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## AGRICULTURAL RESEARCH AND THE RETURNS TO CONSUMERS

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Government funding is the major source of moneys for agricultural research and poultry research in particular. Dun [1] has estimated that the financial inputs from the poultry industry were less than 25 per cent of the total research expenditure in the industry. But where there are quotas on an industry's output (eggs produced) or alternatively on a factor of production (hen number), with both approaches trying to influence the price of eggs, there is some question as to whether society and consumers would benefit from cost-reducing research.

Duncan [2] has measured the economic benefits of innovations which reduce average costs per unit of output. "The adoption of such practices has the effect of shifting the upwards-sloping product supply curve to the right. The total gain to society, assuming no externalities and perfect competition, is depicted in Figure 1 by the hatched area. This area represents the gain in consumers' and producers' surplus. Consumers' surplus has increased from *abg* to *acf*; while producers' surplus has increased from *gbe* to *fed*" [2, p. 2]. The ex-post measurement of economic surplus is obtained by estimating the loss to society if the productivity increase were to disappear; that is if the supply curve were to move from  $S_1$  back to  $S_2$ .

In the above case both consumers and producers obtain a share of the economic benefits from investment in research, and both are better off. At this stage the cost of research has not been accounted for in the partial equilibrium analysis. Duncan and Tisdell, however, suggested that Australian farmers would be keenly interested in producers' surplus as "they are contributing by levy funds to support research for agricultural improvements" [3. p. 124]. They showed that where research reduces costs in marginal areas more than in infra-marginal areas and where the demand curve is relatively price inelastic, producers can lose as a result of cost-reducing research.

Australian consumers will be interested in economic surplus as they contribute through government funding to agricultural research. They may be interested in how consumers' surplus is affected by cost-reducing research in an industry that has a quota to limit output.

The implementation of the Egg Industry Stabilization Act and transferable hen quotas is the dominant feature of the egg producing industry. Of interest here is the limit on the number of laying hens in order to limit the number of eggs on the market and to eliminate export sales. The Stabilization Act also allows the Egg Marketing Board to

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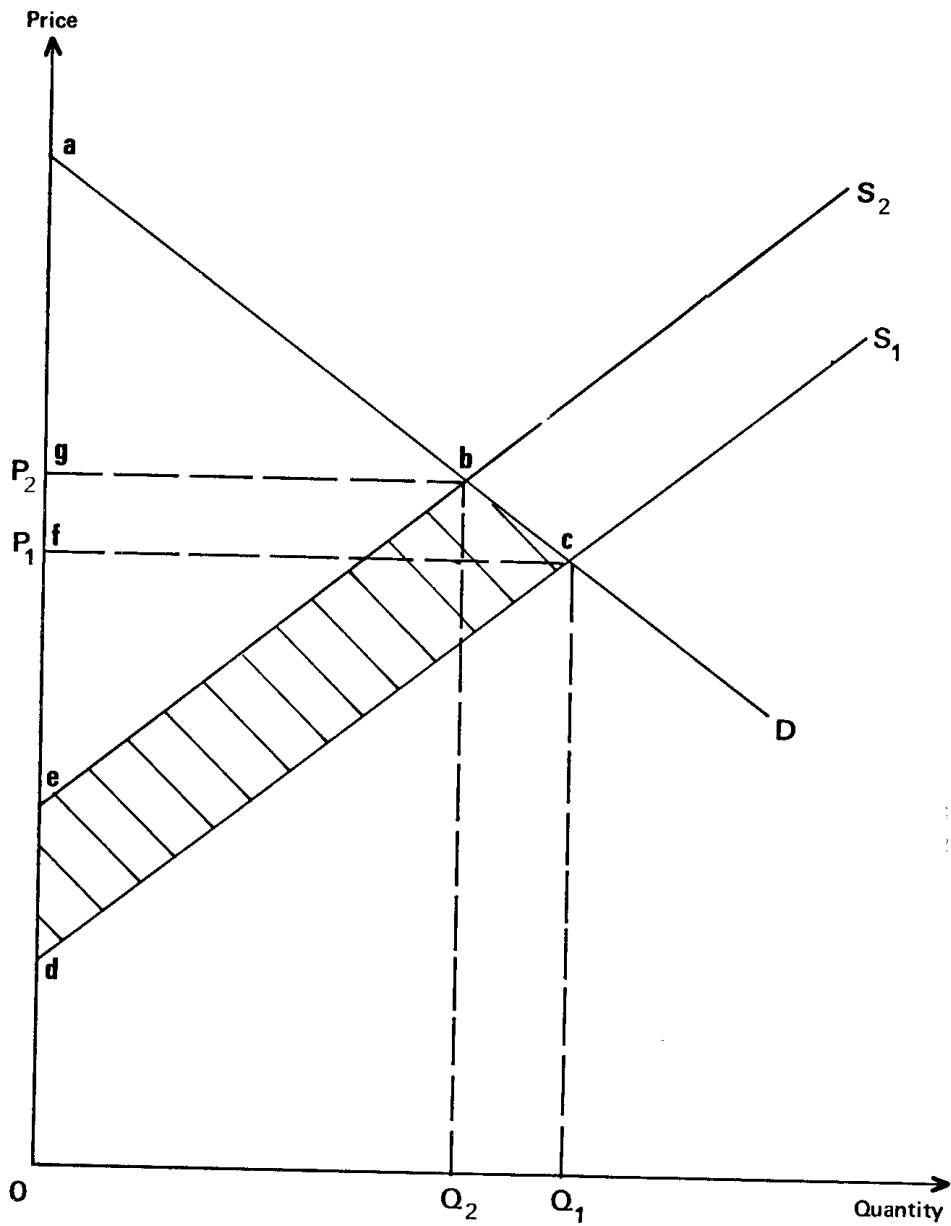


FIGURE 1: *Economic surplus resulting from the adoption of a cost reducing innovation*  
 Source: Duncan [2, p. 2]

regulate supply to maintain price. In the short run, after the hen number limit has been set, the producer cannot respond to price increases; for practical purposes the industry supply curve beyond the kink caused by the hen quota is perfectly inelastic.

Figure 2 represents supply management in the egg industry where the quota by limiting output forces the supply curves to become perpendicular at  $Q$ , and the supply curves  $S_1^1$  and  $S_2^1$  are dashed to show where they would normally be. In the short run especially, producers cannot react to increases in the price of eggs; the supply curves beyond  $Q$  are assumed to be perfectly inelastic. In this case the rent or producers' surplus (area  $hgfi$ ) is derived from the market power of the Egg Marketing Board. The total gain to society from a cost reducing innovation is depicted in Figure 2 by the hatched area  $efcd$ . The total gain is below the price line and thus goes entirely to producers. The net social loss associated with the reduction in output is shown by the area  $fabc$ ; the consumer gets nothing.

In practice however the Egg Marketing Board, faced with an inelastic demand curve and having power (via legislative action) to set prices and regulate supply, may argue that it will forego price rises while it continues to obtain the total gain from research for egg producers. This would satisfy the aim of the Marketing Board, which is to safeguard farmer incomes by ensuring adequate returns or by demonstrating reductions in the average costs of production. Thus it could be argued, consumers can benefit from cost-reducing research which indirectly slows down price rises.

In the longer run the producer can adjust the management of the farm to increase output per hen, causing the industry supply curve to be less than perfectly inelastic but still relatively price inelastic. If this occurs, the price of eggs would fall through greater quantities of eggs reaching the market. Consumers would benefit though not necessarily in proportion to their contribution to research funds. The net social loss would also be reduced.

Social implications when a food industry is aided are pertinent. Policy-makers may argue that the situation depicted in Figure 2 is little different from the payment of a subsidy, that the transfer payment to farmers is via the total gain from research and innovations, and that it is better the payment comes from Government funds rather than from too high a price on a basic food. Such a view would need to take into account the relationship of benefits of research to its cost, the extent to which price restraint was exercised, a consideration of alternative forms of income transfer, and of course the broader objectives of supply management in the egg industry. Producers will also see the advantage of not receiving an open and direct subsidy payment.

Government involvement in agriculture must be seen in terms of both facilitating cheaper food, and providing aid and assistance to the farming community. In this now conflicting environment, consumers can still have a vested interest in research in an agricultural industry which limits output.

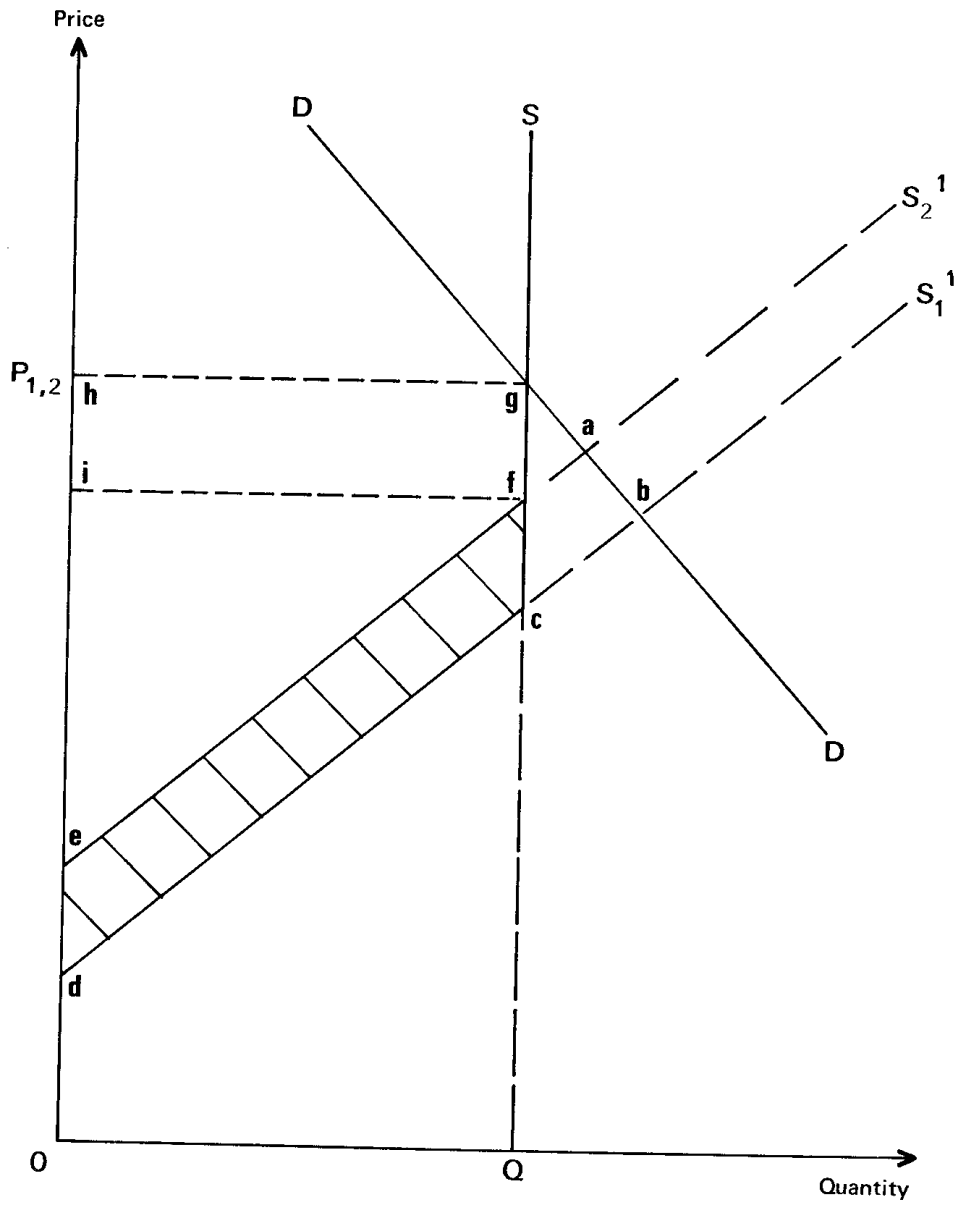


FIGURE 2: *Economic surplus resulting from the adoption of a cost reducing innovation under supply management in the egg producing industry*

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