



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Miscellaneous Publication 8-1981
Minnesota Agricultural Experiment Station
University of Minnesota

Evaluation of Agricultural Research

**Proceedings of a Workshop Sponsored by NC-148
Minneapolis, Minnesota May 12-13, 1980**

ACCOUNTABILITY IN RESEARCH THROUGH INDUSTRY FUNDING

Robert Lindner*

The large volume of research reported at this symposium is just one indication of the considerable cost involved in meeting the current public demand for evaluation of agricultural research. Presumably the principal reason underlying this demand is the fact that a high proportion of agricultural research is publicly funded, and unlike many other forms of investment, not necessarily subject to the discipline of market forces. This paper discusses a method of funding rural research in Australia ^{1/} which, at least in part, overcomes the inability to appropriate the benefits from research, and thus allows the industry to determine the level of funding and to control the allocation of research resources. The essential feature of what is known in the United States as the "check-off" system is a collective decision by an industry to impose a levy on its output to raise funds for research into industry problems.

In his address to the symposium, Ray Miller challenged agricultural economists to undertake more studies of the effectiveness of research management procedures in different countries. The difficulty, of course, with such cross-country institutional studies is that it is all too easy to describe differences, but all too difficult to determine whether, and how such differences affect performance. This paper is similarly long on description and short on analysis, but hopefully the discussion below of how industry funding of rural research operates in Australia may be of interest to the countries like the United States where its use is much less prevalent.

In Australia, the industry bodies which administer and allocate the research funds derived from a levy on production are known collectively as Rural Industry Research Funds, or RIRFs. To understand the role played by the RIRFs, it is necessary to know a little about how rural research in toto is organized and funded. Table 1 provides an overview of the system for the financial year 1973-74, which unfortunately is the *Economics Department, University of Adelaide, and Visiting Research Fellow, AFRAS, University of Sussex.

last year for which comprehensive data are available. However, with the exception of inflation, there have been no changes since then which would radically alter the situation depicted in Table 1.

It can be seen that, in contrast to the U.S.A., government research organizations carry out the greater part of all rural research conducted in Australia, with the commonwealth government (mainly CSIRO) accounting for 48%, and the state governments (mainly state departments of agriculture) accounting for an additional 39%. Higher education, which in some senses is also government, accounts for an extra 6%, leaving only 7% to be carried out by other bodies, including business enterprises.

Table 1 also reveals that direct government financing, typically by way of Treasury subvention, is the dominant source of funds for the three most important groups of research organizations. The remainder mainly came from a combination of RIRFs (about 12% in the case of CSIRO, and about 9% for the state departments of agriculture) and from other government financed (but not industry controlled) research funds.

While there are important differences between individual RIRFs, all are organized in essentially the same manner, and the most important features include:

- 1) Agreement by members of the industry to impose a levy on output to provide funds for research into industry problems. For the 10 statutory RIRFs, which cover all the major industries, the levy is legally compulsory, but there are a similar number of non-statutory RIRFs covering some of the less important industries for whom the levy is voluntary.
- 2) Agreement by the commonwealth government to match the industry contribution, usually on a dollar-for-dollar basis. Hence, the amount of funds which RIRFs control, as opposed to collect from production levies, is approximately double the amount shown in Table 1.

Table 1. Sources of Research Funds by Type of Research Organization (1973-4)

<u>Research Organization</u>	<u>Common-wealth Government</u>	<u>State Government</u>	<u>Higher Education</u>	<u>Non-Profit Organizations</u>	<u>Business Enterprise</u>	<u>Total</u>
Total Amount \$(million)	67.3	55.0	8.2	2.4	7.3	140.2
Source of Funds (%)						
Commonwealth govt ^a	88	8	59	19	5	49
State govt	-	88	3	3	-	35
RIRF ^b	10	4	18	16	1	8
Other Sources	2	c	20	62	94	8
Total Sources	100	100	100	100	100	100

a Including matching grants to RIRFs.

b Excluding imputed value of commonwealth government matching grant.

c Less than 1%.

SOURCE: Industries Assistance Commission, "Financing Rural Research" 1976.

3) Allocation of funds to high-priority (for the industry) research projects. To ensure effective control over research priorities, industry representatives make up a majority of the membership of the management committees which make decisions about which research proposals to sponsor, but membership also includes several members from the scientific community plus at least one representative of government. Furthermore, most funds have a full-time executive and/or a system of advisory technical sub-committees to supplement the advice of the scientific members of the main allocating committee.

Advantages and Disadvantages of the RIRF System

The Industries Assistance Commission (IAC) enquiry into Financing Rural Research saw important advantages in this method of funding research, and strongly recommended that government support for the RIRF system be continued. The IAC was attracted by the idea of the customer/contractor principle proposed in the UK Rothschild Report as a means of ensuring accountability of the research system to social needs; but saw the RIRF system as a means of implementing this principle within a pluralistic funding system, and thereby avoiding the centralized bureaucratic system which was established in the United Kingdom. To quote, the IAC regarded the RIRFs as "an eminently suitable instrument for the assessment of priorities for each industry" (IAC, 1976, p. 47).

To appreciate why the IAC attached such importance to the role of the RIRFs given their relatively minor contribution to overall funding as revealed in Table 1, it is necessary to understand in some detail how the RIRFs operate. Out of a total of A\$ 23 million allocated by the 10 statutory RIRFs in 1973-4, less than half was used to support most of the costs, including staff salaries, of entire research programmes, mainly in CSIRO, but also in the Bureau of Agricultural Economics. For this type of support, provided largely by the Wool RIRF, and to a lesser extent by the Meat RIRF, industry control over the direction of research is circumscribed by lack of flexibility in the current stock of human capital.

Most of the remainder of the RIRF funds are used to provide supplementary support for individual research projects, and are allocated on a competitive basis. Some RIRFs simply invite all research organizations to submit proposals for research relevant to the industry in question, and then sponsor those projects deemed to be of (potential) economic importance to the industry and of sufficient scientific merit. Other RIRFs decide on certain priority areas first, and then invite proposals for research on those areas. Where long-term work on a major industry problem is felt to be needed, they may virtually call for tenders to make specific contributions to the solution of the problem.

While the absolute amount of funds provided on a competitive basis is small, RIRFs are able to exert an influence on the direction of research equivalent to the proverbial tail which wagged the dog because they only fund direct experimental costs, including vital items of equipment in some cases. Other research costs, particularly salaries and infrastructural costs, which typically account for 70-80% of total research costs, are left to be paid for out of "core" funds provided to research organizations by direct government grants. Given the fixed nature of research personnel, this policy has allowed the RIRFs to exert an influence over the direction of rural research which far exceeds their contribution to research expenses.

Other advantages of the RIRF system noted by the IAC included the beneficial effect on efficiency of research agencies through being subject to external review, and the greater liaison and coordination of rural research brought about by contact between research workers and rural producers through representation on joint committees, and by sponsorship of conferences and workshops. The IAC also noted that the RIRF system of funding tends to share the costs of research between consumers and producers in the same proportion as the benefits of research, since the incidence of the production levy and of research benefits both depend on the elasticity of demand. This statement needs to be qualified in two respects, one being that only a proportion of research costs are funded by a production levy. The second qualification relates to the fact that a production levy will always shift the supply curve up in a parallel fashion, while the offsetting downward shift of the supply curve induced by implementation of (successful) research results need not be parallel. If the latter shift is divergent, the producers' share of research benefits will be less than the proportion of the production levy which they bear.

In theory, the almost intractable problem of determining the optimal level of investment in research could be solved by letting each industry decide for itself the rate at which to levy production to fund industry specific research. One difficulty with such an approach in practice is that research results are rarely entirely specific to a particular industry. Furthermore, these inter-industry spillover effects become more severe, the further a particular project is along the spectrum from applied to basic research. Another problem is that funds derived from production levies reflect current levels of production, whereas the optimal level of investment in research, given the considerable time lags involved, should be related to future levels of production. For instance, a RIRF system of funding would be most unlikely to carry out research leading to the development of a new industry.

Presumably, it is for these reasons that government subsidizes the RIRFs, as well as providing funds by other means to support research. Nevertheless, the IAC enquiry felt that the RIRF system could exert an influence on research resource allocation between industries, and chose to regard the variation in the level of funding contributed by different industries as "a reflection of the consensus of opinion among primary producers as to the level of research support which is required by individual industries." Such a proposition is debatable given the fact that there are alternative sources of funds from industry specific research.

Table 2 provides information on rural research expenditures broken down by industries, and the contribution made by RIRFs to funding of industry specific research. It would be unwise to read too much into the figures in Table 2 as the IAC encountered a number of problems in collecting and classifying the data. Nevertheless, there is little evidence in the table to support the view that an industry can increase the relative share of research resources devoted to investigation of its problems if there are alternative sources of untied funds available to research organizations.

Apart from the more general drawbacks to industry funding of research due to inter-industry spillovers and other problems discussed above, the IAC noted several practical difficulties encountered by RIRFs operating in Australia. Some of these problems derive from the fact that for most RIRFs, levies are on a unit of output basis. As a result, the rate of growth of research funds from the levy has not kept pace with the rate of increase in research costs. Output levies also involve inequities where prices for a product vary substantially due to large quality differentials; while for industries facing a highly inelastic demand curve, levy collections vary inversely with ability to pay. For these reasons, the IAC enquiry strongly recommended that all RIRFs switch to a levy based on value of output. In recommending this change, it was recognized that it would tend to exacerbate another problem, namely the high administrative costs encountered by at least some industries in collecting the levy. To minimize this problem, the commission suggested collecting the levy as far down the marketing chain from the producer as feasible, and/or employing a standard value method of pricing commodities, such as beef, which are not homogeneous, and exhibit substantial price fluctuations over time and space as well as between different grades of output. Switching to a value-based levy also would tend to ameliorate the problem of fluctuations in levy income faced by the RIRFs. The IAC saw establishment of reserves by RIRFs as the best solution to this problem.

Table 2. Research Expenditures and RIRF Contribution, by Commodities, 1971-2 to 1973-4

	GRP A\$m. (X)	Av. Res. Expendit. A\$m (Y)*	Research Intensity (100Y/X)	Est. % Prodn. Levy (Z)**	Est. % RIRF Share (2ZX/Y)
Wool	1044.1	9.74	.9	.53	114***
Sheepmeat	281.1	3.64	1.3) .16) 27
Beef	936.1	11.01	1.2))
Dairy	463.2	6.98	1.5	.10	13
Pigs	136.0	1.37	1.0	.15	30
Poultry	104.3	1.17	1.1	.10	18
Eggs	125.4	.84	.7	.10	30
Other	9.0	14.12			
Total L/S	3099.2	48.86	1.6		
Wheat	710.4	4.93	.7	.07	20
Barley	135.2	.70	.5	NSR	
Oats	45.2	.35	.8		
Rice	29.1	.65	2.2		
Maize	9.4	.36	3.8		
Sorghum	63.5	.50	.8		
Cotton	29.8	1.25	4.2		
Tobacco	40.4	1.12	2.8	1.11	79
Sugar cane	218.8	2.61	1.2	NSR	
Other	731.1	7.34			
Total Crop	2012.9	19.80	1.0		
Dried Fruits	35.3	.37	1.1	.15	28
Grapes	36.2	1.59	4.4	NSR	
Citrus	44.5	1.05	2.4		
Stone Fruits	38.5	.98	2.5	NSR	
Pome Fruits	82.0	1.67	2.0	NSR	
Bananas	23.9	.43	1.8		
Potatoes	65.2	.83	1.3		
Tomatoes	35.1	.47	1.4		
Beans	7.9	.32	4.1		
Other	105.0	3.58			
Total Hort.	473.6	11.29	2.4		
Fisheries	101.2	5.51	5.4	.26	10
Forestry	168.7	7.42	4.4		

Source: Based on Industries Assistance Commission 'Financing Rural Research' 1976.

* The 'other' category for Average Research Expenditure includes research which could not be allocated to a specific industry as well as research on industries not listed in the table.

** Based on 1973-4 data only. Expresses levy funds, excluding commonwealth government contribution, as a percentage of value of industry output. NSR indicates non-statutory RIRF relying on voluntary levy.

*** This anomalous figure probably is due to classification of some research funded by the Wool RIRF as sheep meat, or other industry research. The figure may also include some funds spend on wool promotion.

Another difficulty encountered by Australian RIRFs was the resistance to changing a levy rate once it had been established. The need to do so frequently is less pressing for a value levy than a unit-output levy, but still might arise if research costs inflate at a faster rate than the increase in price of the commodity, and/or if future market prospects for the industry change in any way. Thus, it would seem desirable to make it as easy as possible to change the levy rate, and in particular, to avoid cumbersome procedures for doing so. A related problem facing government is the rate at which to subsidize, if at all, levy collections. The primary argument for such a subsidy is interindustry spillovers, but until such time as the relative importance of these has been established, the level of government subsidy will have to be determined arbitrarily.

To summarize, industry funding of research by way of production levy does partially overcome the appropriability problem, and provides a device for ensuring a degree of accountability on the part of rural research organizations to the needs of rural industries. However, society needs to provide alternative sources of funds as well, since the scope for funding research in this manner is limited to applied research and development work, and for even this type of work there is a case for governments to subsidize the RIRFs. Attention also needs to be paid to resolving several practical problems which otherwise might impair the efficient operation of the RIRFs.

Footnotes

1/This paper draws heavily on the following two publications:

Financing Rural Research, Industries Assistance Commission, Australian Government Publishing Service, Canberra, June 1976.

Jarrett, F. G. and R. K. Lindner. "Rural Research in Australia." In D. B. Williams (Ed.), Agriculture in the Australian Economy. Second edition. Sydney University Press (forthcoming, 1980).