

Forestry in the rural economy: a new approach to assessing the impact of forestry on rural development

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Summary

Forestry contributes to the rural economy in a number of ways: directly as a user of land and resources to transform biological and other inputs into a range of outputs; indirectly through its linkages with upstream suppliers and downstream processing sectors; through the re-spending in rural areas of parts of income derived from forestry and its related industries; through the provision of non-market benefits; and in more opaque, though nonetheless important ways, in providing a desirable location for non-forestry-related business activity and a living environment which many people find attractive. The full range of these economic benefits can be more or less easily enumerated and are likely to vary very substantially from one region to another. In some areas, the forest production sector may be the greater contributor to rural economic well-being; in others the local forest-dependent spending associated with firms and households living in a tree-rich environment might contribute more to local economies than the benefits arising from production forestry. This points to the need for a strong degree of regional, and perhaps more local, differentiation in forest policy and practice, based on a sound knowledge of the relative contributions of different benefit streams (and costs) in particular locations and of the potential trade-offs between production and amenity. This paper presents a new approach to estimating the impact of forestry on rural development and applies this to a case-study area in England.

Introduction

Forestry contributes to the rural economy in many ways. The widespread acknowledgement of the multi-purpose nature of contemporary forestry throws up a challenge to economists (and other

social scientists) to measure the multiple contributions of forests and forestry to economic well-being in rural areas. In this paper, we use past experience and ongoing work to illustrate two points: (1) that the methodological tool-kit that economists have used in the past is incomplete

and that we need to move forward with more refined techniques; (2) following from this, in considering the present and future role of forests and woodland, there is a need to move away from blanket aspatial prescriptions and pay much more attention to the spatial aspects of the local economy and, more generally, local context.

The assessment of the economic case for forestry raises considerable challenges. Dickie and Rayment (2001) note the wide-ranging contributory components to the economic values of trees within a standard appraisal framework derived from Pearce (1991). They argue that 'a particular woodland or forestry system cannot be labelled as 'uneconomic' on the basis of returns from timber alone' and that two elements of value are important: the economic values of forestry, including the non-market values; and the impact on local economies. In 2003, a major review of the economics of forest policy in England was published (CJC Consulting, 2003) which concludes that 'the case for measures to encourage rural forestry has to be made in terms of procuring valued public goods, with any contribution to the local economy seen as a desirable spin off'. In general, the case for forestry as a significant contributor to rural development is seen to be weak, with urban and peri-urban forestry being commended as a better use of public money. However, no methods were used or even indicated in this report, which might be used to measure the local economy spin-offs. This paper proposes such a method and applies it to a case-study area in England, mid-Bedfordshire. First, however, it reviews existing understanding of the contribution forestry makes to rural economic development.

Forestry's contribution to the rural economy

Any overview of the rural economy in recent years points to the declining role of traditional land-using activities and the emergence of a more broad-based range of economic activities in rural areas. This is an inevitable response to market forces, where low profitability and restructuring have combined to reduce numbers in employment in the primary sector and given rise to new industries, sometimes dependent on a rural

setting like tourism, and sometimes more foot-loose, but still choosing to locate in rural areas. This market-driven process has also often been aided by policy measures that have actively nurtured rural economic diversification.

Some geographers and regional economists have alluded to a transition from productivism to post-productivism as a central feature of rural restructuring in the late twentieth century, although the terms are often not defined with great clarity (for a discussion in relation to forestry, see Mather, 2001). Because of this lack of clarity, the terms have also been criticized by other geographers and social scientists for misrepresenting the situation (especially in relation to the farm sector) (Evans *et al.*, 2002). The argument is that there has been a shift from a production-oriented way of looking at resources to a more consumption-based focus, although whether such changes constitute post-productivism or modified productivism is open to debate.

Similar processes of change are taking place throughout the world, although the extent to which countries and regions remain attached to a more production-oriented model of primary land use varies dramatically. In Nordic countries, there is still a strong orientation towards a production-based rural economy. In their study of forestry and regional development, Hytinen *et al.* (2002) acknowledge only production and conservation functions, but not the multiple amenity functions of forests. In contrast, in a more central European setting, Mantau *et al.* (2002) have shown clearly how the recreational and environmental services of forests can be commoditized and turned into market goods, although the capacity to do this is intimately connected to institutional structures and systems of property rights. Wiersum and Elands (2002) make explicit reference to the spatial variability of perceptions and attitudes to forests, which it might be anticipated would be reflected in economic and wider values derived from forests.

There are thus divergent views about the contribution of forestry to rural development in western countries. However, none of the studies referred to above offer a methodology to deliver a comprehensive appraisal of the contributions of forestry to rural economic development. In part, this is a function of contested conceptions of

rural development; in part, it reflects the partial nature of the studies.

Multifunctionality has increasingly been articulated as a justification for supporting agriculture (European Commission, 1998). It has also been recognized as being synonymous with multi-purpose forestry (OECD (Organisation for Economic Co-operation & Development), 2001). As multifunctionality has now been widely accepted by both forestry and policy professionals, so there is a need to reassess the multifunctional outputs of the sector if the aim is to appraise the overall contribution of forestry to the rural economy. The OECD study (2001) offers a theoretical perspective on multifunctionality, but does not consider the question of local economy benefits. A number of types of economic investigation can be identified, which are more or less capable of offering comprehensive coverage.

- 1 Financial appraisals of forestry are based on standard investment appraisal techniques. In their basic form, they reveal the return to forest investment, taking into account the frequently long time period lapsing between initiating forest activity and obtaining returns from trees. It is possible to adjust standard investment appraisal models to take account of non-market values, which represents a movement away from conventional investment appraisal towards a cost-benefit analysis approach. A partial cost-benefit approach can be found in work carried out by Willis and Garrod (1992) for the UK as a whole, and Slee and Snowdon (1999) in relation to forestry in Scotland.
- 2 Impact or multiplier studies focus on the ways in which core forestry activities connect with other aspects of the national or regional economy. Investigations reveal the wider network of economic effects arising from forestry, based on the transactions arising between firms and from incomes arising from forest-related activity. This type of investigation was carried out throughout the UK in the late 1990s and provides a platform of evidence relating to the wood supply chain (Public and Corporate Economic Consultants, 2000; Munday and Roberts, 2001; Eiser and Roberts, 2002).
- 3 Non-market benefits and costs of forestry arise because of market failure and have been the subject of extensive investigation (Stewart Roper and Park, 1999). The concept of market failure is founded on the neoclassical economic notion of efficient resource allocation. Market failure arises when certain assumptions are not met, through the presence of imperfect competition or through the presence of external effects. For a variety of reasons (large firm size of processors and quasi monopolies) the scope for imperfect competition in the forest sector is considerable, although there are few investigations of welfare losses arising from imperfect competition in forestry. The major interest with regard to market failure in forestry has been with external effects. A range of external effects has been identified in relation to forestry, including informal recreational benefits, biodiversity benefits, landscape benefits, carbon storage benefits, scenic effects and effects on water supplies. A great deal of investigative work in forestry has endeavoured to enumerate these effects and it has been an area of major development in research techniques (e.g. Willis and Benson, 1989; Willis, 1991; Brainard *et al.*, 1999). The CJC Consulting report provides a summary of recent work in this field (CJC Consulting, 2003).

Out of the recent work on forestry and rural development, three new strands have emerged.

- 1 Mantau *et al.* (2002) offer conclusive evidence that it is possible, under certain circumstances, to internalize the externalities associated with forestry, e.g. by charging for recreational events or bottling water from forest springs. This 'cultivation of rural amenities' (OECD, 1999) suggests that the degree of market failure may not be quite as great as has sometimes been implied in the past. The markets may be direct, such as in buying a bottle of spring water or the right to ride in a forest, or they may be indirect, when someone is willing to pay for a car park in order to go walking in a forest where there is freedom to roam. Elsewhere, this latter process has been described as secondary marketization (Slee, 1994).
- 2 Where policy is premised on market failure, new markets may be established by means of

policy mechanisms, e.g. through carbon credit trading. Until the market is created, the carbon storage effects of trees cannot be realized by the forest owner, though there are still benefits arising to society as a whole. Subsequent to the creation of that market, the forest owner is able to derive financial benefits and this will then generate knock-on benefits in rural areas.

- 3 Forests may generate social values or be connected with people's lives in various ways that contribute to social well-being. Quite where the boundary is between social values and economic values is not clear. Recently, some economists have begun to look again at an individualistic economic ethos based on a narrowly defined conception of wealth and have found that happiness comes from a number of sources, and is associated with work, families, communities, mental health and personal and political freedom (Layard, 2003) and rather less with personal wealth than has often been assumed. Forestry can be seen as one potential mechanism for building social capital as, for example, in the case of Abriachan, near Inverness, where the community bought its forest from the Forestry Commission. On the foundations of mutual trust and understanding, which have been identified by Layard (2003) as important contributors to happiness and a sense of well-being, it is highly probable that other types of social, community and economic development may arise through forest-related activities.

Methods

Within this context, the comprehensive appraisal of forestry's impacts on the rural economy requires rather more conceptualization and more data collection than has been thought necessary hitherto. The Understanding Forestry in Rural Development (UFIRD) research project on which this paper is based has endeavoured to take precisely such a broader view of forestry's impacts than has hitherto been considered. The factors outlined above formed the basis of the thinking behind the project.

The basis of UFIRD has been to recognize the breadth of contributions of forestry to the rural economy and eschew the desire to try to reduce

all the benefits to a single monetary value. Previous work on forestry has tended to reduce its economic contribution to either forest-related market outputs or the estimation of non-market values. Instead, the UFIRD project recognizes that a number of types of non-additive values may be of interest to practitioners and policy makers.

Four main groups of values are identified in the study:

- 1 Forestry values derive from forest-related activity by forest managers and the upstream and downstream connections with other parts of the economy arising from such forestry activity. The key economic contributions arise from employment and output contributions in the rural and wider economy. These can be direct, indirect or induced. Where forest managers engage in diversified enterprises in forests (e.g. game management, or commercial recreation), these are also considered as forest values. Where forest work is contracted out to remote contractors, this will be manifested in leakage of benefits out of the locality. In addition to production forestry, there is a need to look at the employment and output associated with amenity tree management. It seems highly probable that a substantial part of landscape management in tree-rich areas relates to the management of trees for amenity and such labour-intensive activity can contribute significantly to overall forest-related employment.
- 2 'Shadow' values arise as a result of other economic activities benefiting or experiencing loss as a result of forestry. We use the term in a different sense to that used previously in cost-benefit type studies where it indicates estimates of real resource costs where distortions exist in extant prices. The shadow value we consider is that generated by the metaphorical shadow of forest activity on surrounding economic activity. In most situations in the UK, it might be expected that these values would be positive, but if forest environments are deemed unattractive places to live or work, then a negative shadow effect is by no means impossible. As a result of the outbreak of foot and mouth disease in the UK in 2001, more attention has been given to what are termed here

shadow values. For example, hotels suffered a large loss of trade because of the closure of footpaths. This indicates the capacity of the tourism sector to extract value from the public good of footpaths and mirrors a role played by forestry in the wider countryside.

There are two main types of shadow values: those arising from business activity as a result of their locational decisions (or profitability/turnover) being influenced by forests; and those arising from household location decisions.

The shadow businesses are of two principal types in relation to forestry. First, there are tourism and recreational businesses that make use of nearby forests as free-entry attractions and often use the forests as part of their marketing strategy. Where these businesses are internalized by the forest owner, they are forestry values and are readily picked up in surveys of forest owners. Deer stalking comprises a typical example. However, in the penumbra of many forest and woodland areas, there is a constellation of tourist and recreational businesses, ranging from campsites to bed and breakfast enterprises that depend, in part at least, on the existence of the forest, but where they are not owned by the forest proprietor. The second type of shadow business is that where a business location decision is influenced by the presence of forests. Where new firms have locational flexibility, selection of a location near a forest may be partially conditioned by the presence of forest or woodland. This is probably more likely for home-based businesses, where household and business location decisions are effectively merged.

The second type of shadow value is that arising from household location decisions. There is a substantial literature that indicates that house values are higher in tree-rich neighbourhoods. These values have often been investigated using hedonic pricing methods (e.g. Morales, 1983; Anderson and Cordell, 1988; Tyrväinen, 1997) and are seen essentially as increments in cost/capital values of property arising from proximity to trees and woodland. However, if there are economic flows arising from the affluent residents living in these tree-rich areas, they must be at least partially attributable to the forest. Consequently, there must be a forest-induced component of residential spending.

- 3 Non-market values are the external effects associated with forests and woodland. They can be positive or negative. What is or is not a non-market value is conditioned by property rights and excludability and rivalry in consumption (Mantau *et al.*, 2002). Forestry externalities have been flagged in relation to informal recreation, biodiversity, carbon storage, health, soil and water effects and landscape. The different external effects might be expected to be of very different magnitudes in different places. Some, such as recreational values, are strongly conditioned by proximity to people; others such as carbon storage are completely unaffected by location with respect to people and are conditioned by rates of growth and decomposition of trees and timber. In this study we focus exclusively on two types of non-market value. The omission of biodiversity values is only partial and relates to non-use biodiversity values, as the use values associated with biodiversity should be captured as recreational trips.
- 4 Social values comprise the sum of values to local communities arising from identity and a sense of belonging, social capital building attributable to trees and social entrepreneurship arising from the development of tree-related projects. Such values are not a necessary product of proximity to trees; they are more likely to arise where there is some engagement of communities and trees or where trees occupy important symbolic space in a community.

These various values can be illustrated diagrammatically (see Table 1), which also identifies the preferred methods to use in their estimation.

As shown in Table 1, a range of techniques was needed to assess the contribution of forestry to rural development in these areas. Surveys were conducted of forest and woodland owners, forestry-connected businesses and of firms and households in the sub-region. A common core of general questions was used with all respondents to enable a degree of triangulation between different stakeholders.

The development of the toolkit to estimate the full range of impacts was achieved through a heuristic process in three case-study areas. The case-study areas were selected so as to reflect the

Table 1: Methods used in the UFIRD study to estimate forestry's contribution to rural development

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 Estimation of level and pattern of forest-related tourism expenditures	As above	
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 Estimation of proportion of household and business expenditures attributable to the presence of forest and woodland in the locality	As above	
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 though focus group & follow-up interviews with local households	Interpretive methods	

range of conditions encountered in different rural areas in the UK. These comprised part of Powys in mid-Wales, a substantial proportion of mid-Bedfordshire, including parts of the green-sand ridge and the clay vale, including the Marston Vale Community Forest, and Breckland at the border of Norfolk, Suffolk and Cambridgeshire (see Figure 1 for a map of the study areas).

As the piloting proceeded, a number of adjustments was made to the approach. Generally, there were far fewer problems with conducting fieldwork in the two English study areas. This was attributable to changed administrative arrangements, the different cultural context and some changes made to the actual process of collecting data.

For the forest values and shadow values, information was collected from a survey of a range of forest and shadow businesses and households. More detailed information was sought on forest businesses, whereas, in the case of the shadow businesses, it was necessary only to know the extent to which their locational decision was forest-related and the knock-on impacts in the local economy arising from that locational

decision (i.e. spending and re-spending within the defined rural area). In the case of households, it was necessary to ascertain the extent to which the household was motivated by a desire to live close to a forest, and the spatial pattern of household expenditure. So as to focus solely on injections into the local economy, only commuters and retirees whose locational decisions were stated to be influenced by the presence of trees were considered.

For the estimation of non-market values, benefit transfer models were used. Although a range of amenity benefits from forestry have been identified, including landscape, biodiversity and recreation, it is likely that there is a degree of double counting. The methods used were based on work by Brainard *et al.* (2001). The two most important non-market benefits identified in the literature survey (recreational and carbon storage) were selected for further study. Of the two values, the recreational values are highly spatially variant and the benefit transfer approaches relating to recreation are still under development. In the case of carbon storage values, although the issues have been widely debated, the values remain hotly contested (CJC Consulting use a value of £6.67 per tonne C sequestered). The approach adopted in this study was to adopt a value that reflected a general consensus of opinion (£6 per tonne of C sequestered). The subsequent CJC Consulting estimate of almost the same figure vindicated this approach. In the case of informal recreational values, Brainard's best-fit model, which explained over 80 per cent of trip variation in her case study, was used. This model focused both on forest attributes (length of walks, car park capacity) and the nature of the population in the catchment.

In order to elicit the social values, a range of techniques was used. (1) The identical subset of questions asked of all respondents (including attitudes to changing levels of forestry, use of forests and membership of groups involved with forests) enabled effective triangulation of the social values and assessment of consistency of results. (2) Focus groups were held in a number of communities in each of the study areas. These provided further scope for triangulation and, in addition, offered scope for exploring more deeply the interactions among those with different

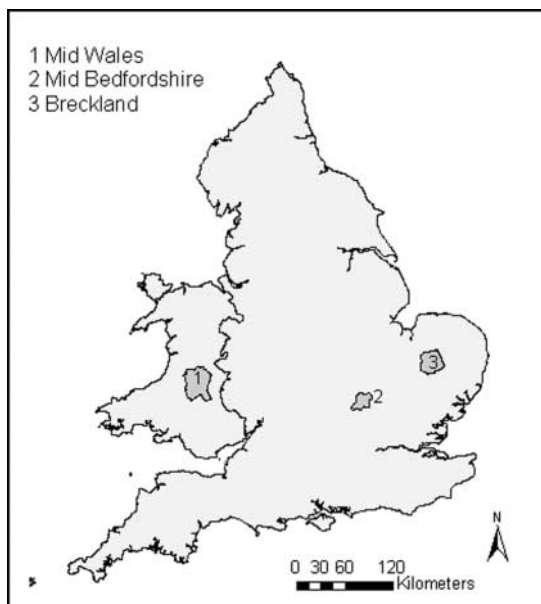


Figure 1. Study areas for the UFIRD study 2002–2003.

attitudes to forestry. (3) Face-to-face interviews were held in the communities with a range of key actors. (4) Checklists of social value indicators were used. (5) Secondary sources of information on the value of forests to local communities were explored. (6) Visual ethnographic methods were used to identify the role of trees and woodland in the case-study areas.

Interim results

In this section, some results are presented for one of the study areas, mid-Bedfordshire. The study area in mid-Bedfordshire was chosen to include three distinct landscape types: the relatively lightly forested boulder clay plateau in the north of the area; the Oxford clay vale in which a Community Forest is being developed in a landscape scarred by clay extraction and brick manufacture; and a greensand ridge which has a high level of forest cover.

Within part of the mid-Bedfordshire study area, the recreation and conservation management of much of the woodland, which is under both private and public sector ownership, has been handed to the Greensand Trust, a local NGO (non-government organization). In many ways, it provides an interface between the various local authorities, the woodland owners and the recreational user groups that make extensive use of what is still in some places very much a production forest. To the north of the Greensand ridge, the mid-Bedfordshire study area also

contains one of the 12 Community Forests jointly sponsored by Countryside Agency, Forestry Commission and local authorities. The Marston Vale Community Forest is located in the Oxford clay vale, which has been and still is used for clay extraction and brick making. Former workings have become either water-filled or have been used for waste tipping on a large scale. Some have been transformed for recreational use and a major visitor centre and conference centre stands at the heart of the vale as the hub of the developing community forest.

The results shown in Table 2 suggest that production forestry is relatively unimportant in this area in terms of its overall impact on the economy. There is a small processing sector consisting of a couple of small sawmills and a modest forest contracting industry. In contrast, the impact of residential and tourism shadow effects accounts for more than 95 per cent of the estimated total forest-related income injection into the local economy.

Almost one-quarter of mid-Bedfordshire residents asserted that forests were highly important in their residential locational decision. About one-third of households commuted out of the area to work and 22 per cent of the households in the area were retired. The results published below are based on households responding that trees and woodland were very important or important to their locational decisions and relate only to retirement and commuting households, not households who might have chosen to live in the area and then taken up local employment

Table 2: Forestry and shadow values in mid-Bedfordshire (£ million/year)

	Net forest- dependent injection (£ million/year)	Multiplier	Impact on local economy (£ million/year)
Forestry			
Forestry	0.453	1.404	0.636
Shadow			
Retiree and commuter households	12.5 (@ 25%*) 37.51 (@ 75%*)	1.075	13.44 (@ 25%*) 40.32 (@ 75%*)
Tourism expenditure	2.183	1.395	3.043

* Proportion of total expenditure of those households who are commuters or retirees, who live in the forest 'shadow' and whose locational decision was strongly affected by trees.

opportunities. An estimate was then made using GIS (Geographical Information System) of households resident within 2 km of areas of woodland of 10 ha or more. This results in well under 1 per cent of the population of commuters and retiree households in the sub-region being considered in the calculation. The questionnaire obtained information on the extent to which the households purchased goods and services locally. Two estimates were made: (1) 75 per cent of the local expenditures of woodland-adjacent households that stated that forests were very important in their locational decision were attributed to forests; (2) a lower estimate was made based on 25 per cent of the expenditure of the households stating that forests were very important in their locational decisions. In spite of a low estimated income multiplier of 1.075, the net contribution of this to the overall value of forests is considerable.

As might be anticipated, the two non-market value estimates are very different (see Table 3). The modest amount of forestry and the considerable extent of scrub and semi-natural ancient woodland reduces the carbon values, but the high level of adjacent population and the popularity of the forest as a recreational destination results in high informal recreational values.

In mid-Bedfordshire, the non-market values of forestry are very small in comparison to the shadow effects, even using the most cautious attribution method of attributing household expenditure to forestry. Given the high values for informal recreation in comparison to forestry values, this suggests that, as a proportion of the overall contribution of forestry to rural development, the shadow effect may be very considerable indeed.

The social values were elicited by the means identified in Methods. From the household questionnaires, it was evident that people valued trees

and woodland very highly. Local woodlands were important recreational destinations but were in some cases seen as intensely local resources. Trees and woodland were seen to be associated with higher property values and to provide a stream of benefits to almost all households.

Some respondents were resentful of the community forest, partly for the superimposition of its authority over existing community projects, partly because of the restricted hours when access was permitted, and partly for its more overtly commercial stance in the provision of informal recreation opportunity.

Forests and woodlands were important identifiers of place, both in terms of people's sense of occupying a wooded territory or living space and in their enjoyment of trees as landscape elements, and in terms of trees and wood products in and around their homes. A combination of factors at both landscape and more local level contributed to the high social values they placed on trees. These values may have economic dimensions, particularly in increments to property values, but were rarely articulated in such terms.

Discussion

The Bedfordshire case study showed that it is possible to use a number of complementary methods to elicit the multiple impacts of forestry and woodland on local economies. Not only do the methods expose the range of values, but also they provide cross-checks (or triangulation in modern social-science parlance), which enable the results from the different methods to be appraised for consistency. In mid-Bedfordshire, the consistency between the economic results revealing large 'shadow' effects and the household and key contact responses to social questions gave a high degree of confidence about the relative values of the different contributions.

Whilst forest and woodland are highly valued, there is concern about the community forest, the largest forestry-based project in the area. The future development of the community forest is impeded by a number of factors. (1) There is necessarily a considerable emphasis by managers of the community forest on making the large visitor centre pay (or, more modestly, to recover at least some of the running costs). As well as

Table 3: Non-market values of forestry in mid-Bedfordshire (£ million/year)

	Low	Medium	High
Informal recreation	1.453	2.034	2.615
Carbon	0.035	0.076	0.114

Carbon values based on £2, £4 and £6 per t C sequestered.

concentrating on establishing a forest, managers are thus focusing on another task. Visitors are thus charged to enter the exhibition area in the centre and conference facilities must be advertised and let. (2) There are outline planning proposals for major new residential and industrial (warehousing/distribution) developments in the area, which already accommodates several major developments of this type. Consequently, few landowners are willing to plant trees when there is prospect of the substantial profit to be made from the selling of land with development rights and where any existing woodland areas might be seen as meriting protection from development. However, use of Section 106 agreements (Section 106 of 1990 Town and Country Planning Act) may allow some forestry to be established around new developments. (3) The development of this particular community forest is also impeded by the range of uses that are broadly antagonistic to amenity enhancement, including waste management and an air of industrial dereliction that still hangs over the area. (4) Within the clay vale, there are sensitivities about the management of a number of residual broadleaved woodlands (especially Kings Wood, Houghton Conquest) where village-based groups have taken an active part in their management as conservation resources. Some of these groups are sensitive about the takeover of their 'patch' by a bigger body, not least because it is perceived to lead to greater general public use, rather than to preserve the woodland as a local community and conservation resource.

Overall, there is a stark contrast between the industrial villages of the clay vale (Brogborough, Marston Morteyne and Stewartby) and the tree-rich commuter towns and villages of the greensand ridge including Amptill, Clophill and Aspley Guise. Given the abundance of opportunity for recreation on the nearby greensand woodland and heathland, the justification for a new community forest in the clay vale is, perhaps with the benefit of hindsight, questionable, at least on economic grounds.

At a general level, the principal challenge exposed by the case study is the need to adapt forestry to the particular socio-economic contexts of different areas. Forestry contributes to rural development in many ways, some direct and others indirect. Forestry needs to be adapted

and nuanced to local socio-economic factors rather than managed by a one-size-fits-all policy. Where there are significant amounts of private woodland that yield high levels of benefits for recreation and conservation and these benefits cannot be internalized by the owner, there is a strong case for public support for the delivery of these quasi-public goods. However, there clearly is substantial local capture of these benefits and, in many ways, these goods approximate club goods, with adjacent residents treating their local woodlands as if they were a club good. Further, in relation to community use and evident increments in property values, the proximity of forest and woodland to the village is a crucial factor in influencing value, with a rapid fall off in values over relatively short distances.

A simple economic vision is insufficient if the object of attention is the wider functioning and well-being of the rural economy. Forestry can also deliver social values and help give places identities, as well as giving people association with those places. It can provide platforms on which social capital is built and which make communities more vibrant places to live.

If the social development of rural communities is a cause of concern (and wider rural policy thinking in recent rural white papers and other policy documents suggests it ought to be), there is a need to consider the role of forests in addressing social exclusion. In the study areas in this project, forestry probably contributes little to resolve problems of social exclusion. Even within the poorer communities of mid-Bedfordshire, access to forest recreational opportunity is usually dependent on a car. Elsewhere in the UK, where forests have become major objects of concern by local residents, it is often the more affluent who engage with forest-related concerns, although there are some notable exceptions in some crofter forestry schemes in Scotland and in some community forest areas.

In order to function as platforms for local development, institutions must exist (or be created) to provide the structures that guide development processes. There are many different types of institution including LEADER+ projects, local partnerships, Community Forests and other local NGOs. In some of the study areas, there are strong cross-sectoral institutions that are intimately connected to forests and

woodlands and their multi-purpose management; in others, there was less evidence of these cross-sectoral institutions and more evidence of institutional competition. Successful multi-functional forestry may depend more on these cross-sectoral institutions than production-focused industry clusters.

Forestry's contribution to the rural economy is multi-faceted. Ensuring that forests and woodlands are managed so as to maximize their contributions to rural development is no easy task. Forestry (and the forester) need to be attuned to spatial variations in values. This is relatively straightforward when dealing with market values but rather more complex when dealing with non-market or social values. They also need to be aware of how different values are measured and the level of public and academic confidence in different approaches to measurement. It is also important to recognize that there are complex systemic implications of a change in one value on another (e.g. water quality and volume effects of new planting). However, there are ways of measuring forestry's wider contribution to the rural economy, which, although more demanding than standard investment appraisal models, are conceptually straightforward and readily implemented at a range of spatial scales.

There are still likely to be some areas where a production model should continue to dominate forestry practices. Typically, these will be in relatively remote rural areas, where tourism is weakly developed and where environmental values are modest or where there is limited local demand for forest recreation (either due to remoteness or plentiful alternative sites). Where communities abut forests, there may be a call for substantial engagement between forest and woodland owners and those communities, especially in relation to the forests as potential providers of non-market goods and services. In the more densely populated parts of the UK, the case for a wider and deeper analysis of the actual and potential benefits arising from forest and woodland is strong. There are complex trade-offs between production and consumption functions of forests and unless these are elicited in site-specific studies, the wrong type of forestry may result. Further, the value of forest recreational opportunity is likely to be reduced by the presence of complementary sites.

In the spending of public money, issues of additionality and displacement dominate the concerns of policy analysts. In the case of forestry, the critical question is what would be lost from the overall level of economic activity if forestry were not supported by public funds. On the evidence presented the additional economic activity arising in some local/sub-regional economies from forestry is very considerable. Clearly some of this economic activity constitutes displaced economic activity from major urban centres outside the study region. However, some forests will provide national additionality when, for example, overseas visitors take holiday trips in their shadow. Further, a net transfer from cities to rural areas may be considered a socially and politically legitimate form of displacement, although whether disadvantaged groups are well placed to benefit from these transfers is more open to question.

It is probable that over large areas of lowland England the non-market, social and shadow values of forest and woodland are much more important than the conventional forestry values for local development. This does not imply that no forestry production should take place, but it does imply that a production orientation to forestry is probably inappropriate if the aim is to support the broader development of the locality. Forest owners, whether in the public or private sector have long been unintended contributors to rural economic activity through the shadow effects. In places such as the greensand ridge of mid-Bedfordshire, the shadow values of forestry are far more important to the rural economy than production forestry values. People living in tree-rich environments (especially broadleaved trees) are more likely to be wealthy and will spend money not just in local shops but also on a range of local services including gardeners and tree surgeons. These local demands from residents who live but do not work locally (that is commuters and retiree households) generate multiplier effects thus connecting rural well-being to the presence of trees. What has long been self-evident should now be capable of enumeration, using a suite of techniques developed in the UFIRD study. However, the forest owner often receives no credit at all (and almost certainly no reward) for providing such a catalyst to local economic activity.

The types of method designed in the past to assess forestry's contribution to rural economies have been partial in that they have only recognized forestry values (including the non-market values) rather than other forest-related values that still have potentially very important market consequences. This paper has presented a method which allows a more thorough appraisal than one those techniques have been used in the recent past and still dominate policy debates about forestry.

However, when looking at forests there is a need for humility. Past forestry 'mistakes' can be physically and visually apparent for a long time. They may not have been 'mistakes' at the outset. Without divine foresight, we can predict the future but cannot know it with certainty. The length of typical forest rotations in the UK ensures that the contribution of current management decisions about trees will be seen (and have effects) over a very long period of time. Consequently, as societal preferences change over time this will expose the time-bound nature of previous demands. Changed preferences place new demands on existing as well as on new forestry.

A broad-based approach to estimating the various actual and potential contributions of forestry to rural development is thus an essential starting point in guiding decisions about how forestry can better contribute to the rural economy. Tools are needed to explore the range of social and economic contributions to throw light on their spatial variability and to give clues as to how the contribution of forest and woodland to the rural economy can be enhanced and how any case for additional forest and woodland can be better presented.

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References

Anderson, L. and Cordell, H. 1988 Influence of trees on residential property values in Athens, Georgia

- (USA): a survey based on actual sales prices. *Landsc. Urb. Plann.* **15**, 153–164.
- Brainard, J., Lovett, A. and Bateman, I. 1999 Integrating geographical information systems into travel cost analysis and benefit transfer. *Int. J. Geograph. Inform. Sci.* **13**, 227–246.
- Brainard J., Bateman, I. and Lovett, A. 2001 Modelling demand for recreation in English woodlands. *Forestry* **74**, 423–438.
- CJC Consulting 2003 *Economic analysis of forestry policy in England*. A report to DEFRA and the Treasury.
- Dickie, I. and Rayment, M. 2001 *Assessing the economic benefits of forestry in the UK*. Paper prepared for the Forestry Commission's Advisory Panel, Environment Sub-Committee.
- Eiser, D. and Roberts, D. 2002 The employment and output effects of changing patterns of afforestation in Scotland. *J. Agric. Econ.* **53**, 65–81.
- European Commission 1998 *The Agricultural Situation in the European Union*, 1997. Report, CEC, Brussels.
- Evans, N., Morris, C. and Winter, M. 2002 Conceptualising agriculture: a critique of post-productivism as the new orthodoxy. *Prog. Hum. Geog.* **26**, 313–332.
- Hytinen, P. et al. 2002 Forest-related perspectives for regional development in Europe. *EFI Research Report No. 13*. Brill, Leiden.
- Layard, R. 2003 *Happiness: has social science got a clue?* Typescript of the Lionel Robbins Memorial Lectures 2002–2003.
- Mantau, U., Merlo, M., Sekot, W. and Welcker, B. 2002 *Recreational and Environmental Markets for Forest Enterprises*. CAB International, Wallingford.
- Mather, A. 2001 Forests of consumption: postproductivism, postmaterialism and the postindustrial forest. *Environmental and Planning C: Government and Policy* **19**, pp. 249–268.
- Morales, D., Micha, F. and Weber, R. 1983 Two methods of valuating trees on residential sites. *Arboriculture* **9**, 21–24.
- Munday, M. and Roberts, A. 2001 The role of forestry industry transactions in the rural economy *J. Rur. Stud.* **17**, 333–346.
- OECD 1999 *Cultivating Rural Amenities: an Economic Development Perspective*. Organisation for Economic Co-operation & Development, Paris.
- OECD 2001 *Multifunctionality: Towards an Analytical Framework*. Organisation for Economic Co-operation & Development, Paris.
- Pearce, D. 1991 Forestry expansion – a study of technical economic and ecological factors. *Forestry Commission Occasional Paper No. 47*.
- Public and Corporate Economic Consultants 2000 *English Forestry Contribution to Rural Economies*. Report to Forestry Commission.

- Slee, B. 1994 Market led provision of environmental goods. In *Agricultural Externalities in High Income Countries: Proceedings of the 37th Seminar of the European Association of Agricultural Economists (EAAE)*, 14–17 September 1994, Vienna, Austria. M. Hofreither and S. Vogel (eds).
- Slee, B. and Snowdon, P. 1999 Rural development forestry in the United Kingdom. *Forestry* 72, 273–284.
- Stewart Roper, C. and Park, A. 1999 *The Living Forest: Non-market Benefits of Forestry*. Stationery Office, London.
- Tyrväinen, L. 1997 The amenity value of the urban forest: an application of the hedonic pricing method. *Landsc. Urb. Planning* 37, 211–222.
- Wiersum, F. and Elands, B. 2002 The integrated Multifor.RD research project. In *The Changing Role of Forestry in Europe: Perspectives for Rural Development*. F. Wiersum and B. Elands (eds). Wageningen University, Wageningen, pp. 1–22.
- Willis, K. 1991 The recreational value of forestry in the Forestry Commission estate in Great Britain: a Clawson-Knetch travel cost analysis. *Scott. J. Politic. Econ.* 38, 58–75.
- Willis, K. and Benson, J. 1989 Recreational values of forests. *Forestry* 62, 93–110.
- Willis, K. and 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.

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