



ANALYSING THE ECONOMICS OF FARMING: What Every Rural Social Scientist Should Know

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Why the seminar?

In recent years, the UK government has published major statements on directions for agriculture and rural environment policy. Most notably, these are the Farming Profitability Review, Farming Roadmap 2050, and Land Use Framework. Heavy on *what is desired* for the future, none of these satisfactorily addresses the issue of *how to achieve* objectives. Unless that limitation is addressed, all the consultations and discussions that underpin ambitions will amount to nothing.

Economics is the neglected ingredient. Without understanding that policy instruments and incentives at all levels are invariably economic, objectives will remain unfulfilled. Fundamental is need to understand that technical processes linked to financial incentives and disincentives determine outcomes. Extraordinarily, the relevant, rigorous analytical framework that reached its maturity in the late 20th century appears to have fallen into disuse: agricultural production economics, the application of microeconomics to farming.

The Approach

Historical perspective is instructive. **Slides 3 and 4** point to the effect of wars on agricultural commodity prices, and of periods when the unexpected happens. Such was the last quarter of the 19th century when poor domestic harvests saw cereal prices fall, not rise, in Britain. The arrival of the USA as a major exporter to Europe was the reason, better understood in hindsight than at the time. When American farmers also experienced problems after the First World War, on both sides of the Atlantic and observed foremost by technical experts, steps were taken to document farmers' financial situation (**Slide 5**). Yet recourse to accounting left scope for misunderstanding economic relationships and gave rise to what became known as 'the farm problem', the tendency over time for farm net incomes to fall relative to increasing non-farm incomes. **Slide 6** illustrates reasons why farmers appeared to be different, not responding as others do to changing economic conditions. It took the maturing discipline of economics (**Slide 7**) to illuminate the nature of the farm problem, exemplified by E.O. Heady's groundbreaking contribution in the immediate post-World War

Background Notes

2 years (**Slides 8 & 9**). Still relevant is that the purpose of economic understanding is to help solve problems in the real world (**Slide 10**).

Slides 11 to 14 set agricultural production economics within general economics, outlined because the scope and purpose of the parent discipline is commonly misunderstood. **Slides 15 to 25** introduce some basic ideas, centrally the 'production function' concept, and concludes with a question on **Slide 26**. This exposes a frequently encountered misconception, both written and spoken in farming circles. It asserts that farmers aim to maximise output but will be better off financially by reducing inputs and thus output as, for instance, by 'regenerative' farming. Yet this is a long-understood relationship in farm production. Today, it speaks volumes for how much which is elementary has been forgotten. If a farmer does in practice aim to maximise output, it may signify poor business sense, unreflective decision-making, or received bad advice.

Slide 27 briefly draws attention to choice criteria for efficient input allocation, similarly for combinations of output (i.e. farm enterprise choices) and, when observed together, define conditions for the most efficient farm business. But are these merely theoretical relationships, devoid of usefulness in the messy real world? Emphatically not! **Slide 28** shows John Nix, an exemplary exponent and teacher of such principles applied in real world contexts. **Slide 29** is images of books written by just a few of the many distinguished teachers and researchers who built on Heady's foundations. For instance, the assumption of perfect knowledge of input and output prices, and production function(s), in the simple basic models, is manifestly untrue in conditions of real world uncertainties. Adding complexity may be essential. But if simple assumptions nevertheless give good predictions, remember 'the powerful simplicity of economic principles'¹ and do not complicate unnecessarily.

Where are we now?

Slide 30 summarises the institutional framework in England and Wales (Scotland and Northern Ireland have their own variants) which paralleled the growth in analytical capacity since 1945. Today, with agricultural economic expertise declined as environmental economics takes precedence, a new 'farm problem' with 21st century characteristics has emerged (**Slide 31**): the implications of climate change for sustaining a farm business; uncertainty in international markets about supplies, demand, and so prices; policy uncertainty at government level; absence of public sector institutions to advise farmers, now reliant on commercial consultants; public finance focused on providing environmental public goods, agricultural commodity production leaving farmers wholly exposed to the vagaries of world markets; financial support to encourage technical efficiency (e.g. aspects of the Sustainable Farming Incentive) vulnerable to changing government priorities and public fund constraints.

In short, a host of issues begs for help from agricultural production economists. But where is the expertise to be found? In the UK, have we not lost capacity evolved in response to a 20th century farm problem only to go backwards as a 21st century farm problem presents? These are issues needing our urgent attention. Where, and how, to begin?

¹ Tony Rayner, one-time Professor of Agricultural Economics, Nottingham University

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Supplementary Information

Appendix 1 is background to **Slides 25 & 26**, emphasising the contrast between numbers of UK farms, suppliers of purchased farm inputs, and food retailers. These data imply the absence of economies of size in farm production. Why else are there so many farm businesses compared to input suppliers and purchasers of farm products? The term 'economies of size (or scale)' is used loosely in relation to farming, and misleadingly. The reason is technical, the fact that diminishing returns to size set in very quickly in farming. It owes to the complexity of planning, co-ordinating and supervising farm business activities subject to constraints imposed by hard-to-control (if at all) natural processes and environment. With a few exceptions, e.g. large-scale arable in East Anglia, large dairy herds enabled by modern milking/handling technology, in contrast to ancillary industries there are not significant economies of size in farming.

The existence of diminishing returns is relevant to the contemporary 'discovery' that farmers who aim to maximise output find they are financially better off by reducing inputs to get lower output. Of course they are! Unless variable inputs are free, with diminishing returns it NEVER pays to maximise output. The empirical evidence for that truth confirms the existence of a curvilinear production function which, formally, is concave to the variable input (i.e. horizontal) axis.

[Remember that the 'optimum' in focus here is only with respect to use of variable inputs, i.e. those that change with the current level of output. For a farm business, that is equivalent to 'total gross margin'. That 'profit' margin must be at least sufficient to cover fixed costs, e.g. a tenant farmer's rent, farm family outgoings. If it is not, sooner or later the farm will go out of business.]

Appendices 2 & 3 belong together. The fundamental problem for farmers in high income, developed market economies such as the UK is that a) aggregate demand for food inevitably is limited (see Adam Smith quote), and b) because relative to economically powerful ancillary sectors, the many farmers are price takers (if one tries to negotiate a higher price than in the market, buyers simply turn to one of the many others who will sell to them cheaper). Thus to sustain, never mind increase, farm income means that farmers have constantly to innovate, to seek ways to reduce their costs of production by increasing productivity in the face of prices they cannot control. They have to keep running faster and faster just to stay in the same (net income) place. And left to a free market, margin per unit of output thus continues to decline, reinforcing farmers' need constantly to innovate. American agricultural economist (John F Kennedy's top agricultural campaign adviser who became chief economist of the USDA), Willard Cochrane, called this phenomenon 'the agricultural treadmill' (see Further Reading).

Further Reading: note how old are the majority of these texts, and many American.

Finally: For completeness, **Slide 32** shows my uncle who, more than anyone, inspired my interests as a small boy that led to a lifelong career in agricultural economics.