1994 NZAS Survey of Scientist's Perceptions of New Zealand Science: The Why, The How, The Release and The Response

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Background to the Survey - The Why

The survey was undertaken to establish New Zealand scientist's perceptions of their situation and how they view the changes in the organisation of science which have occurred over the last decade. Scientists, as distinct from managers and policy makers, had not had their opinions canvassed on what is actually happening to New Zealand science.

It seemed to the Council of NZAS that there was a discrepancy between the view that the 'reforms' were wonderful, which tended to be the position of those involved in driving and defending the changes, and the messages of concern and anguish from many working scientists. The Council gets communications from NZAS members, who tend to be those interested in broader perspectives of science, and its councillors have their own observations. This anecdotal evidence suggested that the perception that New Zealand science was thriving was a somewhat partisan view of reality. There seemed to be different realities down on the coalface. We believed that the perceptions of working scientists are particularly important and accurate views of what is happening to New Zealand science, and need to be known in appraising it. We wished to base the views by NZAS on substance, rather than anecdote, so the decision was taken by the NZAS Council, in December 1993, to survey the actual situation of scientists, as perceived by themselves, as the major focus for Association activities in 1994.

The Survey - The How

There were formidable difficulties in planning and carrying out the survey, not the least of which was that the people involved were under considerable pressure for time and effort in their own jobs [1]. The major technical difficultly was in how to reach a representative selection of scientists with the questionnaire, there being no database of scientists in New Zealand. The survey was finally carried out in three waves as the opportunity arose. First, the Association membership (334) in April/May 1994 was targeted. Second, 1000 questionnaires were to be sent in May/June 1994 to a random selection of members of professional societies, generated from the Royal Society lists. Societies were selected which had a high proportion of scientists in their membership, and which had updated their Royal Society mailing lists within the previous three years. Finally, the Primary Production Group of the Royal Society (nine professional societies) were considering the need for a survey of scientist's views just as the Association's questionnaire appeared. They decided to send the NZAS separately to 1229 scientists on lists of their member societies. They asked their member societies to identify scientists among their membership. Currently, this is probably the most accurate way of way of identifying a wide range of New Zealand scientists. The decision to circulate the Primary Production Group of the Royal Society occurred just afterthe 1994 Government Budget which announced not only an end to the ongoing cuts in Science funding but also a modest increase in funding over three years. This enabled a question to be included to this group concerning perceived effects of the Budget on science.

Of the 2569 questionnaires circulated, 837 were received in time for the major analysis. This is an overall response rate of 33% but allowing for overlap and probable non-scientists in the Royal Society lists, the actual response rate was probably similar to the NZAS rate of 42% (see next article). Overall, the survey included about 35% of the PhD's involved in New Zealand R&D. This substantial coverage helps validate the results (summarised in the next articles and in Kirton, Ross and Mercer, 1995 [2]), despite a lack of a database of scientists.

Based on our wish to determine the views of those actively involved in science, a subset of 713 individuals employed in scientific research or otherwise in science within the last five years was used for relevant questions. This group was further broken down into those employed in CRIs, in universities, and the rest. We made sure in the design of the original questionnaire that we could not identify individual employers. The aim was to uncover issues which needed addressing, not to apportion blame for any problems. This also precluded praise for any successes. In retrospect, we probably lost information useful to science employers by not identifying them. Although the survey was beta-tested on a number of NZAS members, and shortened considerably, problems remained with some questions affecting our ability to analyse them.

Privacy was maintained and we regarded this as crucial. The unsummarised, numerically encoded, data have been confined to those who were directly involved with analysis of the survey[1] and to Dr Tony Robinson who is an NZAS member, and to those employed to enter the data. Wilford Lie was contracted to develop a programme to analyse the survey, but other data analysis has also been used. We did not have direct access to the Royal Society mailing lists.

The Release of Results

Summarised versions of the Survey results were released in the following ways:

(1) As a press release (2 October 1994), with subsequent media interviews and discussion.

(2) As a *Scinet* newsletter (October 1994), received by all members and subscribing libraries.

(3) As a more detailed summary to the NZAS Annual Conference (20 October 1994). This summary is revised and extended in the following articles.

(4) Meetings with interested parties, summarised below, who were also given copies of the detailed summarised results prepared for the Conference.

(5) As an article published in *Agricultural Science*[2] of analysis carried out by the Royal Society Primary Production Group of respondents in the primary production section.

(6) Copies of the summarised data were also given to the Director of the Health Research Council and the General Secretary of the Association of University Staff.

The Conference/Workshop: 'Scientists Take Stock', NZAS Survey 1994

The NZAS Annual Conference was organised primarily as a workshop to discuss the Survey results [3]. The feeling of the Conference was very positive and feedback from the 40 attending was that both the Conference and the Survey were informative, and worth repeating. Many issues were discussed in small groups, and summarised in plenary session, with commentaries from: Tony Robinson (ex HRC Virus Research Unit, now CSIRO, see his article); Mike Collins (past Director-General, DSIR), on how the DSIR structure had become untenable in the new public service environment of the Public Finance Act (1988); Ros Murray-McIntosh (Wellington School of Medicine) on the career difficulties facing health researchers; Brian Easton (Social Science Consultant), on social science perspectives of the policy environment of science; and Craig Ross (Landcare, CRI) on the agricultural sector analysis.

Key issues and points arising from the workshops included:

On the Survey itself:

- It quantified much needed information for the first time, with few surprises for working scientists.
- Demographics of respondents were reasonably close to those of science expenditure — where known. Younger, less experienced scientists were under-represented.
- The survey was sufficiently large for it to be important for those involved in determining and implementing science policy.
- "With the resources available, the best that could be done by people in spare time". Not a rigorous Survey procedure by best social science standards, but lack of a scientist database makes this inevitable.
- The survey is a snapshot of mid-1994 perceptions.
- Scientists are so demoralised by their perception of the situation, and what is happening to science, and especially their management, that the results may inadequately reflect an improving situation.
- The survey provides baseline data and needs to be repeated to monitor changes.

Resource Allocation:

- The culture of "Managerialism", ie that the "business/private sector knows best" is not applicable to research science.
- Funder/provider split is unworkable, funding needs to be more negotiated, less hands-off. Scientific research is a creative activity by scientists, not a commodity.
- Need to fund processes and outcomes not outputs. Non-specific output funding should rise immediately to 20% and shift to 60-80% of base funding. Twenty percent contestable funding would be enough to ensure competition and maintenance of standards.
- Priorities need to be stable — with changes slow and well-signalled.
- 'Accountability' requirements have gone overboard with the need to provide questionable data and excess paperwork at the expense of real accountability for production of good science. Efficiency has decreased (see article by H. Offenberger).
- Output areas distort science, Basic Science Fund [now the Marsden Fund] is an acknowledgment of the need for balance and to allow for the unexpected.

Career Structures:

- Have been largely destroyed. A career structure was needed urgently in CRIs, for full-time health researchers and for other university grant-funded researchers. Need five year grants (three years too short), and retraining options.

Managers of Science:

- Overall, the mode of management is seen as archaic, traditional and authoritarian, secretive, focussed on the short term and the antithesis of supporting creativity (see article by Tony Robinson). Lack of scientific and management expertise especially in CRIs but also universities. Need management training, workplace reform.
- Creativity by scientists is stifled by a hostile, insecure environment.
- Managers and boards not accountable - suggestion that an audit of management (eg by FRST), similar to the 10% management audit of the Inland Revenue Department.

Scientists:

- Scientists' morale is bad, many feel powerless and trapped as a result of: 30% cutback in science since early 1980s, radical and continuing reorganisation and bad management. The 1994 Government budget was a sign of change and hope.

Science in New Zealand:

- Radical change has led to less good and more bad science. There has been loss of efficiency, there is less science per dollar spent. There is less collaboration between science providers.
- Conditions for innovation are less favourable (also see article Dr Tony Robinson).
- There is an urgent need for adequate scientific analyses of science productivity and returns on investment in research.
- Questions raised include:
  (a) Has science that is crucial to New Zealand's future suffered because of the changes that have occurred over the last five years?
  (b) Has New Zealand science become predictable, non-innovative and risk avoiding?
  (c) Has survival and the quest for financial return replaced good scientific judgement?
  (d) Is there still a value placed on a contribution to knowledge?
  (e) Has insecurity, personal and economic, become an over-riding influence in science?
  (f) Have the expectations of scientists become unrealistic and is their training appropriate?

Identified Threats to New Zealand Science

Workshops were specifically asked, among other things, to identify threats to New Zealand science. Those mentioned included:

(a) That the laudable government aims for science will not be met and that this will not be known.

(b The funder/provider split with divided responsibilities for overall outcomes.

(c) Marginalisation of scientists in decision making.

(d) Instability of funding and insecurity of scientists.

(e) A braindrain, lack of recruitment into science, and downskilling with a lack of monitoring and impact analysis.

(f) The rising pseudoscience/antiscience/supernaturalist culture.

(g) That the changes in science organisation will inhibit innovation, reduce good and excellent science, and that New Zealand will not get the science it needs.

Meetings with Interested Parties — The Responses and Issues Raised by NZAS[4]

The Survey results were presented to and discussed directly with various people and groups. These talks were, of necessity, confidential, to allow free and honest discussion. Without exception, the response was friendly, positive and, in general, considerable interest was shown in the results with concern to further develop the issues raised. The groups and some of the issues which we raised and discussed are listed.

Foundation for Research Science and Technology (10 October 1994)

- Need to improve assessment and feedback procedures administered by the Foundation.
- Need for funding stability and careful implementation of changed funding priorities.
- Need for increased funding for science.
- Need to support basic science funded by theFoundation, which is declining.
- Need to address management of some CRIs where management style was not facilitative or conducive to good science.
- Need to monitor human resources in science.
- Need for a funding system to support career structures.

Ministry of Research Science and Technology (14 October 1994)

- Need for database of scientists in CRIs and in science in general.
- Need to address career structures and human resource issues in science (see also article by B. Walker, *Sci-Tech*, 6 June 1995).
- The shift towards applied research was raised and establishment of a Basic Science Fund (Marsden Fund), that was not just a stop gap measure to support limitations of the Public Good Science Fund, was discussed.
- Comparisons of differences between scientists' perceptions in CRIs and universities were discussed.
- Need to further monitor perceptions of scientists in a changing science environment.

Crown Company Monitoring and Advisory Unit (1 November1994)

- Need for more information on human resource base in science.
- Need to monitor scientists and scientists' perceptions — further surveys.
- Monitoring processes and the problems of obtaining information from scientists and CRIs.

Hon. Simon Upton, Minister of Research, Science and Technology (9 November1994)

- Need for overview of how New Zealand science was functioning, such information was not accommodated within the roles of existing government official bodies.
- Need for ongoing, independent surveys of scientists.
- Comparison of science in universities with CRIs.
- Basic and applied research, public good science and [Marsden] funds.
- Career structures and situation of scientists.

Public Service Association Group (7 December 1994; 5 April 1995):

- CRI realities.
- An enormous variation in salaries for starting postdoctoral researchers.
- Management style.
- Secrecy and narrow demand for attainable 'outputs', which was destroying innovation, was described to us.
- Need for ongoing surveys.

Association of Crown Research Institutes 10 February 1995):

- Validity and limitations of survey and need for further analysis to identify positive/negative bias.
- Management issues and career structures, need to develop an overall view of these.
- Database of information on scientists within some CRIs.
- The problems of defining establishing career structures were discussed.

Dr the Hon. Lockwood Smith, Minister of Education (16 March 1995):

- Effects of cuts in the tertiary education sector on research; limitations of current weightings of EFTS (effective full-time student) funding; targeting doctoral EFTS funding to support research.
- Effects of Marsden Fund on research in the universities.
- The role of research versus teaching within the universities.
- Effects on research of reduced tertiary funding per student.

New Zealand Vice-Chancellors' Standing Committee on Research (29 March 1995):

- Comparisons of universities with CRIs.
- Redirection of EFTS funding for postgraduate research to other uses.
- Science priorities and scientist morale.
- Effects of reduced tertiary funding on research within the universities.
- The Marsden Fund.

In Conclusion

With all groups we had positive and constructive discussions. There was unanimous agreement that the present survey was a valuable baseline and that it would be essential to carry out further independent surveys of scientists, eg every two years. Sometimes individual results cannot be fully interpreted in isolation, but need to be considered in comparison with other values. In some cases internal comparisons are helpful. An example is that more scientists thought that it was harder to recruit and retain the best scientists but that access to international links had increased. Thus the comparison of the two answers allows an internal control of positive or negative bias. But in many cases the useful comparisons will be changes detected in future surveys. Hence, to get the most information from the present survey, another should be conducted next year. It will be a high priority of the Association to see this done.

Footnotes

1. The people directly involved in setting up the survey were Chris Sissons, Mike Berridge, John Offenberger, David Heath, David Penny and Pam Walker, with Robert Davies as adviser. The work involved was immense, especially for those having to work in their spare time. The cost of the survey was borne by the Association with no outside support, except for the Royal Society who handled the second and third mailings. We would like to acknowledge, with gratitude, their help. The total cost of $10,000 (including this issue of the *Science Review*) is being met by a transfer of $5,000 from Association reserves.

2. Kirton A., Ross C. and Mercer G.J.K. (1995). New Zealand primary production scientists take stock of science reforms. *Agricultural Science* 8 (2) 33-36.

3. The conference organising committee was Chris Sissons, Mike Berridge, David Heath, Pam Walker, Brian Shorland, Tom Sydall and Ken Aldous.

4. The NZAS was represented by Mike Berridge, Chris Sissons and David Penny.