Co-operative Research in Agricultural Economics

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1. Introduction

Co-operation in research is a complex question which would seem to depend to a large extent on a number of necessary and sufficient conditions for success. In this note an attempt is made to define some of these conditions and then reflect on a few possibilities for co-operation between institutions, in particular between government departments and universities. First, however, it is necessary to provide a brief discussion of research objectives.

2. Research Objectives in Universities and Government

In contrast to government, universities or even university departments *per se* do not have defined research priorities. Individuals within universities may have research priorities. Some research institutes within universities may have defined research priorities. However, this is perhaps one of the key differences between research in agricultural economics in universities and research in government. To be able to control the research process in government it is necessary that research priorities be set. Academic freedom is integrally bound up with this issue in universities. The freedom for an academic to choose a research topic and then the freedom to speak out about the results of that research are jealously guarded. The reputation of an academic in the research field then depends on the evaluation by peers of this research work. In government the evaluation depends, in a major part, on how well the work meets the goals and objectives of the senior members of the department or the decision maker(s).

Without research priorities in an organisation, research takes place in a rather haphazard way. However, research within universities does tend to follow a set of established lines of work depending on the people involved. This is because there is usually a very significant investment required in human capital to produce quality research workers. Thus, university staff tend to follow the same lines of work for considerable periods of time. University researchers also usually have a number of lines of investigation. This provides a safety net in case one line fails and also is important in the supervision of postgraduate research work. As with permanent staff of a university, postgraduate students also have a great deal of freedom in their choice of topics for research. Supervision of postgraduate students can often provide the supervisor with a new area in which to gain some experience since it is not always true that the supervisor is researching in the same area as the student. Supervision of research at the postgraduate level must therefore be seen in terms of the provision of guidance rather than instruction.

3. Why Co-operate?

Most analysis of research co-operation is focussed on multi-disciplinary co-operation. Multi-disciplinary co-operation should be viewed as distinct from multi-institutional co-operation within the one discipline. There are many commonalities to both types of co-operation but the purpose must be seen as different. Multi-disciplinary co-operation involves the use of people with specific

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disciplinary skills which are needed to resolve a particular problem. This type of research is often referred to as mission-oriented research or problem solving research. Teams of people are usually involved. It is unlikely that a multi-disciplinary team would be constructed for a project involving mainly curiosity research. This becomes much more the province of the individual researcher or, as Heady (1966) explains, the "lone wolf".

Multi-institutional co-operation would seem to have as an objective the need to meet the problems of insufficient people with the appropriate professional skills all within one institution so that a particular problem requiring resolution can be resolved. This may involve co-operation to speed up the job, to bring together certain specialisations within a discipline such as an econometrician and a commodity specialist, or to provide experience for a less experienced person within a professional discipline.

Multi-institutional co-operation can be seen as a non-zero sum, two-person co-operative game in which expected payoffs are improved by the co-operation between the institutions. The payoffs, of course, are quite difficult to define and would include things such as higher quality work, a more extensive piece of work, wider impact of the work since more than one institution is involved, skills transfer between individuals, use of specialised support services from one or other of the institutions, prevention of errors in the work through the sharing of the research process (something that can also be achieved in any multi-person team), presentation of a wider set of interpretations and conclusions, opening of channels of communication between institutions and their different perceived problems requiring research and, possibly most important of all, an increased amount of funding for the research effort through the process of co-operation.

Other than the direct payoffs from co-operative research, the payoffs may include the possibility of influencing the priorities of a researcher or research group within an institution, with second-round effects of successful completion of a job leading to more requests for a similar type of research and co-operation in any implementation phases. It should also be pointed out that the assessment of such benefits may also change as the co-operation actually takes place.

Game theory provides a form of analysis in situations where there is more than one decision maker. Co-operative research is such an instance. It is a situation in which the research managers contemplating co-operation will have to make choices which will depend on the decisions of others. There is thus the possibility for conflict or co-operation. To place the research co-operation problem in the context of game theory it is necessary to develop the numeric payoffs for alternative decisions. This poses a considerable difficulty but a number of possibilities exist. One alternative is to attempt a quantitative assessment of the impact of the research analysis given various combinations of co-operation. This might involve some form of social accounting which is designed to measure the net benefits of the research effort. Such accounting would require a consistent measure of the benefits for both organisations. This would have the advantage of allowing the measure of the research input to be budgetary expenditure but the disadvantage of posing difficulties in measuring the gains to individual researchers from such things as an increased number of publications.

The Nash (1953) two-person co-operative game highlights the importance of threats in ensuring that co-operation takes place. The threat provides the motivation for the players of the game to co-ordinate their strategies, whereas failure to co-ordinate will give each player the payoff termed the threat payoff (Intriligator 1971, p.123). This also leads to the notion of bargaining strength. In co-operative research the threat is often quite weak. The weakest of situations is when the consequence of either institution doing nothing is, in fact, nothing. The threat is that "I will do nothing if you do nothing". However, to be seen as doing nothing may have a negative impact on the reputation of

organisations. A somewhat stronger threat is that of reductions in funding if results are not forthcoming. Again, this threat may not necessarily lead to co-operation between institutions although, in the current environment, the threats of tightened budgets is probably providing incentives for organisations to co-operate in a variety of ways. The budget threat may also lead to greater activity within an organisation. Essentially the organisations must be able to exchange resources and gain a benefit for co-operation to be worthwhile. This may seem obvious but it does mean that co-operation for the sake of co-operation will usually not be useful.

Thus, the motivations for co-operation in research are complex but are likely to be driven by a situation of threat and gains to be made through co-operation and a difference in the resources available to each organisation to carry out research. The gains are obviously not always easy to measure but when specialised skills are involved and there is a lack of those skills in one or other organisation then co-operation is very likely to be beneficial. However, as will subsequently be discussed there are a number of other factors which are required to ensure successful co-operation.

4. Conditions for Co-operation

As outlined in the previous section there are a number of reasons for co-operation and, as well, there are costs to that co-operation. In this section the conditions which enhance that co-operation will be outlined.

The analysis from the game theory model above provides two conditions for co-operation in research. These are that an effective threat must exist which can be resolved and that positive payoffs exist to the co-operation. In addition, it would seem that there must be a desire on the part of research managers within organisations to bring about co-operation by appropriate funding of the co-operation. This means that budgets must be specified appropriately and that manpower must be allocated to the co-operative research.

Heady (1966) set out in detail some of the conditions for successful co-operative research. In discussing the problem he noted that there does not appear to be a single recipe for guaranteeing success but did point out that a team basis is often effective if sufficient recognition can be made of the efforts of individuals in the team. He also added, that it is very important for research managers to view the work in a holistic way. The managers must understand clearly the need for co-operation. Summarising the discussion by Heady leads to the following set of important elements for success:

1) Genuine interest in the research by the co-operating individuals;
2) Research administrators may act as "catalysts" but responsibility for the initiative falls on the individual researchers;
3) The co-operative work needs to be seen as not "just another chore" or as one person simply "doing the leg-work" for somebody else;
4) The co-operators must have time to come to an understanding of each other's fields (particularly important for multi-disciplinary research);
5) Co-operators must have personal attributes which make co-operation possible, not the "lone wolf" type;
6) Professional jealousy and competition must be absent;
7) Scientific objectivity rather than trying to prove a point is necessary for co-operation at a personal level;
8) A satisfactory division of labour is required and should be associated with an appropriate degree of recognition; and
9) Political sensitivities in relation to the project should be resolved before research is initiated.

5. Opportunities for Co-operation

What then are the possibilities for co-operation between institutions such as government departments and university researchers? Basically there would seem to be two forms of co-operation. In the first case, there is education or training combined with research and, in the second, there is strictly co-operative work involving funded research.

In the case of education, universities publicly offer to supply such a product and generally gain by having more high quality students (unless quotas are imposed). It is possible for an organisation to have a staff member on full or part salary located at a university while still working for the organisation. The co-operating institution gains by obtaining a more highly qualified individual and, if at the postgraduate level, can obtain results from a research-oriented project. In this case the co-operation involved is in terms of the initiation and development of the research project with which the postgraduate student becomes involved. As well, the student may be encouraged to take certain types of courses which are appropriate to the type of research to be carried out. One of the elements in such co-operation is that it has to be seen as longer-term since it usually takes about 18 months to complete a Masters degree and three or more years for a Ph.D. The "fire-fighting" type projects, often encountered within government, are usually not suitable for such work. The fact that such co-operation is not common would seem to imply that the value of the education is not seen to be as great as the contribution an individual can make by staying within the employing institution.

The second type of co-operation is in terms of fully-funded research. In this case funds may be sought from a research funding body on a co-operative basis or be provided by one or more of the co-operating organisations. This type of co-operation would seem to be a very effective means of combining diverse sets of skills into one project team. On the whole, universities and probably most government departments do not usually have funds allocated for such work. However, if the expected payoffs are high enough then funds may be allocated. A good illustration of this was the case of the construction of the FARM model of Canadian agriculture. In this instance successful co-operation between government and university departments was brought about by contract funding. The approach was used to permit the bringing together of a set of modelling skills sufficiently diverse to construct an econometric model of Canadian agriculture (Johnson, Huff and Rausser 1982).

Other cases of co-operative research are readily available such as the joint work by the Australian Wool Corporation and the Bureau of Agricultural Economics (Cairns, Curran and Devine 1984; Australian Wool Corporation and Bureau of Agricultural Economics 1987). Perhaps one of the best illustrations of an institutionalised system of co-operation is the Land Grant system of universities in the United States where co-operation between government and the Land Grant Colleges was an integral part of their development (Schuh 1986). This type of fully-funded research co-operation would seem to be more common than co-operation through postgraduate study. The reason is most likely that there are significant payoffs to combining appropriate sets of skills within a team to solve a particular problem.

6. Concluding Comment

It is apparent that in many instances there may be gains to be made from some types of co-operative research. However, it is important that the free-rider problem be overcome by a sufficient threat to overcome the consequences of inaction. It is also important that the conditions be appropriate in terms of a commitment by the organisations to the work of the individuals involved. This commitment is required on the part of the research managers and the individuals involved in the co-operative research and is summarised in terms of the Heady conditions for co-operative research.

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