



The socio-economic evaluation of the impact of forestry on rural development: A regional level analysis

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Abstract

This paper describes the methods devised to evaluate the contribution of forestry to rural development at regional or sub-regional level in the UK in a research project undertaken by the author and others for the Forestry Commission. It discusses the adequacy of existing methods (including cost–benefit approaches and regional economic modelling) in capturing the full array of socio-economic benefits generated by forestry. It proposes a method to estimate the ‘halo’ or ‘shadow’ effect of forestry on surrounding economic activity, which, although acknowledged by some authors, have not previously been enumerated. In two applications of this technique in southern England, the halo/shadow effect would appear to be greater than the economic impacts on the rural economy arising from conventional forestry. This conclusion raises important questions about the role of forestry as a contributor to economic activity and how this might be enhanced, challenging more productivist notions of forestry and replacing them with a more consumption-oriented emphasis. There are important implications of such findings on the ways in which evaluations of forestry programmes or projects are undertaken.

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1. Introduction

In the UK there has been a remarkable transformation over the last 15–20 years in the ways in which forestry has been promoted as an activity. Since the formation of the Forestry Commission in 1919, a single agency has had primary responsibility for forestry, both as a public sector landowner/manager and as an advisory and grant-aiding authority overseeing private sector forestry in the private. The serious shortages of timber in two world wars led to the

promotion of an industrial model of forestry comprising even-aged, predominantly exotic conifer plantations, which was developed largely by the state through public acquisition and planting programmes and also by the private sector through financial incentives, including grant aid and tax concessions.

In the post-war period, in spite of a number of major inquiries (Zuckerman Commission, 1957; LUSG, 1966; Treasury, 1972; NAO, 1986) which, on balance, were rather critical of the public costs of supporting forestry, the industrial forest of predominantly even-aged exotic conifers continued to be the principal product of public policy with respect to forestry. However, there is growing recognition of

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other values of forestry and these new values have increasingly impacted on new forest and woodland planting (Solberg, 1996).

Since the early 1990s, a number of profound changes in forestry policy direction have occurred, partly as a result of endogenous processes of policy adjustment and partly a result of external policy influences, including Common Agricultural Policy reform pressures and the Rio Earth Summit of 1992. These include:

- The funding of new lowland forestry on farmland as a means of reducing costly EU food surpluses;
- The recognition of multi-purpose forestry as the over-riding rationale for forestry in the UK;
- The promotion of sustainable forest management as an over-riding principle and the injection of a much stronger environmental component in forest policy (Scottish Executive, 2002);
- The dramatic shift in new forestry planting away from industrial forestry towards environmental forestry, supported by major changes in grant aid;
- The promotion of new institutions, such as the new National Forest and the Community Forests of England as multi-agency sponsored means of delivering a broader range of multiple benefits in areas that had been largely unaffected by the dominant thrust of forest policy between 1919 and 1990;
- The emergence of sub-national forestry agendas in England Scotland and Wales prior to devolution and their firming up in new institutional structures as a result of the devolution settlement (e.g., Forestry Commission, 1999).

These public sector shifts have been accompanied by a great deal of Non-Government Organisation (NGO) action. The Royal Society for the Protection of Birds (RSPB), along with the state nature conservation organisation, was instrumental in opposing further afforestation in the far north of Scotland and influencing the change of the tax policy that had led to it. Upland afforestation has also been opposed by recreational access-based and amenity NGOs seeking to maintain access opportunity and scenic quality. Throughout the UK, interest in ancient woodland and in native woodland is manifested in the growth of the Woodland Trust as a significant landowner. In addition, in Scotland, there has been a powerful NGO

movement (Reforestation Scotland) advocating greater community involvement in forest-related decision-making. These NGOs are testament to the importance of trees, woodlands and forests in the public psyche and have become important influences on policy formation.

Another major feature of contemporary forestry in the UK has been the promotion of new (or new-old) styles of forestry, often backed by consortia of public agencies, often with support from NGOs, in area-based projects. These range from Highland Birchwoods in the Highlands of Scotland to Cumbria Broadleaves in North-west England to the South West Forest in Devon. The woodland resources that were viewed as moribund and of little value during the drive for increased timber production have become the focus for many partnership-based actions emphasising and seeking to enhance their recreational, landscape and biodiversity values.

However, in spite of such wide-ranging interest and activity, the case for forestry as a market-driven proposition producing wood products is extremely weak. For long periods of time, forestry has been relatively unprofitable, at least as a financial proposition by the state and, in the case of private sector involvement, is driven almost entirely by the extent of grant aid. Such a situation inevitably raises questions about how the overall contributions of forests to socio-economic well-being can be properly appraised.

Forestry as an economic activity can be appraised or evaluated in various ways. Such evaluations can be based on particular policies, programmes or projects. However, whatever the level at which evaluation is pitched, it is crucially important for that evaluation to provide an accurate reflection of the economic contribution made by forests woodland and trees to local, regional or national economies. This paper asserts that established methods are extremely weak in providing a composite picture at regional or sub-regional level and suggests an alternative approach.

The need to measure the wider impacts of forestry has been the subject of a major review by Food and Agriculture Organisation (FAO) of the United Nations (FAO, 2003). This review stresses the need to consider the cross-sectoral policy impacts. Additionally, the report flags the need to identify the full range of beneficiaries of (and by implication, people adversely

impacted by) forestry activity. The study on which this paper is based was commissioned by the Forestry Commission to create a better understanding of the sub-regional level impact of trees, woodland and forest on the UK rural economy. It comprises a contribution to the broadening of understanding of the impacts of forestry on the wider economy.

2. A review of methods

2.1. Introduction

Different types of socio-economic valuation of forestry or any other economic activity have emerged to meet a range of purposes. On one hand, regional impact analyses have normally been based on modelling inter-industry connections at appropriate spatial scale to explore, *inter alia*, the capture of income and the creation of employment within particular areas. On the other hand, cost-benefit approaches have been developed by economists to address the complex questions arising where market failure is endemic in economic systems. More recently other mixed methods approaches have emerged which are more accommodating of non-economic values and of accommodating alternative processes in evaluation (Buttoud, 1999; English Nature, 2002). In general, it is possible to identify a continuum of approaches ranging from quantitative economic approaches through criteria-based indicators that are usually quantifiable but not necessarily economic, to more participatory, qualitative approaches that eschew quantification.

Public agencies have a number of roles. They can be key delivery agents of projects; they can be facilitators of change by other actors and agents; or they can shape and design policy and design appropriate implementation strategies. In the case of forestry in the UK, the basic structures of policy and the parliamentary acts guiding forest policy have not changed greatly over the last 20 years. In spite of that relative stability of policy, quite substantial changes of practice by public sector agencies have occurred, largely because forestry has become a relevant concern of a wider range of public agencies, and also because of the increasing prevalence of a project-based, partnership-structured political culture.

At basic level, public sector bodies are normally concerned to maximise the additionality of projects and to minimise displacement effects. Additionality arises because a beneficial outcome of a project is larger or sooner than any outcome that might have arisen if no project intervention occurred. Displacement arises when other economic activity is suppressed as a result of the project. Displacement may be considered acceptable if it involves the transfer of resources into disadvantaged areas from relatively prosperous areas, although the impacts of such displacement of economic activity on overall economic efficiency need also to be considered.

2.2. Cost-benefit approaches

There is a long tradition in the UK of the application of cost benefit evaluation to forestry policy. The ‘Crabtree report’ (CJC Consulting, 2003) is the latest in a long line of reports dating back to the Treasury Study in 1972 (HM Treasury, 1972) and subsequently revisited by the National Audit Office in 1986 which have undertaken or reviewed Cost-benefit analyses. Recently, Willis *et al.* (2003) reported to the Forestry Commission, indicating the considerable value of non-market benefits of forestry in the UK. Cost-benefit analysis explicitly adopts a neo-classical economic approach to pool together both market and non-market values to give an overall appraisal of forestry’s contribution to national economic well-being. Such studies can be conducted at national level (e.g., HM Treasury, 1972) or local level (Wilson and Whiteman, 1994). Within the UK, compliance with the economic ‘rules’ of the Green Book (HM Treasury, 2003), the Treasury’s manual on project and programme appraisal is *de rigueur* amongst those in receipt of Treasury largesse, and the Treasury’s view on the legitimacy of the various methods is found in the Green Book.

The multiple examples of market failure in the forest sector and the generally recognised presence of so many positive externalities in the forest sector have made it a popular area to investigate (see Stewart Roper and Park, 1999, for a reasonably up to date compendium). Non-market values can be broken down into use values and non-use values. Some non-market values, such as biodiversity, have both values. A capercaillie can be valued whether or not

it is seen, although its overall non-market value might be higher if there were opportunities to view it. Typically, all values associated with a willingness to pay for either the existence of a particular species or habitat (non-use value) or to view it (use value) are legitimate values to consider. Both non-use and use values will tend to exhibit spatial variability, although in the case of non-use values relating to biophysical attributes (e.g., wildlife or CO₂ absorption) this will be determined by the biophysical attributes of the resource, whereas in the case of use values, these will be driven largely by demand variations.

The degree of spatial variation in non-market values is likely to be of crucial importance in relation to forests and woodlands which are used for recreational purposes or as settings for housing. The gradient of these values from the edge of communities and major concentrations of population may be very considerable and coarse-grained spatial mapping of externalities such as carried out by Willis and Garrod (1992) or Macmillan (1993) may be insufficient to pick up these differences. However, in general such analyses tend to value remotely located scarce species or attractive landscapes much less than environmental features that are close to large populations.

Another key concern with non-market values is the time path of such benefits. Where new woodland is created or habitat is altered to enhance prospects for recovery of a species or allow species re-introduction, there may be a lag between the expenditures to promote the action and the receipt of benefits. This should be factored into any appraisal. Indeed, it is not inconceivable that a period of negative effects such as disruption to road traffic and landscape might be associated with, for example, the rehabilitation of native pinewoods or Atlantic oakwoods, even though substantial benefits might accrue in the longer run.

A further concern with non-market goods and services associated with forestry is the extent to which there is scope for capture of these benefits in local economies, through a process of 'internalising the externalities' (Scottish Parliament, 2003). If the internalisation takes place within a proprietorial unit, there is of course no externality. In practice, partial internalisation through 'cultivating rural amenities' (OECD 1999) is extremely common at local economy level and less common at individual proprietorial unit level. For example, some of the value of an ecologically rich

environment will be manifested in local property markets. These values can be estimated by hedonic pricing methods. Alternatively, a landowner may internalise some of that value by introducing parking charges at an attractive site. In the case of environmental investments in forestry, the scope for internalised 'cultivation of rural amenities' may be considerable (Merlo et al., 1996; Mantau et al., 2001).

However, for all its theoretical sophistication, and in spite of major advances in the accuracy of estimating the non-market values associated with forestry and/or nature conservation (Macmillan et al., 2002), there is concern amongst the community of social scientists, including amongst some economists, and even more disquiet amongst natural scientists, about the extent to which economic values can be used to express the total value of a natural resource to society. The disquiet is greatest about non-use values because, in the case of use values, there is normally 'hard' evidence in the form of visits etc., which indicates the attractiveness of a site and which can be used as proxies for willingness to pay or as input into travel cost models. However, a second strand of disquiet relates to the extent to which the methods of cost benefit analysis focus on abstract £ values, rather than tracking what would appear in some cases to be important indirect impacts in the local economy.

As a result of this disquiet, three rather different strands have emerged, all of which offer potentially fruitful avenues along which to pursue more broad-based socio-economic valuation of impacts. These comprise regional economic analysis, Sustainable Rural Livelihoods approach and the Criteria and Indicators approach.

2.3. Regional economic analysis

In the last decade a number of regional impact studies have been conducted of forestry. Most studies have looked at relatively large areas (e.g., Scotland as a whole) (Thomson and Psaltopoulos, 1994; Eiser and Roberts, 2002) rather than sub-regions, though the recent UFIRD study (Slee et al., 2003) looked at much smaller areas (e.g., Breckland). These studies track the impact of injections of money into local economies and explore the extent of linkage and leakage. Because of complexities in calculation, simplified versions of the local multiplier approach have

been developed. The New Economics Foundation (NEF, 2002) has developed a simplified multiplier model—the LM3 (or local multiplier 3), which looks at the impact of the first three transactions in the market place arising from an injection into a local economy. Its simplification is intended to make these normally esoteric approaches intelligible to local communities to enable them to engage in the evaluative processes to a greater extent. Given the considerable data demands of multi-sectoral local multiplier studies, the LM3 approach has considerable appeal for offering insights into local linkages, but avoiding complex modelling demands. Similarly, Midmore and Dirks (2000) have advocated a ‘rapid rural multiplier’ approach in a comparison of organic vs. conventional farming.

Typically, such studies only examine the inter-firm connections (purchases of fencing materials; payments to felling contractors etc.) and the impact of wages received on local firms (increased spending in local shops etc.). Dickie and Rayment (2001) make the point that it is important to consider all the economic outputs of woodland, including game and other Non-timber Forest Products (NTFPs), such as mushrooms and berries (see also Saastamoinen, 1996). In less commercially oriented forests and woodland, the value of non-timber forest products can be considerable. However, some of these products do not enter the formal market economy, but still nonetheless contribute to household well-being. This suggests a need to estimate values of these products to beneficiary households.

Regional (or sub-regional) impact studies do not consider the aggregate output of the whole economy. They focus explicitly on effects within a bounded area (e.g., Environment Prospectus Group, 1998). Inevitably, there is likely to be a degree of displacement of economic activity from somewhere else. For example, new visitor attractions in country parks in the Greater Glasgow peri-urban area might displace day visitor expenditures in the Trossachs (a day visitor destination with high forest cover about 50 km away). Equally, individuals of high net worth living in tree-rich areas such as Deeside in Aberdeen’s urban fringe, represent a potential loss of economic activity in Buchan, a less attractive part of Aberdeen’s hinterland to the north.

Although displacement of economic activity may bring no aggregate gain in economic output at

national level, it may be deemed desirable to transfer economic activity from affluent areas to poorer areas, inter alia to address social inclusion. In some instances, environmental quality might lead to the opposite effect, through adverse impacts on social inclusion caused, for example, by property price rises in areas of high environmental quality.

2.4. Sustainable livelihoods

The Sustainable Rural Livelihoods (SRL) Framework has become the principal means through which the UK’s Department of International Development (DFID) addresses interventions in beneficiary countries. It is based on a largely qualitative approach that identifies the vulnerability of different groups to shocks and stresses through an analysis of their capital assets. Five types of capital assets are considered including social capital, environmental capital, human capital, physical capital and financial capital. The livelihood strategies of different groups are constrained by the transforming structures and processes—the framework of laws and market forces that frame an individual or group’s room for manoeuvre. Livelihood-enhancing strategies are sought to enhance capital assets, which then feed into improved livelihoods. Its classic developing country format is illustrated in Fig. 1.

Most examples of livelihoods-based analysis can be found in developing countries, although the strong participatory components of the approach resonate closely with much contemporary thinking about forest management in developed countries. It has been advocated as a potential means of evaluating project impacts in EU projects and is being implemented as an evaluative tool in an on-going EU Concerted Action ‘TRUC’—(Transforming Rural Communication). The holistic nature of livelihoods analysis has led to such attempts to use it in developed countries. Further, in many new member states of the EU, pre-accession support to these countries from DFID was necessarily framed in terms of livelihoods analysis.

2.5. Criteria and indicators approaches

The proximate origins of criteria and indicators approaches lie in the Rio UNCED meeting of 1992,

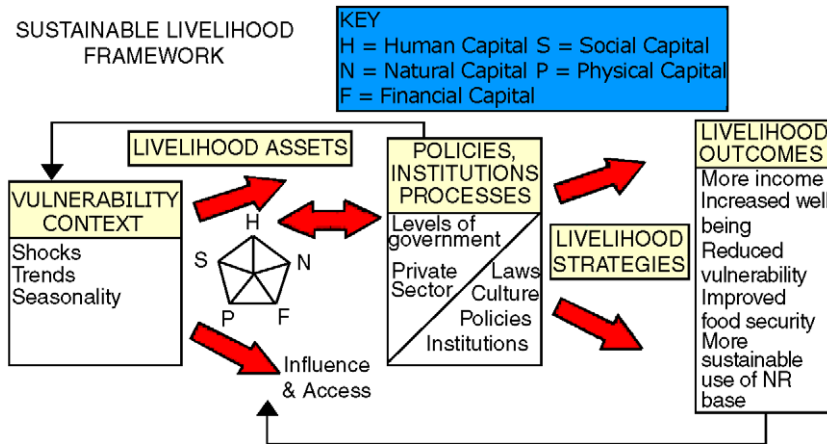


Fig. 1. Sustainable livelihoods framework, Source: http://www.livelihoods.org/info/guidance_sheets_rtf/Sect1.rtf.

although in the field of nature conservation in the UK, criteria-based approaches have long been used to identify and list important sites (Goldsmith, 1983). The particular contribution of the Rio approach is that it explicitly connects environmental and socio-economic dimensions. However, this is not achieved by shoe-horning ‘natural’ values into an economic framework, but by identifying a set of indicators by which a range of criteria can be assessed. These criteria and indicator approaches have been articulated in European forestry through the pan-European (Helsinki) process and adopted in UK forestry circles. In their discussion paper, the Forestry Commission (2001) suggest two socio-economic groupings of indicators—‘People and Forests’, which relates to both recreation activities and workforce issues and ‘Economic’, which includes a range of economic variables.

Indicators approaches are widely used at national (and sub-national level) with respect to forestry strategies and can be developed down to sub-regional scale. The national-level indicators for sustainable forest management were the subject of considerable consultation and similar forms of participatory engagement with stakeholders can be identified in a US project-level example. The Foundation for Sustainable Development (<http://www.bcsdgm.org/pdf/indicators-sustainable-forestry.pdf>) ran a two-year project in the Lower Mississippi Alluvial Valley in which indicators were developed through the use of participatory techniques. The participation was explicitly seen as a tool for stakeholder engagement and co-operation.

Indicator approaches have been used in EU-funded LIFE projects. The final report of the Duthchas project, an EU LIFE project which took place in the North West of Scotland (Duthchas Project, 2001) notes that the lack of availability of a range of expert tools, including sustainability indicators, caused local frustration and delay. In this project, which sought to valorise the environment and nurture sustainable development in a remote part of the UK, sustainability indicators were seen as essential elements of the evaluative process.

2.6. Linking sustainable livelihoods with criteria and indicators approaches

In the normal manifestation of the Sustainable Rural Livelihoods (SRL) framework in the DFID approach, the holistic SRL framework is the starting point for a diagnosis of a problem, which is then addressed by the targeted intervention of the project (Carney, 1998). DFID then evaluates projects, both ex ante and ex post using the ‘Log-frame’ or Logical Framework approach. This approach was first developed by US aid agencies and has subsequently been refined and adapted by a range of state and NGO aid agencies. The Log-frame approach identifies the overall aim and purpose of the project and then seeks to break down the project interventions into a series of actions and outputs that can be assessed by means of a pre-identified set of Objective Verifiable Indicators (OVIs) (see Table 1). Given that interventions are

Table 1
The logical framework approach

Project structure	Objective verifiable indicators	Means of verification	Important assumptions/risks
Goal: the higher order objective to which the project contributes	Measures to verify the achievement of the goal	Sources of data needed to verify goal level indicators	Important external factors necessary for sustaining the objectives in the long run
Purpose: the effect or impact of the project	Measures to verify the achievement of the purpose	Sources of data needed to verify the status of purpose level indicators	Important external factors necessary for achieving the goal
Outputs: the deliverables of the project (its terms of reference)	Measures to verify the achievement of the outputs in terms of quality, quantity and time	Sources of data needed to verify output level indicators	Important external factors necessary for achieving the purpose
Activities: the main activities that must undertaken to accomplish outputs	Inputs: the type of inputs required and their expected cost	Sources of data needed to verify the status of the activity level indicators	Important external factors necessary for achieving the outputs

Source <http://www.ex.ac/GCRMN%20Logframe%training.pdf>.

based on attempts to address particular problems, there is remarkable similarity with this and the Criteria and Indicators approach embodied in the Rio and pan-European processes. It is noteworthy that the pan-European process, especially after the Lisbon meeting, has increasingly recognised the importance of criteria relating to rural development as a core component of criteria to assess sustainable forest management.

2.7. Social analysis

More social forms of analysis of project impacts are rooted in qualitative approaches. A range of techniques may be used from focus groups to in-depth interviews, to reveal the range of meanings and values ascribed to the object of attention. The anthropological/sociological methods normally used in focus groups do not immediately allow quantification. Indeed, they are rooted in a different epistemological base, which searches for diverse meanings and competing discourses relating to real world phenomena rather than quantifiable social facts.

This discourse-based phenomenological approach is used as part of a two-stage analysis by the EU-funded MULTIFOR project (Elands and Wiersum, 2003). The theory of social representations on which it is based asserts that it is necessary to clarify 'how people understand, explain and articulate the complexity of stimuli and experiences emanating from the physical environment in which they are immersed' (Elands and Wiersum, 2003, p 23). Representations of the world are bundled together in discourses.

Elands and Wiersum ask three sets of questions of respondents:

- What meanings and values do actors attribute to forests?
- What meanings and values do actors attribute to the rural area in which they live?
- How are forests and forestry experienced in the area? How did forests develop and how do people perceive that they will develop in the future?

Building on their discourse-based analysis, Elands and Wiersum (2003) use criteria derived from the discourse analysis to derive indicators in four groups:

- community benefits
- economic welfare
- landscape identity
- environment and nature quality.

In a second stage of quantitative analysis, using a standard questionnaire-based approach, Elands and Wiersum (2003) explore the attitudes of local populations to forestry and the use made of forests and woodlands.

Elsewhere, Elands and O'Leary (2002) argue that the principal contribution of forestry in rural Europe is not as a production asset. They conclude that 'forests are perceived mostly within the perspective of nature and landscape quality and less as an economic activity' p43. However, Slee et al. (1996) found remote rural communities still committed to a largely

productivist agenda, since it was this that was seen to generate a greater number of jobs than the environmental alternative.¹

Social analysis also explicitly seeks to establish the views of different stakeholders. In the Regional Forest Agreement process which was developed under Commonwealth (federal) law in Australia to seek an appropriate balance between conservation and production interests, a range of social assessment approaches were undertaken so as to enable a ‘triangulatory’ approach to reveal forest values (see Slee 2001). Workshops were held to which a range of forest stakeholders were invited, in order to balance conflicting demands on the resource, and funds made available to forest contractors who lost out in a forest Industry Adjustment Package.

These various approaches suggest that narrow economic perspectives may not be adequate to appraise the impacts of forests on economy and society. Instead it may be necessary to adopt a multi-dimensional approach embracing elements of cost–benefit, regional impact and social analyses, which closely parallel a more quantitative form of livelihoods analysis.

3. The UFIRD approach

3.1. Methods

The Understanding Forestry in Rural Development Project was funded by the Forestry Commission in 2002–3 to enable more light to be thrown on the regional or sub-regional impacts of forestry on rural development. The study team included economists and geographers. The aim was to develop a set of methods that would be able to assess the full range of social and economic contributions of forestry to rural development.

Four main types of impact or contribution were identified:

- The impact of forestry activity, including forest-related work and the upstream and downstream connections of forestry on employment and income;

- The indirect impact of forestry (also described as the shadow or halo effect) on surrounding economic activity, for example through the encouragement of households or firms to move into the area, or through increased turnover of recreational and tourism businesses attributable to the forestry and woodland;
- The non-market values of forests and woodland, which although not generating immediate regional income, do create a contribution to national green accounts; and
- The social values attributable to forests and woodlands, which range from their contribution to symbolic capital and community identity to their contribution to social capital building.

These four elements required the adoption of a mixed methods approach (see Fig. 2). The first two stages use conventional regional economic analysis methods (for a more detailed presentation of the methods used, see the full report (Slee et al., 2003)). The first element comprises classical forest industry regional multiplier techniques, based on estimating linkages with other firms arising from purchases and sales and the impact of income and wages received on regional income and employment. For this it was necessary to question forest owners and connected firms on their employment levels and input sourcing.

The second stage involves the estimation of what we termed the shadow effect. The term ‘shadow’ is used as a metaphor for the shadow cast by trees on surrounding economic actors. This shadow can impact on firms, especially recreational and tourism firms ‘parasitising’ the forest, but might also include firms that are locationally footloose but have a preference for operating in a tree-rich environment. There is also a possibility that firms might choose to locate in tree-rich areas because development control (the state regulation of development rights) may be less strict where intrusive developments can be hidden by trees.

The third stage comprises conventional non-market benefit (or cost) estimation. There is now a formidable toolkit of techniques that have been used to estimate the non-market benefits and costs associated with forestry (Stewart Roper and Park 1999). In the UFIRD study, rather than using new surveys to elicit values, a benefit transfer approach was adopted, based on previous work undertaken for the Forestry Commission. No attempt was made to try to value land-

¹ Recent evidence from the north of Scotland might appear to contradict this assertion, which may be grounded more in historic levels of afforestation than in contemporary reality.

Type of Value	Proposed Methods		Outcome
	Stage 1	Stage 2	
Task 1 Forest values <ul style="list-style-type: none"> Planting and maintenance, Harvesting Amenity forest management 	Surveys with forest managers and other forestry-related local businesses	Keynesian local income and employment multipliers	Understanding Forestry's contribution to rural development
Task 2a Shadow values from forest-related tourism and recreation <ul style="list-style-type: none"> Day visits Overnight visits 	Surveys with tourism specialists	As above	
	Estimation of level and pattern of forest-related tourism expenditures		
Task 2b Shadow values attributed to households influence of forests on location decisions <ul style="list-style-type: none"> Households Business 	Analysis of findings from focus groups and follow-up interviews	As above	
	Estimation of proportion of household and business expenditures attributable to the presence of forest and woodland in the locality		
Task 3 Non-Market Values <ul style="list-style-type: none"> Carbon sequestration Biodiversity Air Quality Recreation 	Collect information on characteristics of woodland(s) (eg locational characteristics, species types, age etc)	Benefit Transfer methods	
Task 4 Social Values <ul style="list-style-type: none"> Historic Cultural Symbolic 	Collect information through focus group & follow-up interviews with local households	Interpretive methods	

Fig. 2. Methods used in the UFIRD study to estimate forestry's contribution to rural development.

scape values or non-use biodiversity benefits, which are often separated out from informal recreational values, on the basis that there is a danger of double counting recreation and landscape benefits. Two types of non-market benefit were estimated:

- informal recreation benefits
- carbon sink benefits.

The fourth stage comprised the social evaluation. Two principal techniques were used. First, focus groups were held in a number of communities to establish the extent to which forests and woodland

impacted on neighbouring communities, including their capacity to provide recreational opportunity, their symbolic role in community identity and the relationship between the community and forest-related institutions. In addition, households were given a reply-paid questionnaire, which sought responses to the impact of forest and woodland.

4. Results

In two case study areas, both in southern England, the overall impact of forests was found to derive

principally from the ‘shadow’ or ‘halo’ effect (see Tables 2a and 2b).

Mid-Bedfordshire comprises a local authority district about 80 km north of London. Our study area was about 50% of the district, including three principal landscape types. First, there was an area of tree-rich countryside comprising a hilly ridge of sandstone. Second, there was an area of clay vale, deeply dissected by quarries and subsequent landfill sites and now the setting for one of the UK’s community forests (Marston Vale Community Forest). Third, there was an area of boulder clay with relatively intensive farming and some pockets of ancient semi-natural woodland with occasional new farm woodland plantings. The study area includes the extensive private sector (but largely open access) estate woodlands surrounding Woburn Abbey, a large stately home and major visitor attraction. The area is well within commuting distance of London and a number of regional centres such as Milton Keynes, a new city and Bedford.

The second study area, Breckland, is a roughly circular area of about 900 km² at the western border of the counties of Norfolk and Suffolk where they abut Cambridgeshire. It comprises a dissected glacial outwash area of low-fertility, sandy soils, which was extensively afforested after 1920. There are some residual areas of high biodiversity heathland, which provide a habitat for rare birds. The countryside surrounding Breckland is one of the most intensively farmed areas in the UK. The largely state-owned plantation forests of Breckland provide an important resource for informal recreation and the Forestry Commission has developed a major visitor centre in the forest. One of the largest holiday villages in the UK ‘Center Parcs’, is also found within the area, as are many other recreational and tourist businesses,

Table 2a
Income and non-market values Mid-Bedfordshire

Mid-Bedfordshire	£ million income and non-market values
Total income effect from forestry	0.636
Total income effect from forest dependent tourism	3.043
Total income effect from residential shadow	8.33–24.99
Non-market values	
—informal recreation	1.4–2.6
—carbon sink	0.035–0.114

Table 2b
Income and non-market values Breckland

Breckland	£ million income and non-market values
Total income effect from forestry	3.315
Total income effect from forest dependent tourism	20.45
Total income effect from residential shadow	6.1–18.3
Non-market values	
—informal recreation	1.04–1.87
—carbon sink	0.537–1.608

which make extensive use of the opportunities afforded by the forest in their promotional literature.

In both case study areas, focus groups were held and a household survey was undertaken to establish the social significance of woodland and forestry to the local communities. Both approaches yielded strong evidence of local populations, which were often closely attached to woodland, principally for amenity space rather than as an economic sector providing jobs and regional income. Often, forest and woodland was seen to give places a particular character and a sense of identity.

The household survey sought to establish whether forest and woodlands impacted negatively on households, for example through shading, predation on gardens by forest animals, falling branches etc. The overwhelming response from respondents was that forest and woodland contributed positively and significantly to their well-being and for many people this had a discernible impact on their residential choices.

A further finding of significance is that local communities sometimes resented top-down initiatives and the creation of new bodies to promote forestry (in this case, the local community forest in one of the study areas) because they impacted adversely on vernacular use (opening up and promoting forests to a wider constituency) and replaced local organisations which had often adopted publicly owned local woodlands and had taken responsibility for their management, at least with respect to conservation and access, with more distant and less local institutions.

5. Discussion

The results show the overwhelming importance of the shadow or halo effect as an economic impact

arising from forestry activity in two UK cases. This was a major surprise to the study team. However, in the Bedfordshire study the residential shadow or halo was the greater, whilst in the Breckland case the tourism shadow was greater. Very little was found by way of shadow effects for businesses that were not connected to tourism or recreation, although the existence of a relatively high residential shadow implies that, where people work from home, there may be a difficulty in ascribing forest-related benefits to either living space or business.

These two study areas were both in lowland Britain in areas that were visually compromised, by intensive agriculture in one case and extensive mineral working and urban development in the other. It might be argued that tree-rich areas within these regions are likely to be relatively attractive and pull in commuters, tourists and recreationists from a substantial distance. Effectively, the forest is a major contributor to the 'green infrastructure' or 'countryside capital' in which other economic activities could take place, whether in the form of tourism and recreation firms located near to the forest or households attracted to tree-rich areas as living space.

It might also be argued that such benefit levels can only be found in relatively densely populated areas and that high levels of shadow benefits are a function of the choice of study area. However, a recent less sophisticated in-house study by the Forestry Commission attempted to establish spending patterns surrounding a significant investment in mountain bike trails in North Wales at Coed y Brenin. Here an estimated £4 to £5 million is injected annually into the local economy, into campsites, bed and breakfast establishments, restaurants etc. Very little of this accrues as income to the forest owner (except for modest income from let premises), but there are clearly very significant benefits to the sub-regional economy.

Dubé (2004) cites the example of the high level of benefits from recreational services arising in a forest near Madrid, noting that these benefits are not paid for by the forest user. In this paper, we provide convincing evidence that there are substantial benefits arising to regional economies from forest recreation (and in our case tourist) provision and that, if there is a desire to better understand the regional economic impacts of forestry, these shadow or halo effects need to formally be estimated.

Halo effect benefits can arise from natural features or from managed landscapes. Other examples of strong halo effects include those arising from multifunctional agriculture, for example by producing flower-rich meadows in Alpine areas, or rich attractive landscape mosaics, typically in areas of low-intensity agriculture, where a complex landscape of traditional buildings, traditional field boundaries and mixed farming offers a significant tourism resource. Interestingly, as in forestry, more intensive productive land use activity may compromise the multifunctional benefits and the halo effects.

Multi-functional forestry in the UK has, to a considerable extent, become a post-productivist provider of green infrastructure, which is enormously important in economic terms, even though the returns to conventional forestry-based activity are relatively unimportant. To endeavour to estimate the economic contribution of forestry to regional or sub-regional economic development without taking into account the shadow or halo effect of forests is likely to generate highly misleading information about the economic contribution of forests and woodland to forestry policy decision makers and regional development agencies.

The mixed methods approach adopted by the study team proved very useful. At one level, the social dimensions can be seen to offer potential corroborative evidence about the significance or insignificance of forests and woodlands from an economic perspective, but they also throw light on cultural and social values that are embedded in local communities and inform the way people use woodland and the ways in which woodland impacts on peoples lives in many different ways.

These observations raise important questions about the indirect contribution of forest owners to wider economic development for which they are unrewarded or under-rewarded. Economic theory would suggest that in the absence of public sector intervention, under-provision of forests and woodland (or at least the non-market benefits thereof) is likely to ensue. In practice, the high level of state ownership of forests in one study area and the existence of two largely publicly funded charitable trusts in the other provide the means to manage the resource as green infrastructure. Mantau et al. (2001) have shown how, given appropriate property rights, it may be possible

to internalise some of the externalities and produce ‘RES’ goods (recreational and environmental services), but here may be even greater benefits arising at sub-regional level that arise through spill-over effects than can be captured by proprietorial provision of RES goods.

There is a need to consider whether any new mechanisms could ensure that the mix of multi-purpose forestry best meets wider societal aspirations from an economic perspective. From the social analysis, it was found that different areas of woodland have very different social values and that there are high social/non-market value premia for advantageously located woodland for informal recreational use. However, this woodland is not always managed with the interests of local beneficiaries at heart. It is not impossible to conceive of a hypothecated local tax on beneficiary households as a means of ensuring the appropriate management of the forest resource, which also rewards and incentivises the resource owner. Such an approach may assist in bringing neighbouring community and forest owner closer together though a formalised land management contract.

These results should not disguise the fact that forestry is often an unprofitable activity in the UK from the private or state owners perspective. Non-market benefit estimation is a dangerous premise on which to construct a forest and woodland sector as an economic entity. However, where non-wood-related sub-regional economic activity is unambiguously attributable to trees, woodland and forest, we should recognise it as what it is: a potentially valid reason for sustaining a forest and woodland resource and, more importantly, a reason for managing that resource in such a way as to enhance rather than reduce the sub-regional spillover effects. Such findings make a case for a more nuanced forest policy, which accommodates local diversity and recognises these complex and variable halo effects.

It is useful to reflect on how evaluative tools tend to compromise understanding. If externalities are simply dismissed as elements that can be converted into abstract £ signs through non-market values and be set alongside the financial outputs of forests, there will be a failure to pick up the profound local spill-over effects that may have become, in practice, a principal justification of the post-industrial forest.

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References

- Buttoud, G., 1999. How can policy take into consideration the ‘full value’ of forests? EFI Annual Conference, Chartreuse Ittingen.
- Carney, D. (Ed.), 1998. Sustainable Rural Livelihoods: What Contribution Can We Make? DFID, London.
- CJC Consulting, et al., 2003. Economic Analysis of Forestry Policy in England, Final Report for DEFRA and the Treasury.
- Dickie, I., Rayment, M., 2001. Assessing the Economic Benefits of Forestry in the UK, Presented to the Forestry Commission’s Advisory Panel, Environment Sub-committee.
- Dubé, Y., 2004. Assessing cross-sectoral linkages in forestry: status and current effort. Proceedings of a Conference on the Evaluation of Forest Policies and Programmes, Epinal France June–July 2004.
- Duthchas Project, 2001. Area Sustainability Strategies for Peripheral Rural Areas, January 1998–April 2001, Duthchas—the Final Report. The Duthchas Project, Inverness.
- Eiser, D., Roberts, D., 2002. The employment and output effects of changing patterns of afforestation in Scotland. *Journal of Agricultural Economics* 53 (1), 65–81.
- Elands, B., O’Leary, T., 2002. The myth of forests: a reflection on the variety of rural identities in Europe and the role of forest in it. In: Wiersum, F., Elands, B. (Eds.), *The Changing Role of Forestry in Europe: Perspectives for Rural Development*. WUR, Wageningen.
- Elands, B., Wiersum, F., 2003. *Forestry and Rural Development in Europe*. Wageningen UR, Wageningen.
- English Nature, 2002. *Revealing the Value of Nature*. English Nature, Peterborough.
- Environment Prospectus Group, 1998. *An Environmental Prospectus for South-West England*, Environmental Prospectus Group, Exeter.
- Food and Agriculture Organisation, 2003. *Cross-Sectoral Policy Impacts Between Forestry and Other Sectors*. Forestry Paper, vol. 142. FAO, Rome.
- Forestry Commission, 1999. *Scottish Forestry Strategy*. Forestry Commission and Scottish Executive, Edinburgh.
- Forestry Commission, Economics and Statistics Unit, 2001. *Consultation: UK Indicators of Sustainable Forestry*. Edinburgh Forestry Commission.
- Goldsmith, F., 1983. *Evaluating Nature*, Ch 14 of *Warren A and Goldsmith F Conservation in Perspective*. Wiley, London.
- HM Treasury, 1972. *Forestry in Great Britain: An Interdepartmental Cost/Benefit Study*. HMSO, London.
- HM Treasury, 2003. *The Green Book: Appraisal and Evaluation in Central Government*. TSO, London.

- http://www.bcsdgm.org/pdf/indicators-sustainable_forestry.pdf. Report on the sustainable forestry indicators project, Foundation for Sustainable Development, August 2000.
- http://www.livelihoods.org/info/guidance_sheets_rtf/Sect1.rtf. Introduction to the Sustainable Livelihoods Approach.
- Land Use Study Group, 1966. Report of the Land Use Advisory Committee. HMSO, London.
- Macmillan, D., 1993. Commercial forests in Scotland: an economic appraisal of replanting. *Journal of Agricultural Economics* 44, 51–66.
- Macmillan, D., et al., 2002. Valuing the non-market benefits of wild goose conservation: a comparison of interview and group-based approaches. *Ecological Economics* 43 (1), 49–59.
- Mantau, U., et al., 2001. Recreational and Environmental Markets for Forest Enterprises. CABI, Wallingford.
- Merlo, M., Kuehl, G., Ruol, G., 1996. Possibilities of additional income from environmental goods and services produced by agriculture and forestry in mountainous areas. In: Gluck, P., Weiss, G. (Eds.), *Forestry in the Context of Rural Development: Future Research Needs*, EFI Proceedings, vol. 15. EFI, Joensuu, pp. 73–93.
- Midmore, P., Dirks, J., 2002. The development and use of rapid assessment methods in ex-ante and ex-post evaluations of policy initiatives in the rural economy. Paper Presented to the Agricultural Economics Society Annual Conference.
- National Audit Office, 1986. Review of the Forestry Commission's Objectives and Achievement, Report by the Comptroller and Auditor General. HMSO, London.
- New Economics Foundation, 2002. *The Money Trail: Measuring Your Impact on the Local Economy Using LM3*. NEF, London.
- OECD, 1999. *Cultivating Rural Amenities: an Economic Development Perspective*. OECD, Paris.
- Saastamoinen, O., 1996. A framework for assessing the total value of forests in Finland. *Scandinavian Forest Economics* 36, 395–405.
- Scottish Executive, 2002. *Delivering the Scottish Forestry Strategy*. Scottish Executive, Edinburgh.
- Scottish Parliament, 2003. *Nature Conservation (Scotland) Bill*. Scottish Executive, Edinburgh.
- Slee, B., 2001. Resolving production-environment conflicts: the case of the Regional Forest Agreement process in Australia. *Forest Policy and Economics* 3, 17–30.
- Slee, W., Clark, J., Snowdon, P., 1996. *The Scope for Community Participation in Forest Management*. Scottish Office and Forestry Commission, Edinburgh.
- Slee, W., Evans, R., Roberts, D., 2003. *Understanding Forestry in Rural Development*, Report to the Forestry Commission.
- Stewart Roper, C., Park, A. (Eds.), 1999. *The Living Forest: Non-Market Benefits in Forestry*. The Stationery Office, London.
- Solberg, B., 1996. What kind of research is needed for rural development in the context of forestry? In: Gluck, P., Weiss, G. (Eds.), *Forestry in the Context of Rural Development: Future Research Needs*, EFI Proceedings, vol. 15. EFI, Joensuu, pp. 17–25.
- Thomson, K., Psaltopoulos, D., 1994. The regional economic impact of afforestation strategies. Paper Presented at Agricultural Economics Society, Exeter.
- Willis, K., et al., 2003. *The Social and Economic Benefits of Forests in Great Britain*. CREAM, Newcastle.
- Willis, K., Garrod, G., 1992. Amenity value of forests in Great Britain and its impact on the internal rate of return from forestry. *Forestry* 65, 331–346.
- Wilson, A., Whiteman, A., 1994. *Community Forests Project: Resource Cost-Benefit Analysis, Mersey Red Rose and South Yorkshire Forests*. FC Economics Branch, Edinburgh.
- Zuckerman Commission (Natural Resources (Technical) Committee), 1957. *Forestry, agriculture and marginal land*, HMSO, London.