AGRICULTURE AND RURAL INFRASTRUCTURE

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Abstract

Rural infrastructure consists of a complex pattern of facilities, institutions and working arrangements which provide the supporting framework for the rural economic, social and environmental systems. The character of these systems has been determined largely by agriculture, since it is the dominant user of the land base. The economic forces which change agriculture are now primarily related to developing patterns of demand for food products and for the non-food services that rural resources can provide. As farm businesses adjust to these pressures, new economic infrastructure has to develop to support them. Rural economic adjustment then brings with it major changes in the nature of rural society. The growth of a 'dual' agricultural structure, increasing numbers of part-time and diversified farm holdings, and the countryside developing more to provide direct consumer services will change rural areas and call for distinctive adaptations and extensions to the rural infrastructure.

'Infrastructure' is the underlying foundation, the basic framework of a system or organisation which supports its functioning and within which its active processes take place. If we think of this in the context of rural areas we begin to recognise the complex pattern of physical facilities, institutions and working arrangements which underpin country life. Indeed, in the minds of many people there is probably still a rather cosy image of what this rural infrastructure consists of - family farms, local markets and merchants, lanes and hedgerows, village pubs and schools, cottages and barns, harvest festival and the Hunt Ball, social structures and customs. This image contrasts strongly with that of 'urban infrastructure' and is more

suggestive of stability, a natural rather than a built environment, and close community ties to the locality.

The reality in most rural areas, however (certainly in Northern Europe) as the 21st century approaches is far from this idyll. The physical appearance of the countryside has changed markedly over recent decades, the economic activities that take place there are subject to continual adjustment, and the social frameworks within which people live and work develop progressively from one generation to another. Since - in a spatial sense, at least - rural areas means the land base, and since the bulk of the land is held within farm businesses, it seems to follow that it is agriculture and farming activities which determine the characteristics of the rural scene. Change in agriculture, therefore, will be the main force which alters the nature of country life and hence the fabric of facilities and linkages - the rural infrastructure - that support it.

IDENTIFYING THE RURAL INFRASTRUCTURE

To explore this wider canvas of rural change it helps to recognise the existence of three distinct - though not independent - systems. The countryside can be seen in terms of an economy, a society and an environment. These systems are characterised by their own distinct processes, and each has its own particular elements of what we think of as the rural infrastructure.

(a) The rural economy

Much of what takes place in rural areas can be classified as economic activity - that is, the managed utilisation of resources to produce goods and services of value to society, to provide occupations, and to generate incomes for the people involved. This goes on in the non-rural economy as well, of course, but rural economic activity frequently has distinctive features. Either it is specifically land-based or exploits biological processes - which is what is so distinctive about farming - or otherwise has characteristics which make its location in rural areas economically advantageous; this is the case with certain types of recreation or craft industries, for example. Economic activity develops in rural areas, therefore, either because that is where production can best be located, or because that's where the relevant consumers are (as is the case with the village shop or garage).

In either case, there is a particular framework of *economic* infrastructure necessary to support this economic activity. These are the roads and other communications links, the market network and delivery systems to supply inputs and receive outputs, and supporting services from administration and finance to information. The availability and quality of this infrastructure are usually a major determinant of what economic activities can be pursued, and how successfully, in rural areas. Policies for rural development in Third World countries, for example, attach great emphasis to putting in place the necessary physical infrastructure as a pre-requisite for economic growth via the expansion and diversification of production. In an entirely different context, note the current expectations that the development of modern communications infrastructure (such as the Internet) could encourage a major growth in new rural-based income generation through the so-called 'teleworking' system.

(b) The rural society

The people who live in rural areas function not only as components of an economy (as labour resources or consumers) but also constitute a distinct social system in themselves. An important aspect of rural life is the diverse social interactions between the individuals and groups who belong to (which largely means reside in) the locality. This is the 'people-oriented' part of the rural system, and the often distinctive nature of the processes which link individuals together is a major determinant of the quality of life that country living is seen to offer. The workings of the rural social system and the benefits it confers on its participants is, like economic activity, fundamentally dependent on the *social* infrastructure. This is a complex of elements, from the assumptions and attitudes of people, to the institutions and frameworks within which they conduct their daily lives to (again) the physical facilities which support their activities. The rural social infrastructure includes such things as local schools, village pubs and shops, the Womens' Institute and other organisations, as well as habits and traditions. The existence and nature of these, in turn, depends on the type of people who make up the community, their incomes, education and background, assumptions and interests. An issue of concern to many commentators is the change taking place in the type of people living in rural areas, and with it the social infrastructure they create and support - and hence in the nature of rural society itself.

(c) The rural environment

Finally, regardless of its other characteristics a rural area can also be seen as a functioning environmental system. It is a matrix of biological resources, landforms and biophysical processes, interactions between wildlife and plant communities, and evolutionary patterns of growth and decay. This is the 'natural' countryside environment that is increasingly recognised now as a significant element in itself, something with important qualities and inherent values that needs to be sustained, independent of any economic use or direct social benefits that it confers. This system, too, has its infrastructure which conditions and supports its processes through time - the field pattern, hedgerows and banks, water courses, wildlife corridors, habitats and tree cover, the landscape and topography, etc. Although less directly man-managed than the economic and social infrastructure, it is easily modified or destroyed by economic or social processes, is far less easily created or restored, and ultimately determines the very nature of rural areas as places to live and work.

INTERACTIONS IN THE RURAL SYSTEM

Although conceptually distinguishable the three components of the rural framework, and their respective infrastructures, overlap in many respects. They become part of a unified system, yet also retain strong independent or outward linkages. For example, rural economic activity produces goods and services to supply the rural population, but mostly for consumption in the rest of the economy. (This is particularly true for agricultural production, most of which is 'exported' from the region; it might be less true for many rural service enterprises.) The employment and income generating opportunities provided by the rural economy also constitutes some of its social infrastructure, but equally many of the resources in rural businesses are owned by outsiders. The expansion of physical infrastructure which supports the development of economic activity (such as better transport links) by the same token also enables rural people to divert their consumption expenditures out of the rural economy; it also allows others the opportunity to be simply resident members of rural society while owing their workplace allegiance to the city or suburbia. Much rural environment is also the physical base for rural enterprise and the living space for rural society, and is affected directly by these connections; but

it is also the 'countryside' to which many non-rural people vehemently assert a protective right and seek to enjoy as a consumption good.

All this says no more than that rural areas are a complex economic-social-environment system in which change in one component works through to create changes elsewhere. From an evolutionary point of view, it tends to be the economic sector which leads the change, which then causes social and environmental adjustments. And since agriculture has traditionally been seen as the dominant focus for rural economic activity, it is developments in agriculture which have initiated most rural adjustment - and promise to continue to do so.

Despite the prominence given to CAP reform and new measures under the recent GATT agreement, it is incorrect to believe that readjustment in agriculture is being primarily fuelled by political forces. The policy changes are simply delayed, but inevitable responses to a series of inescapable evolutionary economic forces which have distinct developmental implications for rural areas. Some of these are supply-side forces, deriving from technological change in farming which confer major potential benefits in new production opportunities, resource productivities and reduced unit costs of production - but also promise differential changes in resource employment and income distribution. Others stem from demand-side changes - not only for food and the agricultural products from which they are derived, but also in new and growing demands for the goods and services that farm resources can supply. As these economic changes (which are not new, but their impetus is now more strongly felt) work their way through the rural economy they will bring further changes to the people and the countryside environment in a way that many may already see as a cause for concern.

What is new in the contemporary evolution of rural areas are indications that the traditional integration between the economic, social and environmental systems is progressively breaking down. This creates the prospect of the rural economy becoming simply a set of economic activities that happen to take place in the countryside but increasingly independent of that overall context. The concerns that farming has become insensitive to the environment, and that new commercial developments are intrusive in the rural scene, are evidence of this. In addition, it

is seen as lamentable that the rural community may increasingly become simply a collection of people who live in the country but whose economic involvements and allegiances lie outside. This not only displaces the 'indigenous' rural population, but radically changes the values, presumptions and inherent culture of rural society - bringing with it a new rural social infrastructure, and new interactions with the rural environment.

AGRICULTURAL CHANGE AND RURAL SOCIETY

When food supplies were a dominant concern the rural areas were seen primarily as the venue for producing agricultural products. Associated rural economic activity was either coincidental to this (e.g. quarrying) or part of the support structure of farming (blacksmiths, agricultural merchants). However, now that food sufficiency seems to have been achieved in Europe the role of the rural resource base is changing markedly. And because those resources are in farms, the nature of agricultural businesses - and the infrastructure to support them - is changing accordingly.

Most of these changes are due to the changing nature of demands in the economy. The supply-led adjustments of agriculture, and their effects, were significant while they lasted but are now largely a thing of the past. The progressive transformation of farming into a capital-intensive industry via mechanisation and the introduction of novel physical inputs (all encapsulated in the concept of 'new technology') had major effects on farming as a resource-using operation. The removal of hedges for field enlargement, widening of tracks and gateways, proliferation of farm buildings and other physical structures, reclamation and improvement of land, the intensification of production methods resulting in habitat changes and structural shifts in wildlife and plant populations, etc., are all well known as having transformed the environmental infrastructure of the countryside. The new technologies accelerated the trend for declining labour employment in agriculture, changed the nature and skills required in farming - both for physical work and for management - and transformed the culture of the farm as a place of work. The framework of rural firms which traditionally supported agriculture withered away as farming became increasingly dependent on inputs and services derived from the urban and industrial sectors, having further effects on the

employment opportunities in country areas. The scale effects of modern methods created continued pressures for enlargement in the economic size of farming unit which would have displaced farmers from the scene as rapidly as hired labour had declined; but because the implied adjustments in landholdings couldn't keep pace (primarily because so many farmers resisted the signals to change occupation, despite the ostensible economic advantages of doing so) the effect has been to create an increasing number of part-time farm units which are dependent on additional income sources for their continued operation.

All these supply-side forces have had profound impacts on the social character of rural areas and the infrastructure that supports it. Farming is no longer the centrepiece of rural living, either in the minds or the bank accounts of the population. The reduction of aggregate labour requirements in farming and its associated industries has forced each successive generation to look elsewhere for employment - meaning migration from the village, since developments in the rest of the rural economy have not created equivalent alternatives. But the rural population has not declined in numbers - in fact it has increased. Indigenous residents have been replaced by in-migrants whose income levels from non-rural sources, coupled with the access provided by improved transport infrastructure, have allowed them to indulge their preferences for country living. The increasing numbers of farm households having to seek off-farm income sources adds to the effect of village society becoming more outward looking in both its activities and its allegiances. It is the character, not the extent, of village life that changes as a result and so do the institutions and processes that surround it. A thriving Badminton Club appears while the Gooseberry Society is wound up; Harvest Festival and the Village Hall dance take on a totally different meaning; the local weekly market gradually turns into a mixture of car boot sale and craft fair; dinner parties rather than the regular whist drive grow as a basis for social interactions; and new distinctions develop within the community based on incomes and interests which are far more divisive than the hierarchical distinctions of old. This kind of social change is often treated as though it is in some sense a bad thing - though whether there is any defensible criterion for distinguishing 'good' or 'bad' rural social structures from 'different' ones is unclear.

It is also often presumed that the decline of agriculture as a source of income and employment is a prime cause of decline of the rural community itself - but this deserves to be questioned. People may migrate from villages, but the houses they lived in stay behind and, given the widely held preferences for country living, are invariably reoccupied. The rural population does not necessarily decline along with agriculture - only changes its composition. Nor can the much-lamented closing of village schools, post offices, shops and pubs - central components of rural social infrastructure - be associated with the changing place of farming in rural life. There is no reason to believe that residents whose work and income source lie outside the village either have no children or will not send them to the local school, or will not patronise the village store. Schools close down because of public budgetary pressures and the economics of small scale education provision in remote areas. Village shops disappear because the unavoidable economics of retail distribution mean they cannot compete on a price basis with the larger stores and supermarkets in the nearby urban areas. It is not particularly the 'in-comer' residents who fail to support the village store but spend their money in town before coming home; indigenous villagers and those who work locally also own cars and they, too, choose to do their weekly shop at Tescos. This same widening access to personal transport is the reason why rural bus services attract insufficient customers to make them economically sustainable, and so they cannot survive unless specific public subsidies are granted in the interests of the immobile (and generally low income) minority. By the same token, the village pub may actually flourish - though changing its traditional bucolic character - because it can draw customers from a much wider geographical area to sample its distinctive social atmosphere and services.

The linkages between change in the rural economy and change in the rural social system are very real, but also very diverse. The fact that agriculture is no longer the mainstay of the rural economy and new patterns of living are developing in the countryside can really only be condemned either by rural sentimentalists or by those who are directly disadvantaged by the changes. There are many others who benefit from these adjustments, however - and it is a socio-political judgement as to whose interests are more important, not an analytical one.

CHANGE IN THE FARM BUSINESS

The agricultural change considered so far has been that induced by production-related technological factors. However, it is demand-side forces which are the dominant influence on rural resource use and these now represent the more significant determinants of economic, social and environmental adjustments in the structures of the countryside.

The fact that food sufficiency appears to have been achieved in the western world, leaving concerns over food security virtually a matter of history, means that expansion in aggregate food and agricultural output - whether policy induced or via markets - is not to be expected. With the income elasticity of demand for food being less than one, the food sector is inevitably a declining industry relative to the rest of the economy (as it always has been). Preferences and changing demands for the components of value added that make up food products focus increasingly on the post-farmgate service/convenience/quality/diversity aspects of food, with demand for the raw materials produced by farms virtually static. Therefore conventional agricultural production is even more a declining element of the economy than is food production.

The implications of all this are inescapable. The historical tendency for farm land use intensity to increase will cease, having no longer any genuine economic basis. Continued technological advance will create the prospects for more and more land to be available for non-farming uses. Farm businesses will need to grow to survive in a declining sector. Some will do so by incorporating other farming businesses, becoming larger scale commercial agricultural operations but causing even further decline in the number of farm units and households. Many others must survive by developing new economic activities within the farm resource base which either extend the business further towards the final food consumer or generate non-food products and services. This complex evolution - collectively labelled 'farm diversification' - will increasingly transform the image of what constitutes a farm business.

The crucial point is that all these developments are being initiated and sustained by genuine economic demands in society. Consumer preferences for food

are growing towards products with distinct qualitative images - whether in terms of the conditions under which their raw materials are produced (organic, high welfare) or carrying a closer connection with their farm origins (natural/traditional/farm fresh and other apparently meaningful adjectives), or being processed in the farm environment rather than on some factory production line (farmhouse cheese and ice cream). These are not simply ways for farmers to capture more of the 'value added' to agricultural raw materials, but distinctly identified products which can *only* be produced from farm resources. As demands for them grow they should be seen not just as a refuge for farm businesses needing to earn revenue; they are activities that farm operators have a responsibility to pursue because society's preferences are signalling it wants more rural resources used for such purposes.

In addition, the changing demand patterns in a modern, well-fed, mobile and increasingly affluent society indicate a preference for more of the rural land base to be allocated to the provision of recreational and leisure services. Food sufficiency and prospects of further technological gains have caused agricultural production to lose its automatic first claim over land, and diversion to golf courses, picnic sites, nature trails, sporting uses and the provision of horse-based services becomes both increasingly sought and increasingly possible. Again, these are genuine economic demands by society, not second best alternatives for ailing farm units. The indications are that, while no one use will amount to a major element, land allocations for such purposes in aggregate could validly account for a substantial area. In most cases they would represent a far more appropriate and genuinely economic use of land than the production of linseed, industrial crops or even timber - all of which "alternative non-food crops" are somewhat contrived options and sustainable only under artificial pricing, rather than responses to real economic valuations.

These developing directions for the farm business will stimulate an associated development in the rural economic infrastructure to support them. Farm shops, farm-based recreation activities, holiday and tourist provision, on-farm product processing, livery stables and wildlife parks, etc. all require a new and more diverse set of structures and facilities to make them work effectively, compared to conventional agricultural production. Farming requires largely a framework for

providing productive inputs, guiding crop and livestock husbandry, and then shipping the products out to the next-stage processors. The new forms of farm enterprise are based very much more on catering for consumers who come into the rural areas and onto the farm to 'collect' the goods and services they seek. The physical infrastructure to cater for this influx (car parks, footpaths, information boards, paybooths, power and sanitation facilities, etc.), the management infrastructure to assist farmers adapt to the novel kinds of commercial enterprise (the task of having to deal directly with *people* is an uncomfortable novelty for many), and the marketing infrastructure to create awareness, change perceptions and disperse information to the new clientele for farm business services represent a radical adjustment to the traditional rural economy based on agriculture.

A further significant adjustment to farm-based activity is the growing move for agriculture to more specifically provide environmental services and visual amenity - maintaining hedgerows and special habitats, fostering wildlife, improving water quality, reducing input intensity, restoring traditional buildings, planting trees, etc. These, too, are in response to genuine economic demands in society, and are just as valid a use for rural resources as food production or recreation provision. But unlike 'diversified' enterprises discussed above they cannot be developed and sustained via the normal commercial processes where there is an identifiable paying customer. Environmental provision is the classic public good for which no functioning markets can exist, and so the needed resources (primarily, but not exclusively, land) have to be drawn into use via policy structures and payments. This greater emphasis on fostering the countryside as an environmental system requires its special infrastructure too, especially in the form of administrative structures and regulations - National Parks, ESA and stewardship schemes, arrangements for setting standards and monitoring land use, procedures for payments to landowners, etc. The rural infrastructure of the 21st century will be markedly more complex and developed than that which has underpinned the development of farming throughout the 20th century.

RURAL AREAS IN THE 21ST CENTURY

Notwithstanding the truism that we cannot do without food, and hence the raw materials required to produce it, this is not the determinant of how rural areas will

change over the coming decades. Food production will remain the core of land use in the countryside, and the infrastructure to sustain this will retain its centrality. But change occurs at the margin, not at the core, and the new characteristics of country living will emerge from the adaptations that the rural economic and social systems experience. The nature of these are starting to become more evident.

First, the decline in the quantity of labour (if not the number of actual people) engaged in agriculture will continue. The number of hired workers in farming, for example, seems to have a half life of about 25-30 years. In the UK there were one million employed farmworkers in 1940, 500,000 in 1967, and by 1996 the projected number is 250,000. Any countervailing growth in off-farm rural employment will be insufficient to counterbalance this decline. The location of 'industry' in rural areas, though actively encouraged by rural development policies, is severely restricted by the fact that such areas offer very few natural economic advantages - neither in terms of location, resources or external economies - to production processes that are largely directed towards goods and services for urban consumers. And although the growth of new enterprises within farm businesses ('diversification') has an employment-creating aspect, it acts much more to find gainful activities for existing (often family) labour, and thereby forestalling migration to other jobs, rather than to create many net new employment opportunities in the countryside.

The population of people managerially engaged in farming, by contrast, will show far less decline. Nevertheless we shall need to accept a different concept of the term 'farmer'. It will continue to mean someone who operates an agricultural holding, but will less and less frequently imply someone who *only* does this. Already in the UK almost half of those classified as farmers are only part-time engaged in this occupation and that proportion will progressively rise (in the USA, over 90 per cent of commercial farmers have some other income source). A situation of 'duality' will increasingly characterise the modern agricultural sector. A diminishing proportion of farmers will be exclusively concerned with and commercially dependent on conventional farm production; they will produce the bulk of the nation's output, under very commercial conditions, with their incomes subject primarily to the market for agricultural products. On the other hand,

progressively more and more of the people in farming (and increasingly more of the land area) will be in units that have to be classed as agriculturally part-time. Some will be holdings which once were economically viable but have been unable to expand in line with the underlying scale economies of farming. Others, however, will be taken on or retained quite consciously as only partial sources of household income because it is the lifestyle of farm operation and its associated characteristics (independence, country living, elements of self-sufficiency, etc.) that provide a major benefit. In other words, operating a farm unit will increasingly become part of the occupier's *consumption* activities, with not solely a production/commercial objective. In either case, the essential requirement for the survival of this diverse pattern of part-time farms is sufficient availability of and access to income sources (whether off-farm wage employment or other business involvements) to enable the household to supplement or subsidise the farming revenues.

Many look with disdain on such developments, and label them disparagingly as 'hobby farmers'. This is to misinterpret the underlying developments in the rural economic and social systems, both in terms of the preferences of people and the sustainability of economic units. A farming population with a heavy dependence on multiple income sources is the only way the current diverse pattern of farm sizes can be maintained, and will be the main underpinning to a rural society which retains as much as is nowadays relevant of its traditional character and connections to the local economy. If this is to be the modern equilibrium of rural life, a distinctive infrastructure of diverse part-time, off-farm jobs, non-farming commercial enterprises, training programmes, financial and market facilities, social attitudes and institutional arrangements, and (crucially) directed public support for necessary facilities to support a pluralistic community of rural residents is needed. This will become the primary determinant of whether our rural regions remain as integrated socio-economic-environmental systems to the benefit of both local and outside residents, or fall apart into separately functioning components with often conflicting interests in which the traditional synergies are lost. No-one, whether rural or urban in orientation, can believe society would gain from that.