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AN ASSESSMENT OF THE SUCCESS AND IMPACT OF ACIAR PROJECTS[#]

Based on independent reviews of 111 ACIAR projects September 1990 to September 1997

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November 1997

Also incorporating, in Annex C,
A Report on Independent Reviews of ACIAR Projects 1982–1990
by Bruce A Auld[2]
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FOREWORD

ACIAR commissions independent external reviews of its completed research projects. A summary/synthesis of reviews before September 1990 was made in 1990 by Dr Bruce Auld, Research Scientist, NSW Department of Agriculture at ACIAR's request. The report by Dr Auld was not published at that time.

In November 1997, a similar analysis was made of reviews after September 1990, this time by Dr Roger Mauldon, who was, for 20 years before retiring, a Commissioner specialising in agricultural matters with the Industry Commission.

The findings of both reports are published here.

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SUMMARY

In 1990, Bruce A. Auld reviewed 71 independent assessments of ACIAR projects which had been undertaken between the time ACIAR was established in 1982 and March 1990. Auld evaluated the projects against four terms of reference: achievement of objectives; scientific merit and relevance; collaboration; and recommendation for continuation.

This paper reports a similar assessment made of 111 project reviews received by ACIAR between September 1990 and September 1997, but in terms of different outcome criteria. Each project was evaluated on a 1 to 5 scale for three outcome parameters:

- *technical success* (encompassing the meeting of project objectives and the relevance and scientific merit of the research);
- *impact on research capacity* (including access to new techniques);
- *and impact on farmers, consumers and the environment* (taken to encompass *community impact* generally).

A score of *3* was taken to represent a satisfactory outcome in terms of: meeting stated project objectives; providing a basis for continuing research capacity; or having started (or soon to start) actions which impact on the community generally. A score of *4* was taken as being very successful, and a score of *5* as outstanding. Scores of *1* or *2* represent a less than satisfactory outcome for the particular parameters. In the case of *technical success* they also mean an unsatisfactory outcome for the project, since its objectives have not been adequately met.

The evaluation of *technical success* was reasonably straightforward, as most reviews directly and thoroughly addressed this aspect of the projects. The assessment of impact on *research capacity* was less straightforward, as the reviewers' terms of reference generally did not relate as directly to this outcome as they did to *technical success*. The assessment of *community impact* was the most problematic, since reviewers' comments lacked focus on the implementation of project outcomes. These qualifications need to be kept in mind in considering the following conclusions.

As Table 1 shows, a large majority of the projects was assessed to have made satisfactory or better progress towards meeting their specific research objectives. This conclusion is similar to one drawn by Auld in 1990. Similarly, a large majority of projects was assessed to have made satisfactory or better progress towards improving research capacity and thereby meeting ACIAR's general goal "to increase confidence in and expand international cooperation in agricultural research".

In contrast, the community impact of most ACIAR projects did not rank highly in terms of outcomes which were being or could be implemented within three years or so of the project's termination. This outcome is not surprising given ACIAR's priorities and that much of the research it supports is basic research.

Table 1. The numbers and percentages of 111 projects ranked by degree of success in three parameters: technical success; development of research capacity; and community impact

Ranking	Category of success					
	Technical success (number)	%	Research capacity (number)	%	Community impact (number)	%
Outstandingly successful (score of *5*)	16	(14)	14	(13)	5	(5)
Very successful (score of *4*)	41	(37)	36	(33)	20	(17)
Satisfactory (score of *3*)	33	(30)	48	(42)	29	(26)
Less than satisfactory (score of *1* or *2*)	21	(19)	13	(12)	57	(52)
TOTAL	**111**	**100**	**111**	**100**	**111**	**100**

These results rank projects on the basis of single criteria. However, it is useful to categorise projects by composite scores, taking into account all three performance parameters. On that basis, two projects (nearly 2%) could unequivocally be judged as having been outstandingly successful (a score of *5* for all parameters), 12 (11%) as having been very successful or better (a score of *4* or more for all parameters) and 48 (43%) as having been satisfactory or better (a score of *3* or more for all parameters). The remaining 63 (53%) projects had a score of two or less on at least one of the assessment parameters, but only three projects failed to make a score of *3* for at least one of the parameters.

A number of lessons to be learnt by ACIAR for the management, coordination or administration of its project have been drawn from these reviews. These focus on:

- the need for ACIAR to review its protocols to facilitate orderly project commencements (a move which is already under way);
- sharper definition of project objectives, incorporating outcome indicators against which project leaders could expect to have the project assessed;
- quality assurance arrangements for commissioned organisations to ensure the adequacy of field operations and the continuity of project oversight in the event of changes in supervisory personnel; and
- performance assessment benchmarks for reviewers, to enable better evaluations to be made of project impacts.

INTRODUCTION

Most projects supported by ACIAR run for three years. Towards the end of that period ACIAR commissions an external review of the project. The review teams have usually two members—one Australian and one from overseas—but in some cases a sole reviewer may be engaged or a team of three or more members may be engaged. In each case, the team is given terms of reference which usually require it to report on:

- progress towards the achievement of each objective of the project;
- the scientific methodology and rigour shown;
- the degree of collaboration and cooperation shown;
- the adequacy of reporting and resulting publications;
- the impact and relevance to the countries involved;
- administration by ACIAR and by the Australian and overseas institutions involved;
- whether project outputs represent a reasonable return on funds invested;
- any positive or negative environmental impacts and differential impacts on men, women and children;
- whether the project should be terminated, extended or replaced; and
- how spillover benefits of the project might be maximised.

In some cases these terms of reference have been augmented with the specific characteristics of the project in mind. In several cases the reviewers have been asked to evaluate the training elements of the project or to assess the effects of the project on the research capabilities of the collaborating countries. In others, they have been asked whether the project has been adequately funded. Some terms of reference have departed from this general structure, but in all cases the achievement of the stated objectives of the project and the methodologies used have been central to the review.

Following receipt of the report from the external review team, ACIAR itself reviews the review. ACIAR officers sign off a brief report (usually one or two pages) which may comment on success or failure elements of the project's operations and outcomes, and gives consideration to recommendations made by the external reviewers about terminating, extending or replacing the project.

THE TASK FOR THIS REPORT

In October 1997 I was asked by ACIAR to read all of the available external review reports which it had received since September 1990 and, from the evidence they contain, to score each project on a 1 to 5 scale for the following three parameters:

- **technical success**—the achievement of project objectives and assessment of the relevance and scientific merit of the research;
- **impact**—where impact is on
  - (i) research capacity (including access to new techniques), and
  - (ii) farmers, consumers and the environment.

My terms of reference, which also asked me to draw out any generalisations or conclusions, and lessons to be learnt by ACIAR in managing its projects, are set out in an Annex A.

ACIAR provided me with 114 external project reviews which it had received since September 1990. With two exceptions, scores have been made only where a review report has been provided. The two exceptions are for projects ANRE 93 92 and FIS 93 04, where it was judged that sufficient information was available from the review of review report provided.

I did not score projects EFS 86 27, EFS 86 25 and EFS 86 24. I deemed that these three projects, which had been commissioned for ACIAR itself to gauge what research priorities it should be addressing, were so different in type from the others to be inappropriate to score in terms of the nominated parameters. Furthermore, they had been considered already, by Bruce Auld in his 1990 assessment of ACIAR projects completed then (see Annex C).

Scores for project FST88 08/9 are for two linked projects: FST 88 08 and FST 88 09. The two were undertaken together, and were covered by a single review. FST 88 08 applied to overseas collaborating countries and FST 88 09 to Australia.

Thus I was able to score the 111 projects listed in Annex B.

Seventeen of the potential projects listed by ACIAR were replacements of other projects in the list. One of the replacements was itself subsequently replaced by another project in the list. Not all of the replaced or replacement projects could be assessed. However, it was possible to trace the changes in scores for ten sets of replaced and replacement projects.

I have made two sets of comparisons of scores between different classes of projects. One was for the type of organisation commissioned by ACIAR to coordinate the project. Three groupings were chosen: universities; CSIRO (together with a small number of comparable public research organisations); and State departments (agriculture, fisheries, forestry and conservation). Reasonable numbers of projects could be allocated to each of these three classes.[1] The other comparison was between replacement projects and projects replaced. It would also have been possible to classify and compare other groupings of projects, for example by countries in which collaborating work was undertaken or by program area to which the research related.[2] However, because of small numbers of projects in some classes, these were not attempted.

SCORING

From the materials provided and the diversity of the stated objectives of the projects, any scores are inevitably somewhat subjective, and comparisons between them invidious. I have undoubtedly meted out some rough justice in scoring some projects, particularly for the *impact* parameters, which most reviewers did not address directly using criteria which I judged suitable for the task I was given. For this reason, no individual project rankings have been identified in this report. However, in aggregate the scores give a reasonable picture of how the projects performed in terms of the chosen parameters and the scoring criteria I have used.

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1 Of the 111 projects scored, 43 were commissioned to universities, 38 to CSIRO or a comparable organisation and 30 to State departments.

2 Each listed project was allocated to one of 14 program areas, for example crop sciences, animal sciences, fisheries, forestry, land and water resources.

A low score for any parameter does not necessarily mean that a project has been poorly conceived or inadequately managed, though in a small number of cases that may have been the case. In terms of *technical success*, a typhoon or a political upheaval can frustrate the achievement of the stated objectives of the most carefully conceived of investigations. *Impact on farmers, consumers and the environment* (which I have taken to encompass *community impact* generally[3]) may have been too far removed from the immediate focus of the research to warrant consideration. And although ACIAR's raison d'être is to increase international cooperation and capacity in agricultural research, not all projects are specifically orientated in that direction. One project which was designed to demonstrate already proven technology was assessed to have been technically very successful with a significant impact on farmers but to have made no impact at all on *research capacity*.

Technical success

In most cases the scoring of *technical success* was straightforward. Two of the general terms of reference, namely progress towards the achievement of each objective of the project and the scientific methodology and rigour shown, could be applied directly. Most of the review reports focused on these two terms of reference and came to firm conclusions about them. This does not mean that there are not some profound difficulties in making inter-project comparisons. ACIAR does not impose a common format or set of performance assessment criteria on its reviewers, and reviewers are given no benchmarks from which scores can be drawn. Also, the stated objectives of some projects are narrow and highly focused in a single collaborating country while others are broad ranging and involve many diverse organisations in several countries.

I have endeavoured to give a score of *3* to those projects which reviewers considered had met (or had reasonably progressed towards meeting) most but not all of the major stated objectives. This was raised to *4* where the scientific methodology and rigour were assessed to be outstanding or where all objectives were deemed to have been adequately met. If the objectives were all met or exceeded with outstanding scientific methodology and rigour, the project was scored as *5*. Where reasonable progress had been made on some objectives, but not necessarily the main ones, a project was scored as *2*. In the few cases where progress was assessed to have been disappointing on many fronts, it was scored as *1*. Any project objectives which were specified in terms of research development or personnel training were not included, as they were assessed in terms of the impact criteria.

Table 2 shows the outcomes of scoring the 111 projects on the *technical success* parameter.

Table 2. Scoring of 111 projects for *technical success* on a 1 to 5 scale

Score	1	2	3	4	5	Total
Number of projects	2	19	33	41	16	111
Percentage of total	2	17	30	37	14	100

A large majority of projects clearly performed well to very well in terms of meeting or making satisfactory progress towards meeting their research objectives. Of three categories of organisations compared, projects commissioned to CSIRO had the highest average scores for

[3] Forestry and fisheries projects impact on groups other than farmers and some economic policy research is designed to impact broadly throughout the economy through trade or other economic reforms.

technical success, though differences between the averages were not large and variations within the categories probably dominated variation between them.[4]

The Auld Report of 1990 (reproduced as Annex C[5]), which reviewed the outcomes of ACIAR reports conducted between 1982 and 1990, also concluded that the large majority of projects had made satisfactory progress towards meeting their research objectives. As also observed by Auld, many reviews concluded that objectives were overly ambitious for three-year projects and that most research was undertaken with the expectation that projects would continue for a second or third term. Indeed, most (but by no means all) reviews recommended extensions of projects for periods ranging from six months to two years to complete what could reasonably be expected of the project, and many proposed replacement projects to develop research achievements further.

Overwhelmingly, projects were considered to be based on good scientific method, and criticisms of the rigour with which the commissioned (Australian) or collaborating (overseas) organisations undertook the work were relatively few. This reflects well on the processes ACIAR has set up to screen project proposals before they are commissioned. However, a number of problems which marred *technical success* were identified frequently enough to comment on them here.

Many reviews commented that a late start in one or more collaborating organisations had marred progress towards achieving the project's objectives. A common problem was the failure to complete memoranda of understanding with collaborating organisations until well after the project's commencement. Another problem was the failure to negotiate phytosanitary clearances for germplasms or biological control agents with government instrumentalities in collaborating countries, or clearances for the importation of necessary equipment. A later stage problem which was frequently raised, particularly with projects commissioned to State departments and universities, was changes in personnel because of sabbatical leave or duty changes. Personnel changes in collaborating organisations arising from departures to undertake higher degree studies were also raised.

Most comment on *technical success* focused on work done in collaborating countries—the research within Australia generally being considered of greater scientific rigour though not necessarily of greater relevance. A common observation was that Australian project leaders frequently have much higher expectations of the capacities of collaborating institutions to make progress than outcomes suggest are warranted. Some reviews commented in regard to socioeconomic objectives that not enough time had been spent initially studying the system being researched. One review said that the first year of studies of this type should be spent in such familiarisation. Several reviews queried the quality of observations recorded in field trials and the supervision of field trials generally. Two suggested that a system of quality assurance should be required of collaborating organisations supervising field trials.

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4 The average *technical success* scores were 3.14 for universities, 3.76 for CSIRO and 3.53 for State departments. Because of the subjective nature of the scoring, I thought it wiser not to undertake a statistical test of significance between these averages.

5 *A Report on Independent Reviews of ACIAR Projects—1982–1890*, by Bruce A Auld, October 1990. Since that brief report was not published at the time, it has been reproduced here.

Research capacity

Scoring *research capacity* was less straightforward, as terms of reference generally did not map as directly to this parameter as they did to *technical success*. However, in some cases the development of research capability was a specified objective of the project and was assessed directly by the review team. In some other cases, a specific term of reference required the review team to assess the effects of the project on the research capabilities of the collaborating countries or organisations. Yet in most cases my principal sources of information were responses to terms of reference regarding: scientific methodology and rigour; the degree of collaboration and cooperation shown; and an evaluation of the training elements of the project—which bear only indirectly on research capacity. Thus, I had to rely more on my own judgment about scoring this parameter than was the case with *technical success*.

My approach was to emphasise as scoring criteria institution building, linking into the world research community and training. Where collaboration and cooperation were deemed to be good, and appropriate training was provided, projects were given a score of *3*. Where, in addition to good cooperation, a major feature was made of research training or a new research methodology was introduced, the score was raised to *4*. Where all these features were present and/or a major research laboratory or comparable facility was installed, the score was *5*. Where either collaboration or training was deemed to be deficient, the score was generally *2*, while if none of these criteria was met the score was *1*. In those cases where a specific objective or term of reference related to developing research capabilities of the collaborating countries or organisations, the review teams seemed to adopt these same criteria in coming to their conclusions.

Of course, the collaboration and training had to be seen to be orientated to research for these criteria to contribute to the scoring of *research capacity*. I have already alluded to one project for which collaboration, cooperation and training were all assessed to have been excellent, but the objective was to demonstrate proven technology rather than to develop research capacity. For this reason it was given a *research capacity* score of *1*.

The orientation of training for research capacity was difficult to assess in many projects. Where it was associated with several researchers travelling to Australia for research experience or to undertake higher degree studies, it was reasonably assumed to be highly orientated to research. However, although grass roots technical training within the collaborating countries is fundamental to good research, it was sometimes difficult to determine whether this training was orientated to research or to the development of research outcomes within the community. I was therefore inclined to give a greater weighting to training in the scoring of *research capacity* if it was orientated to tertiary studies than if it was orientated solely to technical field work, though I acknowledge that such a differentiation is questionable.

Table 3 shows the outcomes of scoring the 111 projects on the *research capacity* parameter.

Table 3. Scoring of 111 projects for *research capacity* improvement on a 1 to 5 scale

Score	1	2	3	4	5	Total
Number of projects	2	11	48	36	14	111
Percentage of total	2	10	42	33	13	100

Again, a large majority of projects clearly performed well to very well in terms of meeting or making satisfactory progress towards ACIAR's general goal "to increase confidence in and expand international cooperation in agricultural research".[6] In this regard there was little difference between the three types of commissioned organisations.[7]

Many reviews did not differentiate critically between performance outcomes in terms of the criteria I have adopted for allocating scores. Unless there were obvious breakdowns in collaboration and cooperation, typical comments were little more than "a high degree of collaboration and cooperation was evident" or "this project epitomises the ACIAR ideal of partnership in research".

Reviews tended to be more enumerative in reporting on the adequacy of training, listing numbers of personnel attending various types of training courses or graduate programs, though often appreciation was expressed about the value of informal training through personal contact. Unlike their assessments of *technical success*, about which reviewers had considerable expertise, review teams did not appear to have any assessment criteria or benchmarks with which to evaluate cooperation or training. One review team recognised this to be a problem and proposed that a more formal competency approach be developed for assessing training. As alluded to earlier, two reviews suggested that a system of quality assurance be developed for collaborating organisations supervising field trials. This would involve the training of field workers.

Community impact

In the terms of reference for project reviews, reviewers have to address:

- the impact and relevance of the project to the countries involved;
- any positive or negative environmental impacts and differential impacts on men, women and children; and
- how spillover benefits of the project might be maximised.

In practice, however, most responses to these questions lacked sufficient immediate focus to be of much value in drawing conclusions about community impact.

Most responses to these terms of reference were enthusiastic about what the impact of successful outcomes of the research would be, if those outcomes were implemented broadly across the communities to which they relate, but lacked any guidance about "where do we go from here?". There was hardly a project which was not seen as having a very large benefit there were very few reviews which addressed issues of timing or implementation policies. Several reviews expressed difficulties in coming to grips with these terms of reference as they had no benchmarks against which to make their judgments.

Thus, I was left to draw my own conclusions about actual or potential impacts in the reasonably foreseeable future. In scoring *community impact* I have focused on those outcomes which are already being put in place or are in a form which is or will be ready for implementation over the next three years or so. In many cases I had little more to go on than a hunch based on my general reading of the review report.

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6 *ACIAR Corporate Plan 1997–2001*, ACIAR, Canberra, 1997, p. 4.

7 Average *research capacity* scores were 3.30 for universities, 3.63 for CSIRO and 3.44 for State departments.

Where the project was conceived and conducted with no impact in mind or in practice, I scored it as *1*. An example would be a project designed to identify a gene responsible for producing a particular enzyme. At the other extreme, a project which involved no research, but broadly-based field implementation to achieve its objective, by its nature had a fairly immediate impact on farmers and was scored as *5*. Generally, I scored projects whose outcomes could reasonably have been implemented within the next three years or so as *3*, and where steps appear to be under way to incorporate them in extension material or put them into use in other ways as *4*. Where projects had a practical orientation but I doubted whether outcomes were sufficiently advanced or packaged to be implemented quickly without further work, I scored them as *2*.

Table 4 shows the outcomes of scoring the 111 projects on the *community impact* parameter.

Table 4. Scoring the 111 projects for *community impact* on a 1 to 5 scale

Score	1	2	3	4	5	Total
Number of projects	32	25	29	20	5	111
Percentage of total	29	23	26	17	5	100

In contrast to outcomes of the other two parameters, projects did not rank highly in terms of their (immediate) impact on the community. This was equally true for each class of commissioned organisation.[8] This outcome is scarcely surprising given ACIAR's priorities and the fundamental nature of much of the research it commissions. ACIAR has generally taken the view that implementation is the responsibility of collaborating countries rather than of ACIAR-sponsored projects. In several earlier cases during the period under review, ACIAR reviews of reviews rejected recommendations for project extensions to allow developmental components (writing manuals, preparing extension materials) to be completed, though in more recent years ACIAR appears to have looked upon those recommendations more favourably.

However, there is limited evidence that where ACIAR commissioned a replacement project there was a significant improvement in orientation towards impact on the community. Of changes in the ten sets of replaced and replacement projects I was able to track, the score for *community impact* increased for six of them, remained unchanged for two and decreased for two. A similar outcome was also observed for *research capacity* but not significantly so for *technical success*. Table 5 shows the average scores for the Phase 1 and the replacement projects for the three criteria.

Table 5. Average scores for the three success parameters for ten pairs of replacedcement projects

Type of project	Average score for technical success	Average score for impact on research capacity	Average score for community impact
The Phase 1 project (the replaced project)	3.4	2.9	1.5
The Phase 2 project (the replacement project)	3.6	3.9	2.6

[8] Average *community impact* scores were 2.40 for universities, 2.66 for CSIRO and 2.40 for State departments.

JOINT DISTRIBUTIONS OF SCORES

Table 6 shows the relationship between technical success and impact on research capacity.[9] Remembering that scores of 2 or less are classified as low scores, and 3 or more as high impact scores, Table 6 shows that:

- there were 81 (73%) projects which had high technical success and high research capacity impacts
- there were 9 (8%) projects which had high technical success and low research capacity impacts
- there were 17 (15%) projects which had low technical success and high research capacity impacts
- there were 4 (4%) projects which had low technical success and low research capacity impacts

Table 7, which examines the relationship between community impact and technical success, shows that:

- there were 52 (47%) projects which had high technical success and high community impacts
- there were 38 (34%) projects which had high technical success and low community impacts
- there were 2 (2%) projects which had low technical success and high community impacts
- there were 19 (17%) projects which had low technical success and low community impacts

Table 8 covers the relationship between community impact and impact on research capacity and shows that:

- there were 49 (44%) projects which had high research capacity impacts and high community impacts
- there were 49 (44%) projects which had high research capacity impacts and low community impacts
- there were 5 (5%) projects which had low research capacity impacts and high community impacts
- there were 8 (8%) projects which had low research capacity impacts and low community impacts

The above results provide a count of projects on the basis of at most two assessment criteria at a time. However, it is useful to categorise projects by composite scores, taking into account all three performance assessment categories. On the basis of these scores:

- 2 projects (nearly 2%) could unequivocally be judged as having been outstandingly successful (a score of *5* for all parameters);
- 12 (11%) as having been very successful or better (a score of *4* or more for all parameters); and
- 48 (43%) as having been satisfactory or better (a score of *3* or more for all parameters).
- The remaining 63 (53%) projects had a score of two or less on at least one of the assessment parameters. However, only three projects failed to score *3* for at least one of the parameters.

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[9] Each of these involved a significant component of post-graduate training in Australia of overseas research workers.

Table 6. **The relationship between technical success and impact on research capacity for 111 projects. No shading, low–low scores; light shading, low–high scores; darker shading, high–high scores.**

Research capacity score	Technical success scores					
	1	**2**	**3**	**4**	**5**	**Total**
1			1	1		2
2	1	3	1	6		11
3	1	8	16	20	3	48
4		8	12	12	4	36
5			3	2	9	14
Total	**2**	**19**	**33**	**41**	**16**	**111**

Table 7. **The relationship between technical success and community impact for 111 projects. No shading, low–low scores; light shading, low–high scores; darker shading, high–high scores.**

Community impact score	Technical success scores					
	1	**2**	**3**	**4**	**5**	**Total**
1	1	11	8	11	1	32
2	1	6	9	9		25
3		1	10	12	6	29
4		1	6	7	6	20
5				2	3	5
Total	**2**	**19**	**33**	**41**	**16**	**111**

Table 8. **The relationship between research capacity and community impact for 111 projects. No shading, low–low scores; light shading, low–high scores; darker shading, high–high scores.**

Community impact score	Impact on research capacity scores					
	1	**2**	**3**	**4**	**5**	**Total**
1	1	7	14	10		32
2			13	11	1	25
3		2	15	6	6	29
4	1	1	5	8	5	20
5		1	1	1	2	5
Total	**2**	**11**	**48**	**36**	**14**	**111**

LESSONS FOR ACIAR

In addition to scoring the three outcome parameters I have already addressed, my terms of reference ask me to identify lessons to be learnt by ACIAR in terms of project management, coordination or administration. The terms of reference given to most review teams required

them to report on the administration of projects by ACIAR and by the Australian and overseas institutions involved. Most of the responses were not concerned with the technicalities of audit trails or financial acquittals, but rather with how project management had impacted on *technical success*. I have already reported these, and will use this final section to bring those comments together. I also draw some lessons which focus on needs for ACIAR: to review its protocols regarding project commencements; to sharpen the definition of project objectives and incorporate outcome indicators; to require quality assurance from commissioned organisations; and to develop performance assessment benchmarks for project reviewers.

Most reviews were highly supportive of the way in which ACIAR managed its projects. Some observed that, compared with other international aid agencies, project leaders have been allowed to get on with their research tasks with the minimum of bureaucratic overload, which has contributed significantly to the *technical success* of projects. However, there are risks from ACIAR devolving the administration of large scientific projects, often requiring complex logistical coordination, to organisations which may not have the capacity to assure the quality of research outcomes.

Many reviews commented that a late start in one or more collaborating organisation had marred progress towards achieving the project's objectives. A common problem was the failure to complete memoranda of understanding with collaborating organisations until well after the project's commencement. Another common problem was the failure to negotiate phytosanitary clearances for germplasms or biological control agents with government instrumentalities in collaborating countries or clearances for the importation of necessary equipment. Delay problems were cited frequently enough to warrant ACIAR reviewing its protocols to facilitate orderly project commencements—a move which I am informed is already under way.

The Auld Report of 1990 observed that many project objectives were overly ambitious for three-year projects and that failure to sufficiently focus objectives had marred project success. This was also a common observation in the review reports which I read.

As I have already reported, a problem that was frequently raised, particularly with projects commissioned to universities and State departments, was changes in personnel as a result of sabbatical leave or transfers to other duties. Personnel changes in collaborating organisations because of departures to undertake higher degree studies were also raised. ACIAR needs to be assured by every commissioned organisation to which management responsibility is devolved that there will be continuity of administration and research oversight in the event of departures of key personnel.

The need for assurance on the quality of field operatives was also often cited as a management issue. Also, I have already reported that one review team proposed that a more formal competency approach be developed for the assessment of training, and two others suggested that a system of quality assurance be developed for collaborating organisations supervising field trials. It would possibly be overkill to require that devolution of administration depend on formal quality assurance accreditation such as ISO[10] 9000 series certification, for either the

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[10] ISO stands for International Standardization Organization

commissioned or collaborating organisations. But ACIAR may consider exploring whether a quality management system to which all commissioned organisations subscribe can be designed to assure basic field competencies and that changes in personnel do not undermine progress.

It was apparent from reading the review reports that most reviewers were very skilled in the project's science and methodology but floundered in their attempts to assess many of the broader issues such as training, impact and relevance, value for money, and spillover benefits. If ACIAR wishes to pursue these issues in its review procedures, it might give consideration to making the terms of reference which relate to them more focused on particular outcomes, and to devise performance assessment procedures and benchmarks which can used by reviewers. This, of course, may need to be reflected in the formulation of objectives specified in research proposals.

Such procedures and benchmarks should be developed primarily to help project leaders improve the quality of outcomes of their own research. It is also important to develop them to improve the quality of project reviews in order to come to better judgments about project termination, extension, redirection or replacement. Furthermore, their development is important if ACIAR wishes to repeat or extend the sort of study which I have just completed. It is obvious that I have had some reservations about ranking and comparing project outcomes based on the sorts of information I have been given to work from. This is not to criticise the task I was given which, like the Auld review, was commissioned to provide impressions of project outcomes. But if rankings of, and comparisons between, projects are to continue, it is important that the reasons for doing so and their limitations be fully understood, and that reviewers' terms of reference be sufficiently focused to generate a reliable information base from which to work.

ANNEXES

ANNEX A

TERMS OF REFERENCE FOR A SEMI-QUANTITATIVE ASSESSMENT OF THE SUCCESS AND IMPACT OF ACIAR PROJECTS BASED ON INDEPENDENT REVIEWS OF 111 ACIAR PROJECTS (SEPTEMBER 1990 TO SEPTEMBER 1997)

Objective: To summarise the content of ACIAR's routine, independent external project reviews and to use the information in those reviews to make a classification of projects according to the criteria of technical success and impact.

1. Read all ACIAR project review reports since September 1990.
2. According to the evidence therein, score each project on a 1following parameters:
   - **'technical success'** defined as the meeting of a project objectives and the relevance and scientific merit of the research;
   - 'impact' where impact is on:
     i) research capacity (includes access to new techniques)
     ii) farmers, consumers, environment

Seek clarification and additional information, from reviews of reviews, and from relevant parts of project termination reports.

3. (a) Draw out any other generalisations or conclusions about **technical success** or **impact** from reading the above documents for the consumption of the External Review to be conducted in 1998. (The 'Auld' Report gives some guidance, but the added dimension of impact implies that a broader perspective should be taken here).
   (b) Draw out lessons to be learnt by ACIAR in terms of project management, coordination or administration.
4. Report to ACIAR by 19 December 1997 in a form that can potentially be published as an EEU working paper.

ANNEX B

LIST OF PROJECTS AND REPORTS ON ACIAR PROJECTS REVIEWED BY ROGER G. MAULDON (SEPTEMBER 1990 TO SEPTEMBER 1997)

Table 9 shows the projects I examined. Program codes are:

ANRE	Agriculture and Natural Resources Economics
AS1	Animal Sciences 1
AS2	Animal Sciences 2
CS1	Crop Sciences 1
CS2	Crop Sciences 2
EFS	Economics and Farming Systems (now ANRE)
FIS	Fisheries
FOG	Forages (this program no longer exists)
FST	Forestry
LWR1	Land and Water Resources 1
LWR2	Land and Water Resources 2
PN	Plant Nutrition (this program has been merged into other ACIAR programs)
PHT	Postharvest Technology
SWL	Soils, Water Management and Land Use (now LWR).

Table 9. List of projects and reports on ACIAR projects reviewed by Roger G. Mauldon (September 1990 to September 1997)

Count	Project Number	Project Title
1	ANRE 93 23	Dairy policy in Indonesia
2	ANRE 89 03	Economic policies for the Philippine sugar industry
3	ANRE 92 28	Emergence and integration of regional grain markets in China
4	ANRE 89 23	Impacts of protection policies on the agricultural sector of Thailand
5	ANRE 92 11	Socio-economic evaluation of soil conservation technologies for upland farming systems in the Philippines
6	ANRE 90 22	Economic policy choices for rural development in Papua New Guinea
7	ANRE 91 09	The world market for coconut production: an economic analysis from the perspective of the Philippines
8	AS1 91 23	Control of fasciolosis in cattle and buffalo in Indonesia
9	AS1 87 17	Control of Newcastle disease in village chickens with oral V4 vaccine
10	AS1 83 21	Control of tick-borne diseases or ruminants in Sri Lanka with particular reference to babesiosis and anaplasmosis
11	AS1 88 35	Diagnosis and control of foot and mouth disease in Thailand
12	AS1 85 46	Draught animal power
13	AS1 85 55	Effects of helminths and nutrition on sheep production in northern China
14	AS1 84 18	Epidemiology and control of gastro-intestinal nematodes in small ruminants in the Pacific Islands
15	AS1 83 82	Establishment of improved methods for the diagnosis and control of livestock diseases in Southeast Asia using enzyme linked immunoabsorbent assay (ELISA)
16	AS1 83 64	Genetic identification of strains and genotypes of buffaloes and goats in Southeast Asia
17	AS1 89 11	Identification of mineral elements limiting sheep production in Northern China
18	AS1 90 01	Improved management for production of honey and pollination of tropical forests by bees
19	AS1 84 54	Mineral nutrition studies of small ruminants in north-western and north-eastern China
20	AS1 85 23	Self-medication of ruminants in tethered husbandry systems
21	AS1 84 56	Sheep breeding for improved wool quality in north west China
22	AS1 91 19	Towards effective control of infectious bursal disease and infectious bronchitis in poultry
23	AS2 85 65	Development of an improved haemorrhagic septicaemia vaccine
24	AS2 92 02	Diagnosis and control of haemorrhagic septicaemia in Indonesia
25	AS2 89 07	Establishment of improved methods for the diagnosis and control of livestock diseases in Southeast Asia using enzyme linked immunosorbent assay (ELISA)
26	AS2 85 15	Evaluation of different buffalo genotypes for draught, meat and milk production
27	AS2 89 08	Feeding and management strategies for production and draught power in large ruminants
28	AS2 91 16	Fowl cholera. Vaccines for Asia
29	AS2 89 09	Immunity to bovine ephemeral fever
30	AS2 90 11	Improved methods for the diagnosis and control of bluetongue in small ruminants in Asia
31	AS2 91 18	Improved methods for the diagnosis and control of bovine babesiosis and anaplasmosis in Zimbabwe and Australia
32	AS2 90 28	Improved methods in the epidemiology and control of mites and other diseases of bees in Papua New Guinea
33	AS2 91 17	Management of footrot in small ruminants in hill districts of Nepal
34	AS2 86 01	Research into technologies for increasing the efficiency of straw utilisation by cattle and buffalo for growth, reproduction and lactation
35	AS2 88 17	Strategic supplements for improved milk production
36	CS1 90 33	Banana improvement in the Pacific Islands
37	CS1 88 13	Biotechnology for BYD virus resistance in wheat
38	CS1 85 48	Cause and control of yaqona wilt in Fiji and other areas of the south Pacific
39	CS1 84 42	Coconut improvement
40	CS1 90 25	Coconut improvement

Table 9. (cont'd) List of projects and reports on ACIAR projects reviewed by Roger G. Mauldon (September 1990 to September 1997)

Count	Project Number	Project Title
41	CS1 88 14	Genetics and breeding for rust resistance in wheat
42	CS1 90 17	Improved diagnosis and control of peanut stripe virus
43	CS1 90 34	Kava dieback in the South Pacific
44	CS1 90 15	New approaches to the control of bacterial wilt (*Pseudomonas solanacearum*) in tomato and other vegetable crop plants
45	CS1 92 21	Nucleotide sequence determination of Cadang-Cadang-like viroids in the Pacific area
46	CS1 88 34	Peanut improvement in Indonesia
47	CS1 88 05	Plant virus diagnosis
48	CS1 90 40	Plant virus diagnosis
49	CS1 88 12	Virus-free germplasm of sweet potato
50	CS1 90 45	Yield improvement of rainfed lowland rice in drought-prone areas of Thailand and Laos
51	CS2 91 10	Biological control of *Chromolaena odorata* in Indonesia and the Philippines
52	CS2 93 08	Biological control of fruit piercing moth in the South Pacific
53	CS2 88 02	Biological control of pests and weeds in the South Pacific
54	CS2 89 18	Biological control of water hyacinth in Thailand
55	CS2 89 19	Biology and control of fruit flies in Thailand and Malaysia
56	CS2 90 07	Cassava cyanide: improved techniques for estimation and influence of environment on concentration
57	CS2 89 20	Identification and control of pest fruit flies of the South Pacific
58	CS2 93 05	Integrated control of citrus pests in China
59	CS2 89 29	Utilisation of entomopathogenic nematodes to control insect pests in China
60	EFS 86 27	Agricultural research priorities: Papua New Guinea
61	EFS 89 28	Economics of the tuna fisheries industry in Papua New Guinea
62	EFS 86 25	Research priorities for agriculture in Thailand
63	EFS 86 24	Research priorities for Philippine agriculture
64	EFS 88 38	Technical change in agricultural income distribution and economic policy in the Philippines
65	FIS 93 04	Application of underwater visual census to assessing coral reef fish stocks in the tropical Pacific
66	FIS 85 45	Development of an underwater visual census method for assessing shallow water reef fish stocks in the south west Pacific
67	FIS 92 06	Genetic identification and stock improvement of Tilapia in Malaysia and Fiji
68	FIS 85 43	Research on baitfish biology in the Solomon Islands, Maldives and Papua New Guinea for the tuna industry
69	FIS 90 03	Research on baitfish in Solomon Islands, Kiribati and Fiji for use in the tuna industry
70	FIS 87 33	The culture of the giant clam (Tridacnidae) for food and restocking of tropical reefs
71	FOG 89 25	Forage development of the red soils of south central China
72	FOG 86 19	Forage shrub production from saline and/or sodic soils in Pakistan
73	FOG 85 60	Improvement of forage productivity in plantation crops
74	FST 88 08/9	Australian hardwoods for fuelwood and agroforestry
75	FST 86 33	Australian woody species for saline sites in Asia
76	FST 86 13	Fuelwood and sandalwood silviculture in eastern Indonesia
77	FST 86 30	Hybridisation and vegetative propagation of Australian tropical acacias
78	FST 91 15	Improving and sustaining productivity of eucalypts in Southeast Asia
79	FST 87 36	Increasing productivity of casuarina and eucalyptus plantations in southern China by inoculation with selected symbiotic micro-organisms
80	FST 90 44	Increasing productivity of eucalypt plantations in China by inoculation with ectomycorrhizas and nutrient application
81	FST 88 48	Introduction and cultivation experiments for Australian broadleaved tree species
82	FST 90 43	Multi-purpose tree and sandalwood silviculture in Indonesia

Table 9. (cont'd) List of projects and reports on ACIAR projects reviewed by Roger G. Mauldon (September 1990 to September 1997)

Count	Project Number	Project Title
83	FST 91 14	Nutrition and mycorrhizal requirements of tropical trees for plantation and agroforestry systems
84	FST 91 27	Predicting tree growth at specific sites and for general regions in Southeast Asia
85	FST 92 08	Tree establishment technologies in the Philippines
86	FST 88 49	Wattle silviculture and pulping studies
87	LWR1 91 20	Management of boron and zinc nutrition for oilseed crops in China
88	LWR1 92 01	Sustainable cropping systems for tropical steeplands
89	LWR2 88 29	Biological nitrogen fixation by soybeans in rotation with rice
90	LWR2 92 09	Conservation and zone tillage research for dryland farming
91	LWR2 91 01	Diagnosis and correction of mineral nutrient disorders of root crops in the Pacific
92	LWR2 87 35	Improvement of dryland crop and forage production in the semi-arid tropics
93	LWR2 91 13	Integration of forages with plantation crops for sustainable ruminant production
94	LWR2 92 10	Management of legume nitrogen fixation for rainfed cereal production in Pakistan, Nepal, Vietnam and Australia
95	LWR2 91 02	Nutrient management in rainfed cropping systems
96	LWR2 89 40	Use of inhibitors to improve the efficiency of urea as a nitrogen fertilizer
97	PN 85 17	Improvement of the efficiency of urea fertilisation of rice
98	PN 88 00	Measurement of nitrogen fixation in legume production systems
99	PN 85 75	Rhizobium ecology
100	PN 85 74	Rhizobium nodulating grain legumes
101	PN 85 73	Rhizobium nodulating tree legumes
102	PN 83 66	Zinc deficiency in vertisols of India and Australia
103	PHT 90 08	Applications of in-store drying in the grain industry in Southeast Asia
104	PHT 90 51	Development of heat systems for quarantine disinfestation in tropical fruit
105	PHT 88 46	Improved processing systems for dried fish: fish drying in East Java
106	PHT 90 09	Minimising pesticide residues in stored grain by use of mixtures
107	PHT 88 45	Outdoor storage of grain in plastic enclosures in the humid tropics
108	SWL 88 40	Effect of land management on the hydrology and erosion of agricultural catchments in west Java, Indonesia
109	SWL 90 48	Efficient use of water in fruit production on the north China Plain
110	SWL 91 03	Environmental impact of agricultural practices on water resources of the Kelantin Plain, Malaysia
111	SWL 89 04	Management of acid soils for sustainable food crop production in the humid tropics of Asia
112	SWL 89 38	Management of clay soils under lowland rice based cropping systems
113	SWL 83 75	Management of soil acidity for sustained crop production
114	SWL 85 51	Management of soil erosion for sustained crop production

ANNEX C

A REPORT ON INDEPENDENT REVIEWS OF ACIAR PROJECTS 1982–1990

Bruce A. Auld
October 1990

This report summarises an examination of 71 independent reviews of ACIAR projects with 18 partner countries. This represented the total number of reviews available in September 1990. The list of projects considered is given in Table 10.

The reviews were judged against four terms of reference:

- achievement of objectives,
- scientific merit and relevance,
- collaboration, and
- recommendation for continuation.

A project which had not made satisfactory progress towards its objectives and was not recommended for continuation would be regarded as a failure.

Twelve projects had essentially achieved their stated objectives within the life of the project. Only five projects received severe criticism. The remaining projects (49) (excluding five disqualified from consideration in this report on various grounds) had made satisfactory or better progress towards achieving their objectives and were recommended for continuation. Common points of criticism related to over-ambitious objectives, and communication and co-ordination problems. No project could be regarded as a failure by the criteria distilled from review teams' terms of reference.

The weight of evidence in the independent reviews examined is that the work sponsored and coordinated by ACIAR has been a conspicuous success. Every project had a sound scientific basis and was relevant to the countries involved. Many excellent research achievements are recorded in the review committee reports.

INTRODUCTION

This is a report on all reviews by independent scientific committees of ACIAR projects that were completed and available in September 1990 (71 projects). The projects cover the period 1982 to March 1990. They include research on soil science, plant production (including silviculture), plant protection, weed control, post harvest crop management, animal production (terrestrial and marine), animal health, animal power and projects on research priority development in three partner countries.

Partner countries included: Cook Islands, Fiji, India, Indonesia, Jordan, Kenya, Malaysia, Maldives, Micronesia, Papua New Guinea, Peoples Republic of China, Philippines, Solomon Islands, Thailand, Tonga, Vanuatu, West Samoa and Zimbabwe.

Most of the projects were of three-years duration with reports made by review teams in the third year of the project. The independent review teams included experienced scientists from Australia and partner countries, as well as several from third countries (eg. U.K., USA., Canada) and international research agencies. The composition of review teams varied, usually numbering two to four independent members, with ACIAR and project scientists involved as facilitators. In one case (8517) the review panel consisted of one independent scientist. Three project reviews (8201, 8329, 8336) were led by ACIAR personnel and not included in further analysis in this report.

Table 10. List of project reviews examined in the assessment by Bruce A. Auld (1990)

Count	Project number	Project title
1	82001	Pigeon pea improvement
2	82002	Plant virus identification
3	82005	Constraints on development of smallholder farming systems in the south Pacific
4	82006	Methodologies for determining nitrogen losses
5	83004	Spoilage of fish in east Java
6	83005	Nitrogen fixation program report
7	83006	Legume bacteriology
8	83007	Long term grain storage
9	83008	Drying in bulk storage
10	83009	Pesticide use in grain storage
11	83010	Moisture movement in grain
12	83011	Pesticide decay
13	83013	Drying of fish in East Java
14	83014	Grain quality
15	83016	Life cycle of *Toxocara vitulorum*
16	83019	Calcium to inhibit fruit and vegetable ripening
17	83020	Forestry trees for fuelwood
18	83021	Tick borne disease
19	83025	Flooding tolerance of rice
20	83026	Legume and grass seed production
21	83028	Phosphorus and sulphur efficiency in tropical cropping
22	83029	Micronutrient requirements of N fixation
23	83031	Australian hardwoods for fuelwood
24	83032	Giant clams
25	83033	Malignant catarrhal fever in Indonesia
26	83036	Legume development for north east Thailand
27	83039	Control of *Mimosa pigra*
28	83044	Bulk handling of paddy/rice in Malaysia
29	83054	Transport and storage of fresh fruit and vegetables in Papua New Guinea
30	83055	Postharvest handling of bananas
31	83056	Mango characteristics in ASEAN region
32	83057	*Casuarina* for fuelwood and N fixation
33	83063	Shrub legumes
34	83064	Genetic identity of buffalos
35	83067	Foot and mouth disease
36	83075	Soil acidity
37	83079	Wheat germplasm improvement
38	83081	Coconut crab research
39	83082	Enzyme linked immunosorbent assay
40	84002	Coconut cadang cadang
41	84003	Coconut diseases
42	84005	Soybean/mungbean improvement
43	84014	Food legume coordination
44	84018	The epidemiology and control of gastro-intestinal nematodes
45	84019	Peanut improvement
46	84031	Soil salinity
47	84033	Sweet potato
48	84051	Nematodes
49	84055	Ephemeral fever of buffalos

Table 10. (cont'd) List of project reviews examined in the assessment by Bruce A. Auld (1990)

Count	Project number	Project title
50	84056	Sheep breeding
51	84057	Australian broad-leaved tree species
52	84058	Wattle silviculture and tannin products
53	84064	*Brucellosis* of sheep in China
54	84069	Rapeseed improvement in China
55	85015	Buffalo genotypes
56	85017	Urea fertiliser of rice
57	85027	Southeast Asian and south Pacific forage research program
58	85043	Baitfish biology
59	85046	Draught animal power
60	85047	Socio-economics of draught animal power
61	85050	Water use efficiency
62	85073	Rhizobium nodulating tree legumes
63	85074	Rhizobium nodulating grain legumes
64	85075	Rhizobium ecology
65	86001	Straw utilisation
66	86008	Grain drying
67	86009	Integrated pest control
68	86024	Agricultural research priorities : Philippines
69	86025	Agricultural research priorities: Thailand
70	86027	Agricultural research priorities: Papua New Guinea
71	87000	Banana improvement

EVALUATION OF REVIEWS

Methodology for the evaluation of review reports

Each review team was given "Terms of Reference" for its review. The terms of reference have changed with the development of ACIAR, and in several instances were tailored to address specific projects. The number of items in the terms of reference for project reviews varied from four to eighteen.

Review teams addressed all of their terms of reference, but the length, detail and clarity of their responses varied widely. Clearly, the attitudes and expectations of committees varied. However, the rigour and thoroughness of these evaluations exceeded that usually applied to primary-industry funded projects in Australia. Only two reviews were either sufficiently nebulous (8608) or inconclusive (8205) to be omitted from further consideration.

In general, the terms of reference included criteria (in this sequence) which can be broadly stated under four headings:

- *Achievement of Objectives*: To assess progress in obtaining the research project objectives.
- *Scientific Merit and Relevance*: To assess the scientific merit of the work and its relevance.
- *Collaboration*: To comment on the achievement of collaboration between research groups and the benefits to the national governments involved.
- *Continuation*: To advise ACIAR whether or not a project should be extended or continued as a new project.

Of these four common terms of reference the first is obviously critical. If the objectives were not achieved or unsatisfactory progress towards the objectives was being made, a project is clearly in trouble. A negative finding here would override other criteria in an evaluation.

The last term of reference asked reviewers to advise ACIAR whether the project should be continued—perhaps in a modified form. The reviewer's response to this term of reference is a very useful indication of whether or not, in

a review team's judgment, the project was well conceived, worth while pursuing, and that the cooperating scientists and institutions were operating effectively. If the original objectives had already been achieved, this would not necessarily apply.

In reaching an overall judgment of projects, I have put most emphasis on the review team's responses to these two terms of reference.

The extent of collaboration is clearly important and a raison d'être for ACIAR and the projects, but the effectiveness of collaboration should be mirrored in the review team's response to the first two terms of reference. Notwithstanding this, there are some projects, which, while addressing a common or partner country problem, could be done almost entirely in Australia. Little interaction might be necessary to fulfil the specific research aims—in such cases one of the main objectives of ACIAR projects would not be achieved.

Other general terms of reference, such as project management and reporting, interaction with other agencies, and links between related projects, were regarded as peripheral to these four main criteria.

Assessment of review reports

Scientific merit and relevance

All projects were judged to be soundly based scientifically and relevant to the countries involved. This reflects most favourably on ACIAR's choice of project topics. A common view was the one expressed in the review of the grain storage research projects: "The Review Committee was extremely impressed by the relevance of all projects to existing and emerging regional problems". However, in one project area, postharvest technology of fruits and vegetables (8319, 8354, 8356), lack of data on the extent of postharvest losses made the relevant assessment imprecise.

Were the objectives of the projects achieved?

Generally not, because, with few exceptions, the stated objectives were overly ambitious for three-year projects, particularly multi-national projects. The expectation in the drawing up of most projects was clearly for continuation for a second three-year term. Thus, a measure of the progress made towards achieving the research aims is a more appropriate (and a crucial) criterion: Was satisfactory progress made? No project failed this assessment.

A number of projects were judged to have achieved their major objectives. These were: The root nodule bacteria projects (8306, 8573, 8574, 8575), Plant Virus Identification and Data Exchange (8202), Diseases of Coconut Palm (8402, 8403), Nematodes to Control Insects (8451), which impressed the reviewers as an "outstandingly successful" project, Integrated Pesticides in Grain Storage (8609), Wattle Silviculture and Utilisation (8458), Foot and Mouth Disease in Thailand (8367), The Life Cycle and Control of *Toxocara vitulorum* in Buffaloes (8316).

The majority of projects were judged to have made good or satisfactory progress in achieving their aims or the achievable aims.

ACIAR Success stories

Among these two groups of projects were many success stories, as demonstrated by the following extracts from selected review reports.

(i) Stories of good science

One review report contained the following statement:

> "Not only has the quality of the scientific research (especially that on ammonia loss from flooded soils) been at the forefront of knowledge, but also the total scientific effort during the approximately 3.5 years duration of the project has been very impressive" (8206).

(ii) Stories of successful establishment of research facilities
The reviewers of 8456, for example, commented that:

> "The project succeeded in establishing wool laboratories…at three sites in China. These laboratories are the most advanced small sample testing facilities in the whole country" (8456).

(iii) Stories about important biological data generated by ACIAR supported projects
The reviewers of 8304 concluded that:

> "A major advance made by the project (8304) was the isolation and description of the most common fungi found on Indonesian fish which had not previously been identified and named".

Similarly the reviewers of 8543 wrote that:

> "The detailed work carried out during the study (8543) has provided a comprehensive and quantitative list of all the species of fish caught in the nets by bait fishermen in different localities of Solomon Islands and the Maldives".

(iv) There were stories about results which had immediate practical value:
For example the reviewers of 8316 concluded that:

> Project 8316 "Achieved a simple, practical, effective, safe and cheap means of control of *T. vitulorum*, the most important parasitic cause of morbidity and mortality in buffalo calves".

Another report contained the following assessment:

> "As a result of project (8609) activities it is now possible to stipulate effective dosages of grain protectants for a wide range of situations in the region".

(v) There were stories of significant new breakthroughs
ACIAR supported projects made breakthroughs in the following new areas:

- Acacia pulpwood (8458)
- new industries with broad potential benefits to society (Giant Clam project (8332);
- developments in vaccine technology for Australia (8321); and
- the potential to extend projects to other countries (eg. 8367).

(vi) There were stories of successful collaboration
In many cases the review teams commented most favourably on collaboration. For example:

> "Two important features of this project (8402) have been (i) the high level of technology transfer and development between the collaborators and (ii) the high level of collaboration and mutual respect between the scientists involved".

Continuation

Except for the few cases where the original objectives were achieved within the first three years of a project (eg. 8402), all projects were recommended for continuation in their existing or a modified form.

Stories of problems

However, communication problems were common. A small minority of projects—5 of 71—received severe criticism. Shortcomings could generally be attributed to over-ambitious objectives and the need for greater focus in the projects, as well as communication and co-ordination problems. But these same criticisms were frequently raised in relation to fairly successful projects (see below).

One of these five perhaps received the following most telling criticism:

> "It is expected that the data obtained will not be sufficient to completely verify the specific and overall objectives of the Project and that this situation is unlikely to change with additional data collection during the remainder of the Project".

Yet this has to be viewed in the context of a program on perennial shrubs in which there were delays in appointing a key research position and severe budget cuts in the first year.

Failures

In evaluating the project reviews I was prepared to regard any project which was not judged to have made satisfactory progress towards its aims and/or was not recommended for continuation as a failure. On that basis, not one of the 71 projects was a failure.

Shortcomings

There were two common areas of criticism:

(1) Communication and co-ordination problems. This was noticeable from the review reports of at least 6 projects. These problems were more serious where there was more than one partner country; or several co-operating institutions in Australia with one overseas partner

(2) Overly ambitious or impractical initial objectives resulting in the need for subsequent work to obtain greater focus for the research efforts. This was commented on specifically in at least 6 review reports.

The achievement of greater focus during the course of projects was, however, a pleasing outcome. In one case, the reviewers commented as follows:

> "This project has undergone a remarkable metamorphosis during the last three years. It started as a vague, ill-defined project with multiple objectives and is now a clearly defined project with a single objective..." (8379).

CONCLUSION

The evidence in these reports is that the work sponsored and coordinated by ACIAR has been an outstanding success. All the projects had a firm scientific basis and were judged to be relevant. Most projects did not achieve all their stated aims within three years, but did make satisfactory progress towards more realistic goals. The goals set in projects have become more practical as the ACIAR organisation has grown in experience and maturity. There are many excellent research results of wide applicability in these reports. No projects could be regarded as failures by the criteria distilled from review teams' terms of reference.

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Working Papers Series

1. Fearn, M, Davis, J S and Ringrose-Voase, A. 1994. Project development assessment: management of clay soils for lowland rice-based cropping systems: Project 8938.
2. Fearn, M, Mather, P, Macaranas, J and Capra, M. 1994. Project development assessment: genetic identification and stock improvement of *Tilapia* in Malaysia and Fiji: Project 9206,
3. Davis, J S. 1994. Disaggregation rather than mathematical manipulation for incorporating research impacts on supply.
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5. Fearn, M. 1994. project development assessment: mineral elements limiting sheep production in China: Project 8911
6. Fearn, M, Smith, B and Davis, J. 1994. Project development assessment: pacific island pearl oyster resource development: Project 9131
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11. Davis J. S and Lubulwa G. 1994. An overview of ACIAR's economic assessments of the postharvest program projects
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20. Lubulwa G, Underhill S. and Davis J. 1995 Project development assessment: pineapple quality improvement (Pn 9407).
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23. Lubulwa G and Hargreaves, S. 1996. Estimates of realised and potential impacts of three ACIAR projects on the ecology, epidemiology and control of ticks and tick-borne diseases in Sub-Saharan Africa.

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