are cut regularly in summer to facilitate fishing.

3.3 The Allerton Project

The Allerton Research and Educational Trust was set up in 1992 to conduct research, advance public education and disseminate useful results on different farming methods and their effect on the environment and wildlife (both flora and fauna). Following baseline monitoring in 1992, a game management system was first implemented on Loddington in 1993.

Overall, there is currently little that could formally be called "integrated catchment management", although the situation with respect to water seems to be broadly satisfactory relative to the demands placed on the resource.

4. Research methodology

The work was based on systems ideas (Open University 1998), and emphasised identifying stakeholders and systems of interest in the situation, iteration, modelling and evaluation, drawing on different theories of learning (experiential, situated and social). The 4 researchers attempted to operate in a co-researching manner, but sometimes in an action research mode, seeking to encourage collective action within the case study area.

Initial engagement involved Chris Stoate approaching SLIM for discussion and to scope possible studies. Following this initial contact, all four researchers spent a half-day using stakeholder analysis, systems mapping and Root definitions/CATWOE (Checkland and Scholes, 1989) to identify different actors and systems of interest within the situation. The most appropriate system of interest for research purposes, and a CATWOE analysis of this system of interest is shown in Table 1

Table 4. A possible overall Root definition of a system of interest for the Eye Brook

Root definition	A system to develop more environmentally and economically sustainable natural resource management practices in the Eyebrook sub-catchment through approaches based on social learning.
Client	Eyebrook sub-catchment stakeholders (which?) Allerton Trust SLIM-UK
Actors	Eyebrook sub-catchment stakeholders (which?) Allerton Trust SLIM-UK **
Transformation	- (to explore how we can) go from less…to more environmentally and economically sustainable natural resource management practices in the Eyebrook sub-catchment - better understanding of what social learning can offer
Worldview	- it is possible to achieve (land, water and related) natural resource management which is more environmentally, economically and socially sustainable within the Eyebrook sub-catchment - valuing social learning
Owners	Eyebrook sub-catchment stakeholders (which?) Allerton Trust SLIM-UK
Environmental constraints	EU & Govt as policymaker and funder (eg CAP regime, WFD, NVZ); Acts of God; fiscal regime; SLIM project & Allerton Trust time.

Key transformations undertaken by this system would be:

- (to explore how we can) go from less…to more environmentally and economically sustainable natural resource management practices in the Eyebrook sub-catchment

- better understanding of what social learning can offer

The chosen approach to these transformations was a workshop meeting, with a range of actors associated with the situation, to draw out the range of perspectives and issues that concerned these stakeholders and to provide the opportunity for the development of concerted action. A meeting was held at Loddington, followed by email exchanges, to design this process and to divide up preparatory tasks. Our researchers' stakeholder positions were made explicit and considerable attention was paid to the design of the event to enable participation by stakeholders and to ensure that it addressed the agenda of both the Allerton Trust and SLIM.. The systems map and the various root definitions derived earlier were used as a basis to identify the range of likely stakeholders, from which Chris Stoate used local contacts and knowledge to draw up a list of invitees. Invitations were sent to some 30 likely individuals or organisations, with the option for them to pass the invitation to a substitute.

The Workshop programme is shown in Table 2

Table5 Programme

Time	Activity
10:00	Arrival and coffee
10:30	**Introductions, aims and ground rules for the day**
11:00	Small groups exploring participants' perceptions on the Eye Broom, effects of activities and problems and opportunities that exist
12:00	**Consider outputs of group work**
12:30	**Lunch**
1:15	**Walking tour round the farm**
2:15	**Final Plenary and next steps**

A report derived by the researchers from flipcharts on the day was fed back to the participants for their consideration and possible further action. Following the workshop, the four researchers met to analyse the process that had been undertaken, using the SLIM variables (SLIM, 2003) to structure the analysis.

The presence of the Allerton Research and Education Trust within the catchment, and the pre-existing link between Chris Stoate and the OU were critical, as was a preparatory meeting with local Environment Agency staff. Their participation provided a perspective on planned developments in the area that may have particular significance to many stakeholders. Despite all attempts to be inclusive, the actual selection of participants in the one- day workshop was also a “critical incident”, since they were largely self-selected.

5. Workshop process and outcomes

The **aims** of the meeting were:

- to bring together a range of people who live or work in the Eye Brook area with an active interest in its future;
- to explore and discuss any opportunities and/or problems associated with the Eye Brook;
- to provide an opportunity for participants to suggest ways in which they would like to see the Eye Brook and its surrounding area used in the future.

Process

Fourteen people attended the workshop, representing farmers, regulatory agencies and local interest groups. The meeting was designed so that everyone would have the chance to contribute and an opportunity to hear the views and perspectives of other participants. This was intended to enable participants to 'set the agenda' and determine its outcomes and any future activities.

After a short introduction, participants were divided into three small groups to undertake a "carousel" process. Each group was asked to explore and discuss the following themes:

- Where do we live and work?
- What's important to us and why?
- Activities which affect the Eye Brook and the surrounding area
- Opportunities and problems

The discussions and key themes were recorded on a mixture of flipcharts and 'post-it' notes.

After about an hour, each participant was then allocated to one of three new groups for the carousel process, to learn more about the earlier groups' working and to comment on the issues. Additional comments from the 'new' groups were recorded on different coloured post-its. At the end of the morning session, the original groups reconvened to review the additions.

After an informal lunch, Chris Stoate conducted a tour of the farm in the vicinity of the visitor centre to illustrate the interactions between farming practices and water resources and other management issues in the Eye Brook area.

Following this, participants reconvened for a final plenary session to review the points raised in the morning session and to determine what, if any, future actions participants felt should be progressed.

At the end of the plenary session, it was agreed that notes from the workshop and contact details would be circulated to all people who had expressed an interest in attending the meeting.

5.2 Makeup of groups

The groups varied in their geographical coverage; only in one group did the majority live and work entirely within the catchment.

5.3 What group members saw as important

Everyone stressed, in one form of words or another, that they regarded the area as having an attractive, peaceful landscape which is still relatively "unspoilt". For some, it provided a home and a place of work, while for others it had recreational or professional interest through various environmental projects to benefit wildlife or recreational aspects.

It is designated as an Area of Particularly Attractive Countryside (APAC) in the Harborough Local Plan, and several stakeholders saw more specific habitat designations (e.g. SSSI) or the presence of specific landscape features such as woodlands as important.

A repeated concern was with keeping settlements alive and avoiding purely dormitory villages.

Farming and agricultural practices have issues of economic pressure and of diffuse pollution. These are likely to require changes in land use and diversification of enterprises.

5.4 Activities which affect the Eye Brook and the surrounding area

Agricultural practice, recreation and tourism and possibly water abstraction were seen as the major activities affecting the area. Problems of agricultural practice were noted earlier, but tourism was seen as a double-edged activity. It provided economic benefits but increasing tourism could also introduce litter etc. and deleteriously affect the character of the area. At present, abstraction had little effect, but development of Corby or other increased needs for abstraction could change this. Development at Corby, with increasing recreational and other pressures on its surroundings could have large effects on what was currently a sparsely populated, quiet area.

There was some ambivalence to activities such as hunting, and to designations such as SSSI. The potential effects of a ban on hunting, possibly then extended to other rural activities, represented a concern for many. Farmers had specific concerns about increased legislative activities, such as the ban on burial of fallen livestock.

The increase in traffic along the A47 was seen as possibly resulting in increased pollution from fuel spills, but tree planting and other Countryside Stewardship activities by farmers were seen as positive. It was not clear how the wishes of local people were represented in respect of local government, development activities and economic activities. Local foods were seen as a potentially key issue, but not without problems, particularly as a result of closure of local abattoirs.

5.5 Opportunities and problems

Opportunities

There was a general feeling that there were opportunities for change, and a readiness among stakeholders to become involved. Local food related initiatives, such as farmers' markets were recognised as an opportunity for some (though possibly only a minority) that could contribute to environmental value, as might an increase in organic farming. Agriculture has had to change in response to various pressures and farmers were actively concerned to embrace this. Although it was not clear what opportunities existed for agricultural diversification, farmers recognised they did not have to go for intensification as the only way forward. Education about what was available, including grant assistance, was seen as an opportunity to encourage agricultural diversification and it might be possible to attract funding for training to support this. Educating the non-farming community was also seen as important.

The low population density and attractive landscape offered an opportunity to encourage appropriate, sustainable tourism, especially if a shared vision of what was wanted could be created. It was felt that there were unrecognised opportunities for small-scale tourism; for example, the Eye Brook itself offers an opportunity as habitat for many valued wildlife species (otter, freshwater mussel etc). However, the area's "niceness and quietness" also meant that it was little recognised outside the immediate area.

A strong local economy could reduce pressures for industrial development within the catchment. Both the Welland economic partnership, a sub-regional grouping of five districts, is an opportunityand the Leighfield Forest scheme are seen as opportunities. The Leighfield Forest scheme provides funding for conservation, it operates at catchment scale and has implications for water management and could undertake marketing of woodland products and biofuels. Woodland management could also increase access and recreation.

Development in Corby and the Rockingham speedway were seen as both opportunities and problems, although primarily affecting the lower catchment.

Problems

These largely centred on uncertainty about the balance between development and conservation, especially the possible increases in traffic and building arising from development. Planning policy for housing development and its effect in "dormitory" villages is an issue, with both positive and negative effects from increasing planned densities. The general state of misunderstanding between urban and rural populations represented a problem.

The declining rural economy and farmer's practices were seen as interlinked problems, with aspects such as hedgerow removal, diffuse pollution and farm traffic resulting from attempts to improve farm economics. The availability of farm and rural labour with appropriate skills to carry out new activities, and to allow time (and money) for training was a potential problem. Although timber had been identified as an opportunity, its current low valueand lack of market meant that people were unlikely to be motivated to undertake planting and other management without grant aid.

The questions of how to value landscape, water quality, waste disposal, local versus national issues etc. and striking a balance were seen as very difficult

Specific detailed problems that were identified included the possible expansion of Ketton Cement quarrying (based outside the catchment) and the effect of increased abstraction of water which could be a threat especially in hot summers.

5.6 Further points

The following is a summary of the main points raised during the final plenary session at the end of the day. These were recorded on flipcharts during the discussion

- Group today was interesting because seeing and hearing different perspectives, revealing the difference between the farming community and others over questions such as diffuse pollution. This was very useful. It suggests that getting more local people on board and involved in ongoing projects would be of considerable benefit

- Problems of declining income in agriculture and development pressure. The trends in these are not positive.

- Looking for economic, social and environmental gains is harder work but potentially more rewarding than going for one or two economic gains

- Tourism and general recreation would help the rural economy but it could also damage the environment. People value the countryside and landscape with no-one in it. Do we want more activity – tourism? Can we control it? Not sure. Development of Corby at the bottom of the catchment & effects – is a problem and opportunity Need to take ownership to control development?

- The county council provides significant funds for environmental improvements. Funds are much larger at county level rather than district council level. Some funds are available for skills and training. Are County boundaries a limiting factor? The area is split between 3 councils. Will cooperation of authorities be achieved? Perhaps the Welland Partnership is an opportunity to overcome this? EMDA (East Midlands Development Agency) provides funding for sustainability, access, heritage, but applications by 31 May!

- Welland Partnership is seen as more for Harborough District Council than the other members. There is a significant emphasis on Harborough DC, so it is not a uniform body. It is an attempt by the local authorities around the Rutland area to bring about more uniform planning eg disabled planning.

- Should we be looking at the wider area than the Eye Brook as it is a small catchment? Is there an opportunity for identification with 'Eye Brook' or 'Leighfield' to provide some scope for partnership funding? Perhaps a 'Leighfield' produce cluster to market local produce?

- What are the products of this area? Suggestions were: food, water, forestry, recreation, thatching. These are a marketing opportunity and require some kind of 'group' to secure funding to help develop and market these 'products'. But who would be responsible for using the funding? There are also issues of ownership and who benefits. How would it be possible to demonstrate the benefits (so that funding could be secured?) Grant aid is usually used as an incentive for commercial development as a whole, but is there an opportunity to demonstrate an individual good could be a public good too?

- Is there an opportunity for establishing a 'Leighfield foods' in the context of Leighfield? This could extend to forest, tourism, recreation as well. The idea of a 'Leighfield' focus for marketing was generally welcomed, but it was also recognised that there are problems with the fact that agriculture tends to operate on a commodity (bulk, unprocessed) basis, rather than food produced for more localised, smaller scale markets. There is also a perceived link between planted woodland and access – is this a problem? Woodland Trust find this a problem. Leighfield Forest is on private land and therefore access is down to individual owners

- Don't want to be driven by funding. Getting local groups involved is very useful and important. There is scope for getting local people involved in existing projects – eg Leighfield forest project partnership. Can see potential for *that group* to do something relevant to *this group*. Would need a larger group of farmers together to explore potential for collaborative project with Leighfield Forest

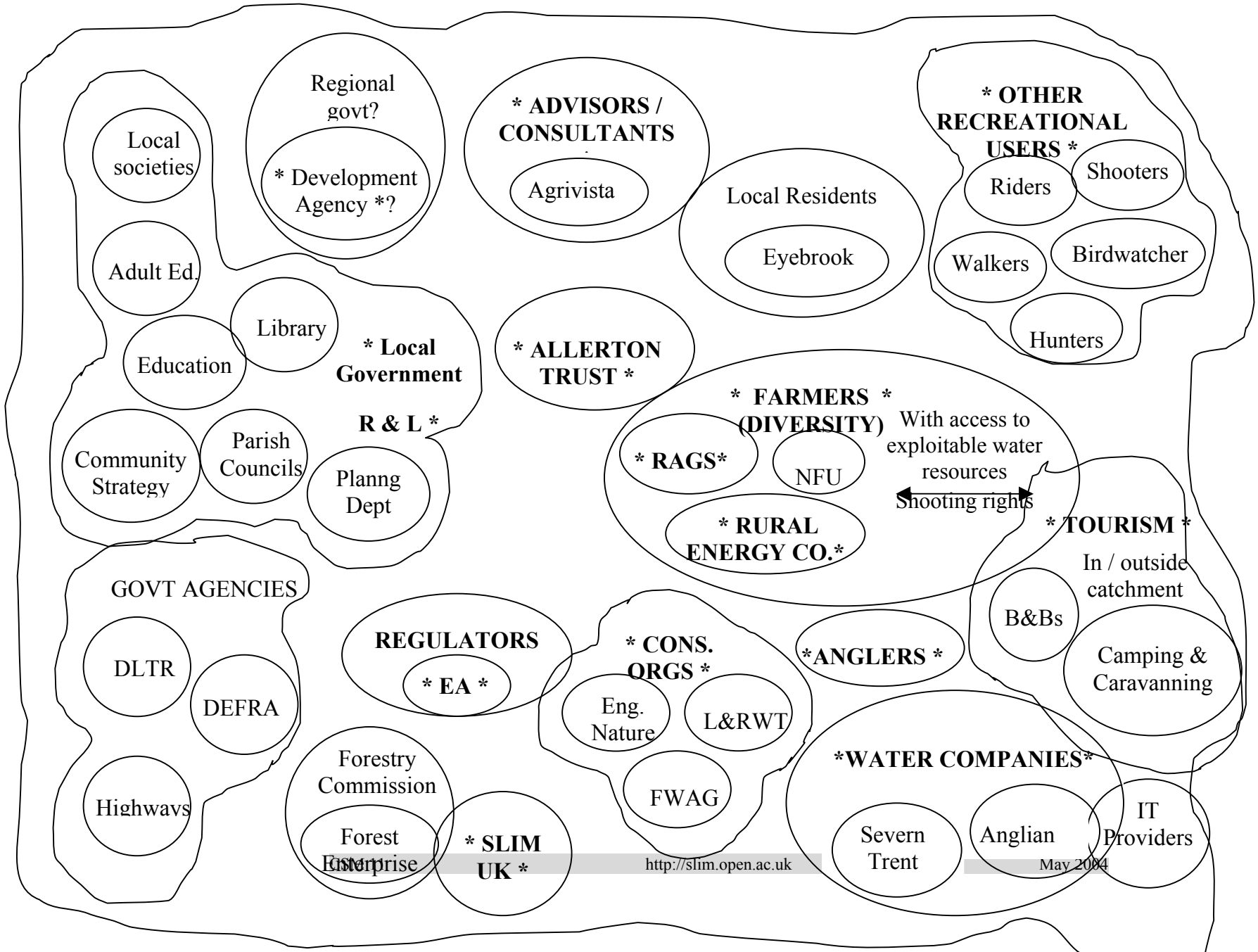
6. Using the SLIM Variables

6.1 Stakeholders

The follow-up analysis concentrated particularly on Stakeholders and the processes of stakeholding. These had been examined as a continuous process involving SLIM, the Allerton Trust and the workshop participants, to identify who were the stakeholders, and the interdependencies among them. The initial Stakeholder analysis (Figure 1) provided a starting point both for identifying stakeholders and the related system of interest, in combination with the CATWOE analysis. This fed into the design of the workshop and the list of potential participants.

The workshop process allowed emerging insights into differences between farmers/landowners and other stakeholders, the role of agencies such as the Environment Agency and Local development partnerships as both a constraint and opportunity. Stakeholding was constrained by local government boundaries and the institutional constraints associated with these, such as the Welland Partnership. Some organisations were seen as not being in the catchment system, but having a major responsibility for it. It was

recognised that this understanding was still incomplete, as was consideration of power relationships and interdependencies among stakeholders. In the short period of engagement, it was not possible to track how the boundaries of perceived systems of interest are changing, or to understand the enthusiasm or reluctance of stakeholders to become involved


Regional govt?
* Development Agency *?
* ADVISORS / CONSULTANTS
Agrivista
Local societies
Local Residents
Eyebrook
* OTHER RECREATIONAL USERS *
Riders
Shooters
Walkers
Birdwatcher
Hunters
Adult Ed.
Library
Education
* Local Government R & L *
* ALLERTON TRUST *
Community Strategy
Parish Councils
Planng Dept
* FARMERS * (DIVERSITY)
With access to exploitable water resources
Shooting rights
* RAGS*
NFU
* RURAL ENERGY CO.*
* TOURISM *
In / outside catchment
B&Bs
Camping & Caravanning
GOVT AGENCIES
DLTR
DEFRA
Highways
REGULATORS
* EA *
* CONS. ORGS *
Eng. Nature
L&RWT
FWAG
*ANGLERS *
WATER COMPANIES
Severn Trent
Anglian
IT Providers
Forestry Commission
Forest Enterprise
* SLIM UK *

6.2 Facilitation

We recognised that the workshop had changed or challenged, to some degree, the existing dynamic between participants. We felt that the role of the facilitators, and the effort expended in designing the workshop process by the SLIM research team had been useful, although we were unsure by whom this should be judged. A lunchtime walk had been valuable in providing some of the background scientific knowledge needed by participants and in lightening the day. The Loddington farm woodlands, fields, buffer strips etc. all acted as "intermediary technical objects" in this context.

6.3 Policies

The workshop had raised issues in this area, especially the awareness, or lack of awareness, among participants of the policy context of the Eye Brook. Participants were particularly concerned about planning issues, and felt a sense of powerlessness in the face of the implicit political ethos of the present Government. There was a strong sense of ambivalence about the "planned development" of the area. The farmers present questioned whether some aspects of policy (for example, decisions regarding the disposal of fallen livestock) showed any awareness of their possible consequences.

While we had begun to identify the relevant policy-makers, the picture was not complete. Some more details are given in the SLIM UK Policy context case study .

6.4 Practices in ICM

A primary focus of the work of ARET is scientific, and the workshop allowed this knowledge to be used and shared among the participants. It provided the opportunity for participants to acquire a wider understanding of local ecological relationships from ARET and from one another. The boundaries of ecological systems, and of the catchment, were not clear to participants, and perceptions of these changed with consideration particularly of the influence of development and other activities in Corby and in the lower catchment. Further work is needed to identify the models of the dynamics of natural resources, indicators and measures of performance being used to manage resources in the catchment.

6.5 Key Issues perceived by the SLIM research team

The key issues in the catchment, as surfaced by the participants, appear to centre on its development; a strong attachment to the existing landscape was expressed by all participants, coupled with a recognition that some development was needed and inevitable. They recognised that the low population density and low levels of formal economic activity in the catchment, while they contributed to its desirable nature, also left it very vulnerable to outside pressures for unsympathetic development. The feeling of powerlessness was increased by questions of boundary and representation, since the existing Local Authority boundaries did not recognise the catchment in any obvious way and it was felt that the voices of the urban centres of Corby and Leicester were much stronger than those from within the catchment.

The economic vulnerability of agriculture was a major issue. While some farmers were providing opportunities for tourism and considering specialist food products, both these options were felt not to provide a solution for the bulk of the farmed area, devoted to "commodity products". While there was some recognition of the role of farmers in shaping and managing the landscape, there was also a lot of initial misunderstanding of their position and actions. During the course of the workshop, this appeared to diminish, and opportunities for sympathetic economic development were discussed, especially via the Leighfield Forest

project. This was primarily a woodland related scheme, but there appeared to be opportunities to broaden it into food and other natural resource related actions.

6.7 The (Existing or Emergent) Platform

Prior to the workshop, Chris Stoate's view was that no coherent platform existed within the catchment. The ARET was potentially the base for such a platform, but it had limited contact with local people compared to its contacts with farmers outwith the catchment. This appeared to change as a result of the workshop and the preparation for it. The proposals for further development under the auspices of the Leighfield Forest Project may offer a platform for the future.

7. Evidence of social learning

What constitutes evidence of social learning is discussed elsewhere in SLIM's publications. Positive evidence may be changed behaviour in the form of concerted action relating to catchment management and sustainable use of water. Learning may be evident both in changed behaviour and in changed perceptions which may remain hidden but can potentially cause changes in behaviour at some future date. There was little that we would call concerted action evident in this case but there were certainly indications of changing perceptions, developed socially and particularly regarding stakeholder participation in projects taking place in the catchment. This may form the basis for more concerted action in the future.. The role of ARET and SLIM appears to have been at least a major catalyst for this. It was hoped that the feedback forms supplied might provide documentary support, but few had been returned at the time of writing.

Evidence of continuing interaction includes a second event organised by Chris Stoate a year later. The event was sponsored by Forestry Commission and English Nature, with the focus on woodland management within the Leighfield Forest. This built on the need identified at the first workshop to bring the Eye Brook and Leighfield approaches together. The event had no formal product but was simply an opportunity to enable local stakeholders with an interest in woodland management/resource use to talk to each other. These stakeholders are also exploring the way forward for addressing the 'problem' of muntjac for woodland conservation.

Picking up on the 'opportunity' of trout fishing identified at the first workshop, a fish biologist helped ARET survey the entire Eye Brook in May 2004. These data will be fed back to all local stakeholders in an attempt to maintain interest and cohesion at the catchment scale, and to develop plans for Natural Resource Management in due course. ARET is taking genetic samples from trout in the reservoir and stream to determine whether there is a continuous trout population. It is also increasing its focus on research into soil and water related issues. Whatever the results, these activities serve to build links within the catchment community.

There are no deadlines (which could actually be counter-productive) for immediate activity . It is believed to be better to build up a picture gradually, bringing various people in as and when appropriate.

8. Discussion Points in Cross Case Comparisons

The Eye Brook case study differed from SLIM's other UK cases in not initially having a specific problem focus, or an operational imperative such as the production of a formal plan (Tweed) or enactment of specific, contracted catchment management actions (Ythan). This

may have allowed a more "relaxed" engagement of stakeholders, who were able to learn from one another without pressures, although of course the timing of the event meant that some participants were inevitably unable to attend (e.g. farmers involved in lambing).

The experience of the workshop suggested that the methods of facilitation being used worked successfully in this context. The "carousel" process in particular was highly successful in providing an opportunity and incentive for all participants to engage with the discussion, and to take ownership of the points made in their workshop groups.

The presence and positive engagement of local representatives of major agencies (Environment Agency, English Nature) was a valuable aspect, but several participants commented on the absence of representation (and implied disinterest) from DEFRA. This is clearly a point to be taken up in later Workshops.

References

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Harborough Local Plan.

Open University (2000) *T306 Managing Complexity. A Systems Approach* Milton Keynes, Open University

SLIM (2003) *Framework: Social Learning as a Policy Approach for Sustainable Use of Water*

[k1]Still need to mention the NVZ guidelines?

[k2]To delete?