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Lessons learned from past ACIAR impact assessments, adoption studies and experience

ACIAR IMPACT ASSESSMENT SERIES 69

Research that works for developing countries and Australia

Lessons learned from past ACIAR impact assessments, adoption studies and experience

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Canberra and Sydney

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The Australian Centre for International Agricultural Research (ACIAR) was established in June 1982 by an Act of the Australian Parliament. ACIAR operates as part of Australia's international development cooperation program, with a mission to achieve more productive and sustainable agricultural systems for the benefit of developing countries and Australia. It commissions collaborative research between Australian and developing-country researchers in areas where Australia has special research competence. It also administers Australia's contribution to the International Agricultural Research Centres.

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Foreword

The Australian Centre for International Agricultural Research (ACIAR) places significant emphasis on assessing the impact of the research that it funds, focusing in particular on quantifying the returns to research investments. In ACIAR's early days, quantification of potential economic impacts was used to support aggregate priority setting and more effective project development, as well as to meet public accountability requirements. As research efforts matured, more attention was given to quantifying the returns to completed projects by estimating adoption levels, measuring economic impact and learning from the findings of the assessments.

In addition to the in-depth economic impact assessments, a rolling program of 'adoption studies' became part of ACIAR's evaluation strategy in 2003–04. The primary purpose of an adoption study is to provide ACIAR with qualitative and, where possible, quantitative information on the extent of implementation of the project results 3–4 years after the completion of the project. In addition, where a project does not result in any change in practices by either the next or final users, information on the reasons for the lack of uptake is sought.

A third means of learning about the factors that enable or inhibit use of the project results is to gauge the opinion of those involved in the project, such as project leaders and ACIAR research program and country managers.

In bringing all three perspectives together, this review has sought to capture the elements that contribute to a successful project. It offers this retrospective evaluation as an opportunity to learn from past impact assessments, adoption studies and experience. It asks two questions: Are there regular or predictable factors that determine the relative success of projects? Are there retrospective lessons from particular projects that can subsequently be applied prospectively in the course of project planning and implementation?

The knowledge and insights gained in seeking to answer these questions will help ACIAR refine its holistic approach to planning, development and implementation of its project portfolio. The lessons learned by ACIAR may also benefit members of the wider research community.

Nick Austin
Chief Executive Officer, ACIAR

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1 Introduction

Background

It is clear that the Australian Centre for International Agricultural Research (ACIAR), established in 1982, has funded a wide range of successful research. The solid series of impact analyses it has commissioned shows high aggregate returns from evaluated projects. Overall impacts are summarised by Pearce et al. (2006) and Harding et al. (2009). The returns are more than enough to justify total ACIAR expenditure.

In the context of this success, it is worthwhile to consider the lessons that have been learned from previous projects. Are there regular or predictable factors that determine the relative success of projects? Are there lessons from particular projects that can subsequently be applied prospectively in the course of planning and implementing new projects?

At a time when the impact and importance of agricultural research is being examined and considered in detail, ACIAR is in the possibly unique position of managing a very diverse research portfolio in a range of challenging environments in partner countries. The lessons from its experience may be relevant not only to ACIAR in managing its own portfolios, but also to the wider research community.

This report draws on three sets of resources to consider the lessons that have been learned from previous projects:

- ACIAR's Impact Assessment Series (IAS) reports
- the reports on adoption studies conducted annually by ACIAR
- a qualitative survey of project leaders and ACIAR research program and country managers[1] that provided responses from 30 persons.

The findings from each of these resources are covered sequentially in Sections 2, 3 and 4. Section 5 brings the various lessons together in a common framework, while Section 6 provides some specific conclusions and recommendations.

What is 'success'?

This study of lessons learned focuses on the factors that lead to project success (or failure). What then constitutes 'success'?

There are two broad levels of success that need to be kept in mind. The first is the success of the project in achieving its objectives. Depending on the project, these may be scientific, market or policy objectives, and they may also include capacity building. In some cases, adoption of project outcomes (a least for a limited group of users) may also be an objective of the project, but this is not always the case for ACIAR projects. This first level of success is what is generally best understood and what all project team members strive for in the course of the project.

A second level of success is in the measurement of the magnitude of the impact that a project ultimately has, once it is completed and once various users have adopted its outputs. This factor of success is often

[1] Country managers are responsible for liaison, coordination and administration of activities required for the effective management of ACIAR's collaborative research program in the respective partner countries.

measured and quantified in economic terms (as in ACIAR's IAS reports, for example), although there are always elements of impact that cannot be quantified.

From the point of view of impact evaluation (the attempt to quantitatively measure the value of the outcome of research), a project will have an impact if it:

- successfully completes the intended research task
- generates an output (which may be a new technique applicable at the farm level or elsewhere in the production chain, new knowledge, or new information or tools for policymakers, or capacity building that enhances the future production of new techniques etc.)
- results in the output being adopted by users (whether they be farmers, processors, policymakers, other researchers etc.)
- results, following adoption, in economic and social benefits (productivity improvements, market access, policy reform) such that the value of the benefits is greater than the research and adoption costs.

A project can be successful without necessarily having an impact in terms of measured economic and social impacts. Many of the factors driving adoption and the size of benefits once adoption is achieved are well beyond the control of the project team so that the project's success (in the first sense outlined above) is not really limited by these external factors. Nevertheless, from the point of view of ACIAR as a whole, the factors that affect adoption and impacts are of interest, particularly if those factors can be accounted for in advance in some way. Thus, for this report, to derive lessons from past projects, success and impact are considered together.

This does not necessarily capture all the dimensions of project success, however. One part of the survey (reported in Section 4) was to ask project leaders, research program managers and country managers what they thought about project success. While most of the responses supported the broad definition outlined above, a number of additional perceptions emerged:

- It is not necessarily appropriate to judge success on the basis of a single project. Often a series of projects is required to generate the full pathway of benefits.
- In policy-related projects, outputs and impacts are much harder to discern and define.
- Success is not necessarily an automatic process moving from inputs to outputs to outcomes, but often involves the building of trust and collaboration with communities.
- In many cases, adoption is beyond the control of the project, but the project can be designed so as to maximise the likelihood of adoption.
- The idea of success should also include the development of sustainable relationships between researchers for future projects.
- In general, the capacity-building aspects of projects should rank high as indicators of success.
- Success can also be viewed in terms of the development of a continuing relationship between the researchers and the communities with which they worked. The ACIAR project may be a 'seed' from which a productive long-term relationship will germinate and grow.

In addition, there were mixed views about the extent to which adoption and implementation fell within ACIAR's mandate. This is an important question that will be explored as the various lessons are considered in more detail.

2 Lessons from impact assessments

In general, drawing lessons has not been an explicit objective of impact assessments, although the authors of IAS reports do at times discuss the implications of their analyses. Often these relate to the sensitivity of impact assessment valuations to particular assumptions underlying the analysis. In many cases, significant factors are uncertain, so sensitivity analysis becomes important to understanding the likely range of results. The lessons from sensitivity analysis are considered in more detail below.

General observations from Impact Assessment Series (IAS) reports

Aside from sensitivity analysis, IAS authors sometimes make more general observations based on their assessment findings. These fall into a number of broad categories, as follows.

The importance of adoption

Several IAS reports have made comments about the importance of adoption of research outputs in determining the benefits of research. A good representation of these comments is in the following quote from a review of ACIAR's fruit-fly research partnerships (Lindner and McLeod 2008, p. 84):

> One of the most important general lessons… is that while successful research project outputs may be necessary to enable potential benefits, they rarely are sufficient for benefits to be realised. In particular, potential benefits will only be realised if there is uptake of project outputs. Yet at the time of project formulation, the necessary conditions for adoption of project outputs often seem to receive insufficient attention. Fundamentally, potential adopters, be they growers, government officers or whomever, will only decide to adopt a new practice or product on an ongoing basis if there are net benefits in doing so. At best, failure to address this fact at the outset can delay the realisation of research benefits by many years. At worst, a return on the investment will never be realised.

There are three fundamental points here:

- research outputs will not produce benefits without adoption
- potential adopters will not adopt without there being clear net benefits of doing so
- the issues of adoption and the incentives facing potential adopters need to be considered at the outset of a project.

These three themes will emerge in many different ways in the rest of this report.

The effect of local industry and policy conditions

One aspect of the adoption issue is the observation that adoption of technologies, even those successful in other countries, depends very much on local industry and policy conditions. An impact assessment of two-stage grain drying in the Philippines (Chupungco et al. 2008) found that the local structure of the grain-trading industry meant that two-stage grain drying technologies—despite their technical superiority—were not profitable and consequently were not adopted.

A project champion

In the evaluation of a peanut project in India (Monck and Pearce 2008) the authors found that adoption of research outputs was very much driven by the actions of a non-government organisation (NGO) that, fortuitously, had a particular interest in the results of the

ACIAR-funded project. Without this NGO champion, it is very unlikely that the outputs of the project would have been adopted.

Capacity building

The importance and effectiveness of capacity building in ACIAR projects is often reflected in IAS reports. A study of capacity building in a pig project in Vietnam concluded (Fisher and Gordon 2008, p. 48):

> It is clear that capacity building was extremely important to the success of the project, which suggests that a significant capacity-building component should continue to be included in future ACIAR projects. Comparison with the lesser benefits of a simple investment in good genetics without the research and capacity-building components reinforces this conviction and demonstrates the value of the ACIAR approach to the development of partner countries.

At the same time, other research has indicated the importance of continuity in projects involving capacity building. One study concluded (Longmore et al. 2007, p. 34):

> The key lesson learned from this project is the importance of continuity in projects involving capacity building. In the modelling subproject it was expected that further funding would be given to continue to develop the APSIM–SORG [Agricultural Production Systems SIMulator–Sorghum] model for use in India. This extra funding would have enabled the model to be widely used in India and could have created some positive results. However, as the project was not extended, there was time to develop the model for only limited use. The capacity of one Indian scientist to use this model was built but this scientist was unable to find opportunities in which to use his training once he returned to India, and this capacity was not utilised.

The challenges in implementing policy outcomes

A recent impact assessment of a barramundi fishery project in Papua New Guinea (Fisher 2010) provides several important lessons about factors determining the impact of policy-related projects. While this project was successful in its scientific objectives (to increase understanding of a fishery) and while it led to a definite policy outcome (the passing into law of a fisheries management plan), the economic benefits of the project were found to be zero or negative.

The two main reasons for this were that:

- circumstances in the fishery changed so that the original management plan became outdated and was not suited to the new circumstances
- the regulations in the plan were not enforced.

However, even without these negative circumstances, the project would not have generated net benefits, for the simple reason that the fishery was too small to ever generate economic benefits sufficiently large to cover the costs of the underlying research.

An observation on sensitivity analysis and adoption

The very common finding that adoption rates are crucial in determining the magnitude of impact of a project is, in one sense, very obvious and unsurprising.

Figure 1 illustrates the typical set-up for a standard impact evaluation of a productivity improvement that results in a downward shift in the industry supply curve (a cost reduction, coming perhaps through a yield improvement). The shaded area in Figure 1a shows the value of the change in economic surplus that is used as the measure of benefits in impact evaluation. The size of this depends on the magnitude of the downward shift, and the slopes of the demand and supply curves (their elasticities).

Figure 1b shows a typical adoption profile. Adoption starts at a low level, accelerates, then slows as the plateau of maximum adoption is reached. Key factors in the adoption profile are how soon adoption starts (or how many years it takes to get to half the maximum adoption rate) and the maximum rate of adoption achieved.

How sensitive is the value of measured benefits to the various factors set out in Figure 1? Figure 2 shows the sensitivity of benefits to each factor. These estimates are generated using an illustrative project and by systematically varying each of the parameters to generate a series of estimates of benefits. The figure shows the 'sensitivity elasticity' that emerges.[2]

[2] This elasticity is expressed in standard deviation form: that is, the coefficient shows the effect on the net present value of benefits of a 1-standard-deviation change in the relevant variable.

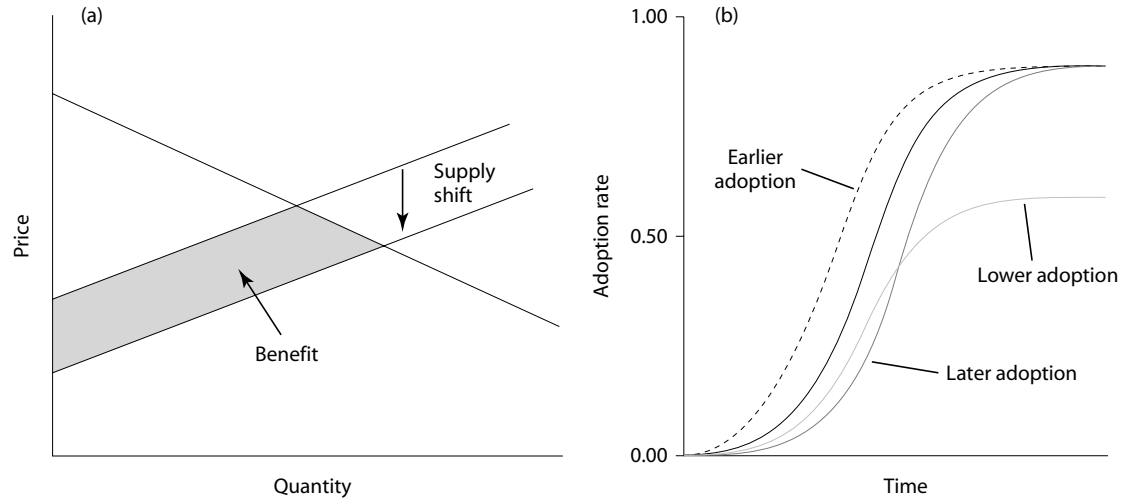

Figure 1. Parameters for research project impact evaluation: (a) economic benefit; (b) adoption profile

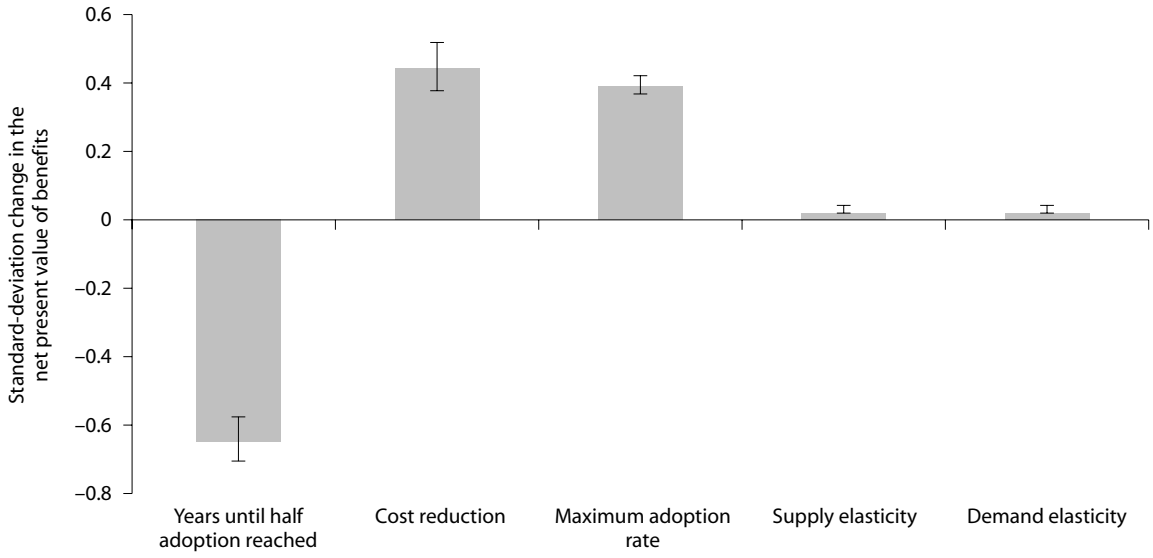

Figure 2. Sensitivity of project benefits to key factors. These estimates were generated by using a sample project and systematically varying the following: years to half adoption (1 to 24); the magnitude of the shift in the supply curve (cost reduction, from 5% to 20%); the maximum adoption rate (from 20% to 90%); the supply elasticity (from 0.05 to 5); the demand elasticity (from −0.05 to −5). Results are presented as normalised coefficients. For example, a 1-standard-deviation change in the variable 'years until half adoption reached' leads to a −0.6-standard-deviation change in the net present value.

By far the most important factor is the number of years until half the maximum adoption is reached. This sensitivity is negative because, as the number of years increases, the present value of benefits declines.

The second most important factor is the magnitude of the cost reduction, just slightly ahead of the maximum adoption rate. The supply and demand elasticities have a very small impact on the overall magnitude of total benefits (although they are important for determining the distribution of benefits).

Interestingly, the two adoption factors combined are considerably more important than the magnitude of the cost reduction.

This example shows the importance of adoption for a relatively straightforward project that results in a yield improvement or cost reduction leading to a downward shift in the supply curve. For these types of projects, the adoption rate will always play a dominant role in the measured economic impact of the project.

While this is the most frequent type of impact, not all ACIAR projects will have this sort of economic effect and, in some cases, the adoption rate is much harder to define. Nevertheless, even for other types of projects, the notion of adoption will be crucial in influencing project impacts.

For policy projects, for example, adoption is not by farmers or processors, but by policymakers and legislators. While an adoption rate is not easy to define in such cases, it is clear that the actual use of project outputs in policy formulation is crucial to generate an impact. Adoption of the project outputs by a single policymaker can often have a very large effect. Alternatively, no adoption will mean no effect.

For capacity-building projects, the impact depends on what the recipients ultimately do with their new capacity. This will be determined by many factors and, again, a simple adoption rate does not capture the full complexities involved. As in the case of policy projects, however, without some sort of 'adoption' there is unlikely to be any impact.

3 Lessons from adoption studies

Patterns of adoption by category

Reports in ACIAR's adoption studies series estimate adoption levels for the projects covered. Adoption estimates are ranked according to a four-level scheme:

- NF—demonstrated and considerable use of results by next and final users
- Nf—demonstrated and considerable use of results by the initial users, but only minimal uptake by the final users
- N—some use of results by the initial users, but no uptake by the final users
- O—no uptake by either initial or final users.

There is clearly a considerable amount of judgment entailed in allocating particular adoption outcomes to projects. Indeed, in many cases a single project will have different outcomes for individual project components.

Figure 3 summarises the proportion of adoption in each of these categories for each of the seven adoption studies completed.[3] These proportions are calculated by taking a simple count of the adoption outcomes reported in the studies. In some cases there may be more than one count per project, reflecting different outcomes within a single project.

As Figure 3 illustrates, the proportions in each category have varied between adoption studies but, on average, 33% of the adoption rankings are NF, 22% are Nf, 33% are N and 12% are O.

[3] McWaters and Templeton 2004; McWaters et al. 2005; McWaters and Davis 2006; Gordon and Davis 2007; Pearce and Davis 2008; Pearce and Templeton 2009, 2010

Factors contributing to, or inhibiting, adoption

Each of the adoption studies summarises the factors that contribute to, or inhibit, adoption. These findings are summarised in Figure 4, which gives counts of the number of times each factor emerges across the studies.

Lack of incentives for users to adopt outcomes

The most frequent factor considered to inhibit adoption is a lack of incentives for the users to adopt outcomes. The adoption studies identify a number of reasons for lack of incentives, including:

- competition from cheaper or more profitable alternatives to the output of the research
- higher cost of the research outputs relative to the status quo
- institutional constraints such as limited land tenure
- farmer suspicion of the outputs
- inability of potential users to capture the benefits of the outputs
- absence of commercial means of accessing the outputs of the research.

Apparent lack of incentives may also be associated with unawareness of project outputs.

Lack of knowledge of project outcomes

The second most frequent factor inhibiting adoption is lack of knowledge of project outputs. Reasons underlying this include:

- ineffective distribution of information to farmers

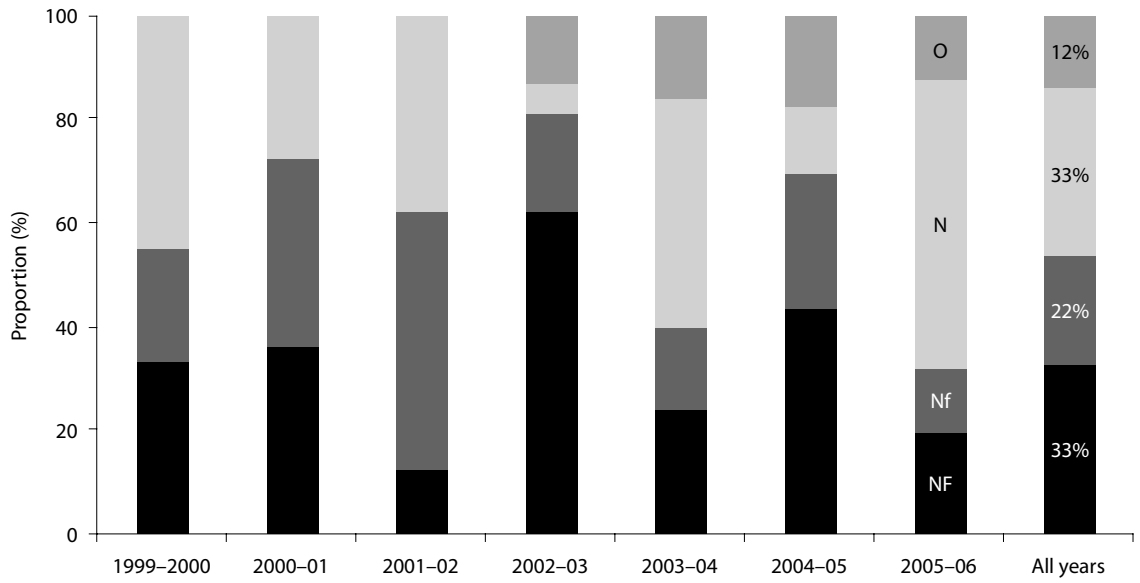

Figure 3. Tallies of proportions of projects achieving various degrees of adoption in ACIAR adoption studies: NF = demonstrated and considerable use of results by next and final users; Nf = demonstrated and considerable use of results by the initial users, but only minimal uptake by the final users; N = some use of results by the initial users, but no uptake by the final users; O = no uptake by either initial or final users

- lack of funds to extend adoption
- inability of the project team to simplify the message and package it in a way suitable for farmers
- language barriers within the project team.

Other constraints

Lack of incentives and lack of knowledge together account for just under one half of the factors reported as inhibiting adoption. A further sixth is accounted for by capital, infrastructure or resource constraints. This group includes infrastructure around the industry concerned (for example, lack of grain storage infrastructure) as well as limited access by adopters to financial capital.

Factors contributing to success

The factors contributing to success are almost the inverse of the factors inhibiting success. In this case, the most frequently cited factor is knowledge of outputs. This factor alone accounts for more than half of the citations. When combined with user incentives, the two account for around three-quarters of cited factors.

In summary, this aspect of the adoption studies reinforces the crucial role of incentives and knowledge in influencing levels of adoption.

Interestingly, these two factors have quite different characteristics. Incentives cannot usually be influenced by the project itself but are, in many ways, a function of the economic and institutional structures within the country or region concerned. While incentives cannot necessarily be directly manipulated, they can be studied and understood in advance of the project.

Knowledge of outputs is, on the other hand, within the control of projects through the simple means of communication undertaken within the project or the efforts of champions of outputs (who may be independent of the project).

General lessons from adoption studies

Each of the adoption studies also reports a range of ad-hoc lessons that emerge from the particulars of the projects examined.

Table 1 provides a thematic summary. The summary is built around lessons grouped into four broad areas: the selection of research partners; the ability to build capacity and research infrastructure; the approach to communication, dissemination and extension; and incentives for adoption. There is considerable overlap between these lessons and the factors identified in Figure 4.

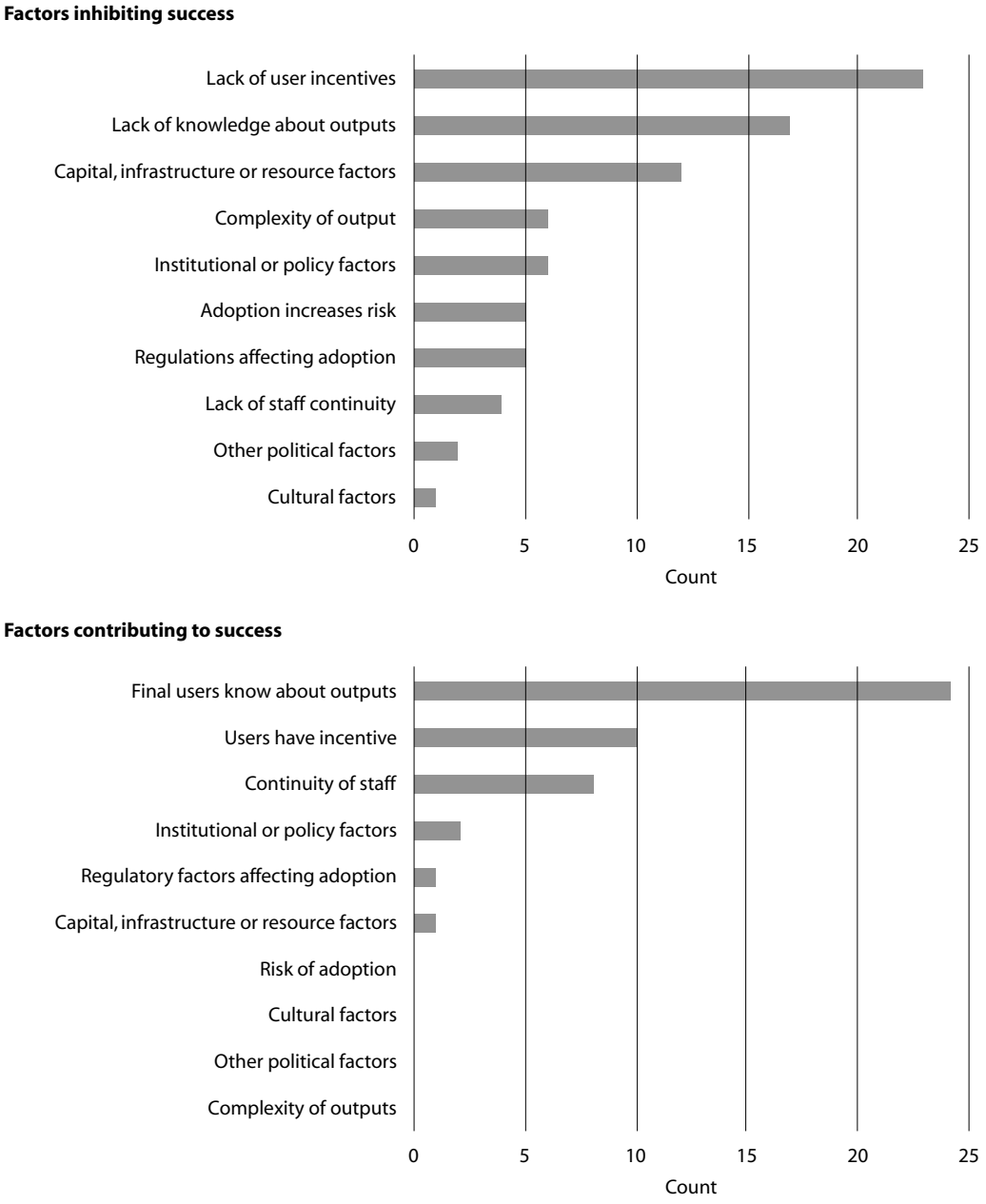

Figure 4. Counts of factors contributing to, or inhibiting, adoption of project outputs, based on the findings of various ACIAR adoption studies

Table 1. Lessons drawn from recent ACIAR adoption studies

Area of lesson	More details
Careful selection of research partners — particularly, understanding their resources and incentives	*Do the partners have*: an active involvement in the production chain? direct conduits to policymakers? a long-term future and stability in the short term? committed in-country scientists and researchers?
Ability to build capacity and research infrastructure — leaving a long-term impact	*Does the project:* devote resources to research infrastructure? create collaboration between researchers, extension workers, policymakers and farmers? include targeted training? involve face-to-face training visits?
Communication, dissemination and extension — getting results out to users	*Was the communication and dissemination strategy*: thought out in advance? included as part of project funding? *Does the partner country:* have extension resources and institutions? show a commitment to extension activities?
The incentives for adoption — why should users take up project outputs?	*Are the project outputs:* commercially available? consistent with (or encouraged by) regulations? beneficial for users to adopt in their subjective view? championed on an ongoing basis?

Overlap between adoption and IAS studies

Seven projects, reported in six IAS reports, have had detailed impact analysis along with qualitative treatment in an adoption study. Each of the projects was categorised as NF in the adoption study and, with one important exception, each was found to have significant benefits in the IAS report. Figure 5 summarises the returns from the five IAS reports that found positive benefits.

Clearly, the range of returns is very large. Given this, and given the small sample size, it is not possible to draw any conclusions about the relationship between the findings of an adoption study and the potential outcomes from an impact assessment study.

While not all of the IAS reports speculated about the reasons for the magnitude of the returns, the broad reasons given as underlying the success of these projects included:

- government recognition of the importance of, and support for, the research findings (in the case of mud crab hatchery technology in Vietnam)
- strong demand for the final product and the importance of foreign commercial interests (in the case of eucalyptus tree improvement in China)
- the high rate of adoption achieved through embedding the research findings in varieties used by those growing trees (in the case of fungal diseases of eucalypts in South-East Asia)
- the high commercial adoption (in the case of shelf-life extension of leafy vegetables in China)

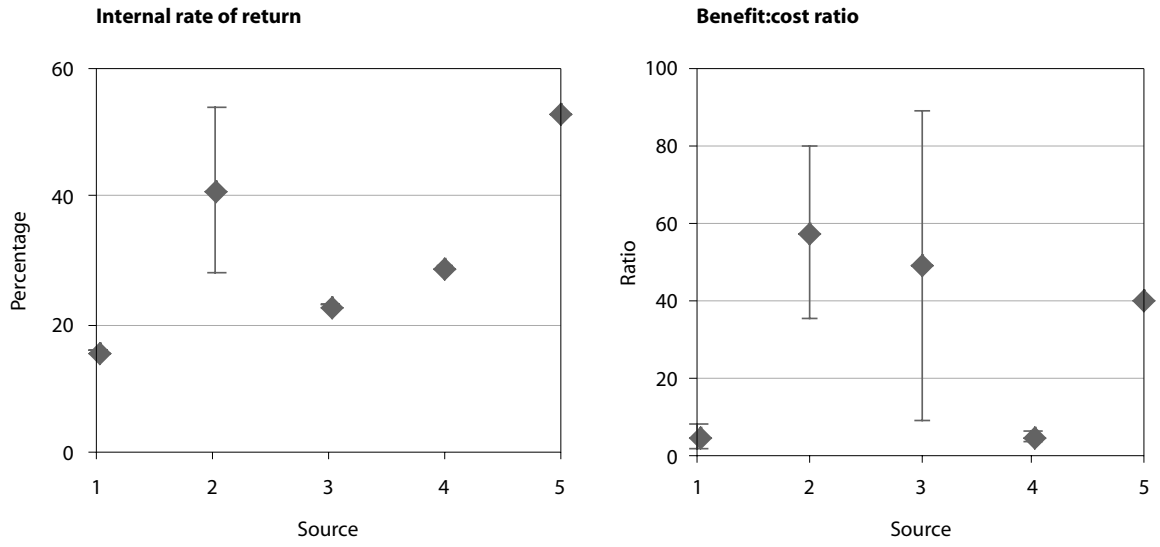

Figure 5. Returns from ACIAR projects covered by both an ACIAR Impact Assessment Series report and an adoption study that found positive benefits. The error bars show the ranges reported in the relevant studies. (Sources: 1. Lindner 2005; 2. van Bueren 2004; 3. Fisher and Gordon 2007; 4. Monck and Pearce 2008; 5. Tingsong Jiang and Pearce 2005)

- the high adoption due to the efforts of an NGO (in the case of white grubs in peanuts in India).

Importantly, as mentioned earlier, one IAS study (Fisher 2010) that was carried out after an adoption study, found that the project, while achieving NF status in the adoption study, did not in fact yield any economic benefits. The project involved the development of a management plan for a barramundi fishery in Papua New Guinea. While the project was successful in scientific terms, generating considerable knowledge about the fishery, and in terms of developing a management plan that was passed into law (hence the high adoption ranking), several circumstances surrounding the fishery and the plan meant that no economic benefits were actually achieved.

This case illustrates that while, in the majority of cases to date, successful adoption has led to economic benefits (a positive impact), a positive impact is not guaranteed and there are many circumstances beyond the control of the project that can affect the measured impact.

4 Lessons from the survey

To obtain a range of lessons from direct practical experience, a qualitative survey of project leaders and ACIAR research program and country managers was undertaken. A list of the questions asked is provided in the appendix.

This section considers the key findings from the survey.

Overall impressions

Definition of project success

There were mixed views on the definition of 'success'. Some respondents were hardline, requiring demonstrated impacts at the end of the project; others suggested that success needs to be assessed at different points along the project chain. One respondent said that outcomes (and therefore impacts) can really be considered at only a program level, not at the individual project level.

Two respondents raised the question of whether ACIAR projects need to focus on all points in the research, development and extension (RD&E) chain. Perhaps some projects should focus on R&D, and others on D&E. The expertise required for each is quite different. A related view was that ACIAR could focus on developing a pilot of the project outputs plus the in-country capacity to get the job finished (implicitly relying on partner-country institutions).

General impressions on project success

The survey responses gave rise to a number of general impressions, including the following:

- The 'human' side of projects is important; in particular, the choice of capable project leaders, team members who get on with each other and have complementary language skills, to ensure cultural understanding and awareness.
- Having a close to 100% commitment of time from Australian and partner-country key researchers is a big contributor to success.
- Success is often related to the amount of time the Australian project team spends in the partner country; the more time spent in country, the greater the likelihood of success.
- Good management throughout the course of the project features highly as a success factor. Poor management can create serious problems early on, delaying projects by years, and often requiring additional funds to solve them.
- Physical and technological aspects of communication must be attended to, such as dealing with the lack of internet in some countries, and making sure that the full team stays in constant communication.
- Demand-side drivers are important in determining the content and conduct of the project.
- Projects should align with partner-country government objectives to ensure in-country institutional and government support.
- A commercial partner in the project helps maintain focus.
- The needs and characteristics of the intended users of the research need to be understood and kept in mind during all steps in the project.

Each of these general impressions will be elaborated on in the following discussion.

Reaction to factors in the adoption studies

Survey respondents were presented with the lessons summarised in Table 1 and asked to consider which of the lessons most resonated with their experience. Figure 6 summarises the responses. The careful selection of partners was the most frequently cited lesson, with the other three factors following closely behind. From the practical perspective of running projects, the regular interaction with research partners clearly looms large as an important factor affecting project outcomes.

Five factors leading to project success

Respondents were asked to list what in their view were the five most important factors in determining project success. With 30 respondents, there was a potential total of 150 factors. However, there was considerable overlap between the responses and they could be grouped under 14 broad factors. These are summarised in Figure 7, along with the frequency with which they were cited.

Clearly defined objective and research questions

By far the most frequently cited factor (in nearly a quarter of the responses) was the importance of good project design, embracing clear objectives and research questions responding to a well-defined need. Elements of this included:

- building the project around a clear research need and involving all parties (Australian and partner country) and stakeholders in the design to respond to that need
- a project plan with a well-defined path and which assigns clear responsibilities to participants
- achievable research objectives based on a sound understanding of the problem to be tackled
- project coverage relevant to the research priorities of partner-country agencies.

Strong communication leading to good collaboration

The importance of ongoing communication between all members of the project team is the core feature of this factor. Excellent communication enhances the potential for the most productive research collaboration.

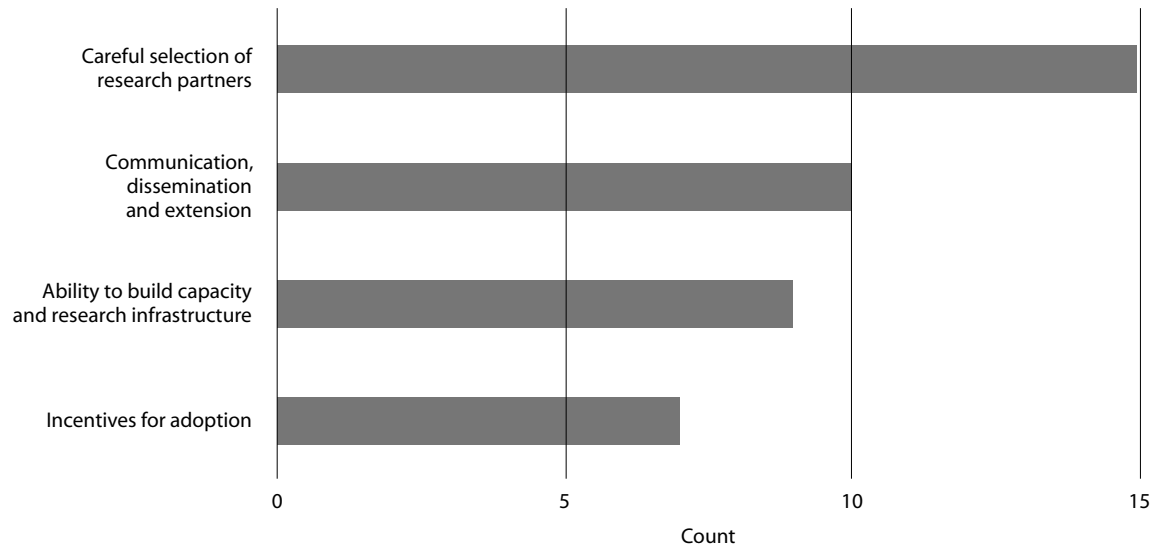

Figure 6. Importance of factors identified from adoption studies, as determined from a survey of project leaders and ACIAR research program and country managers

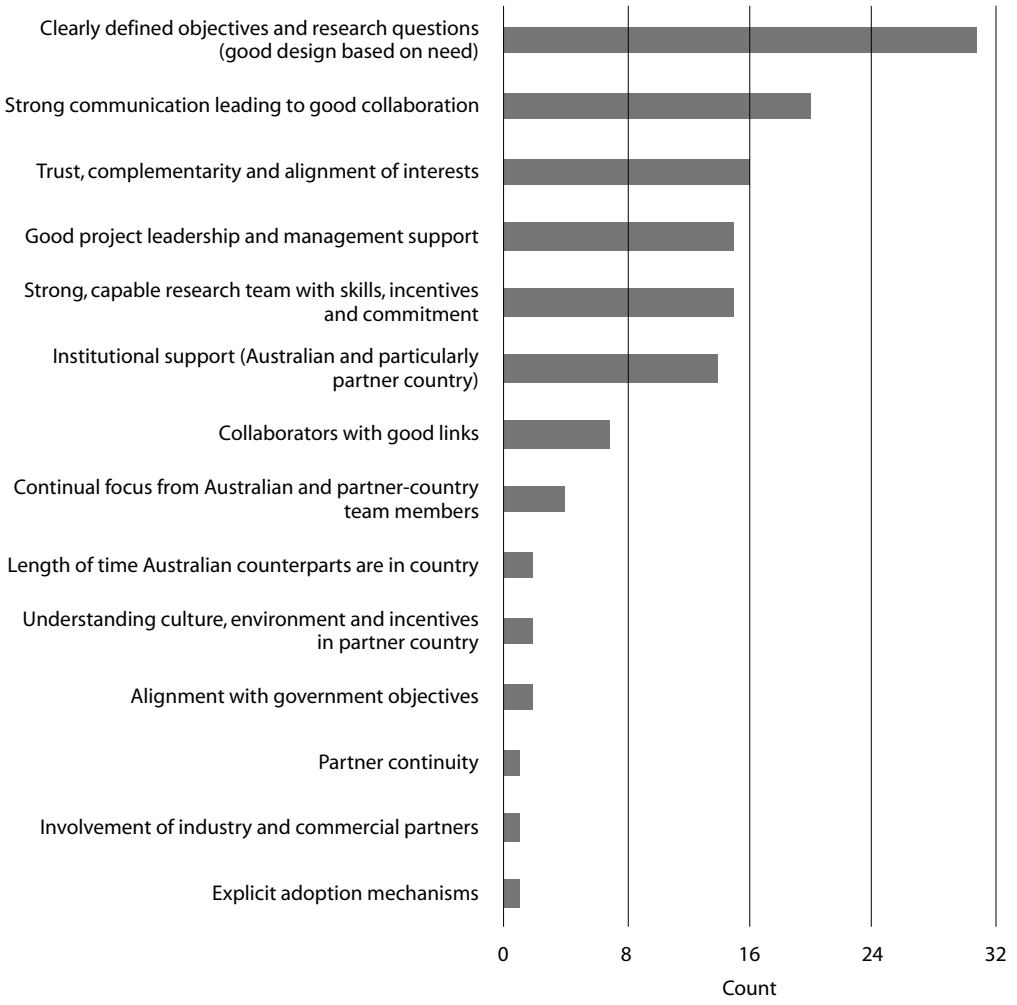

Figure 7. Fourteen broad factors derived by grouping responses of project leaders and ACIAR research program and country managers who were asked to identify the five most important factors contributing to project success

Elements of this factor included:

- the language skills of project participants, particularly where Australian participants had some skills in the partner country language
- an established program of formal communication, including regular team visits (at least thee times a year)
- rigorous annual review and planning meetings.

Trust, complementarity and alignment of interests

These factors related to both the interpersonal relationships within the team and the sharing of research interests between team members.

On the interpersonal aspect, mutual respect and trust was a frequently cited success factor. From the Australian perspective, this meant empathy with, and understanding of, partner-country needs. From the partner-country perspective, this meant engagement in the project by partner-country scientists combined with respect for the capability of the Australian partners.

Good project leadership and management support

The importance of the leadership qualities of the project leader was a major component of this set of factors. Project leaders were expected to have the ability to empower the research team as well as the communication and interpersonal skills to keep a diverse group of researchers working together.

Management support was closely related to this, but also referred to support from the broader management structures of the Australian and partner-country research organisations.

Strong and capable research team

Like the qualities of the project leader, the qualities of the research team are clearly very important to project success. This factor refers to:

- the technical abilities of the research team, particularly having the knowledge needed to undertake the research
- the commitment of the research team to the project
- the motivations underlying the research team (is it about the research itself, or about tapping into another source of funding?).

Institutional support

This factor captures the idea that, to achieve success, it requires the support of the institutions within which both the Australian and partner-country researchers work.

Collaborators with good linkages

For overall project success, the partner-country collaborators need good linkages with agencies within their own countries, particularly to ensure government support for the project and to help ensure dissemination of project results.

Factors behind the most successful projects

The survey also asked respondents to consider the factors behind the most successful projects with which they had personally been involved. The responses are summarised in Figure 8.

In this case, the most important factors were the quality of the research team and institutional support, followed closely by strong collaboration and communication. Interestingly, the involvement of industry collaborators appeared on this list but did not appear on the 'five factors' list discussed earlier.

Figure 8. Factors behind projects identified as the 'most successful' by project leaders and ACIAR research program and country managers surveyed

Factors behind the least successful projects

The survey also asked respondents to consider the factors behind the least successful projects with which they had personally been involved. The responses are summarised in Figure 9.

In this case, the main factor leading to less success was poor project planning and design, followed by poor management and leadership.

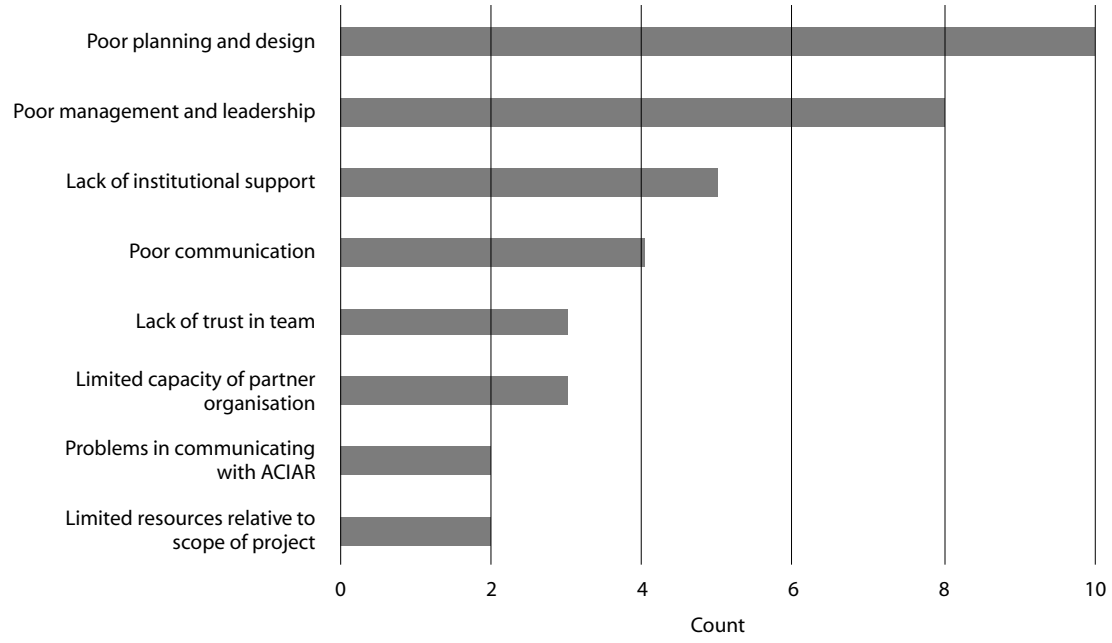

Figure 9. Factors behind projects identified as the 'least successful' by project leaders and ACIAR research program and country managers surveyed

5 Bringing the lessons together in a common framework

The project cycle

One way of organising the lessons discussed in previous sections is to arrange them within the context of a project cycle—the way in which the project moves through various stages from beginning to end. A project cycle is not necessarily applied in a literal way to all projects, but it is a conceptual frame to help understand the flow of information and decisions as a project progresses. A wide range of decisions is made and information is transferred—either implicitly or explicitly—at various stages in any project.

Key elements of the project cycle

Broadly speaking, the following are the key elements in the project cycle:

- problem selection—what problem will the project address?
- project design—how will the project tackle the problem?
- team selection (including partner-country team members)—what team composition will best address the problem within the project design?
- project conduct—how will the project operate on a day-to-day basis; what rules will govern its conduct?
- managing outputs—how will the results of the project be disseminated?
- adoption—who are the expected users of the project outputs and what attention will be given to the adoption of project outputs by the appropriate users?
- linkages—how will the project interact with the broader aid agenda in the particular country?

These elements are not necessarily linear or even distinct, but one way or another they are all present in projects. As noted previously, there is some debate on the extent to which adoption should be considered as a component of ACIAR projects. For the purposes here, however, adoption will be considered as being part of the project cycle.

Five categories for the lessons

The various lessons discussed in this report clearly apply at different stages in the project cycle. To allow them to be summarised and compared, they can be arranged into five broad categories of lessons or, putting it another way, five broad categories of factors that affect each stage in the project cycle. The five factors are:

- human
- management
- communication
- institutions
- incentives.

Figure 10 summarises some of the ways in which these factors are related.

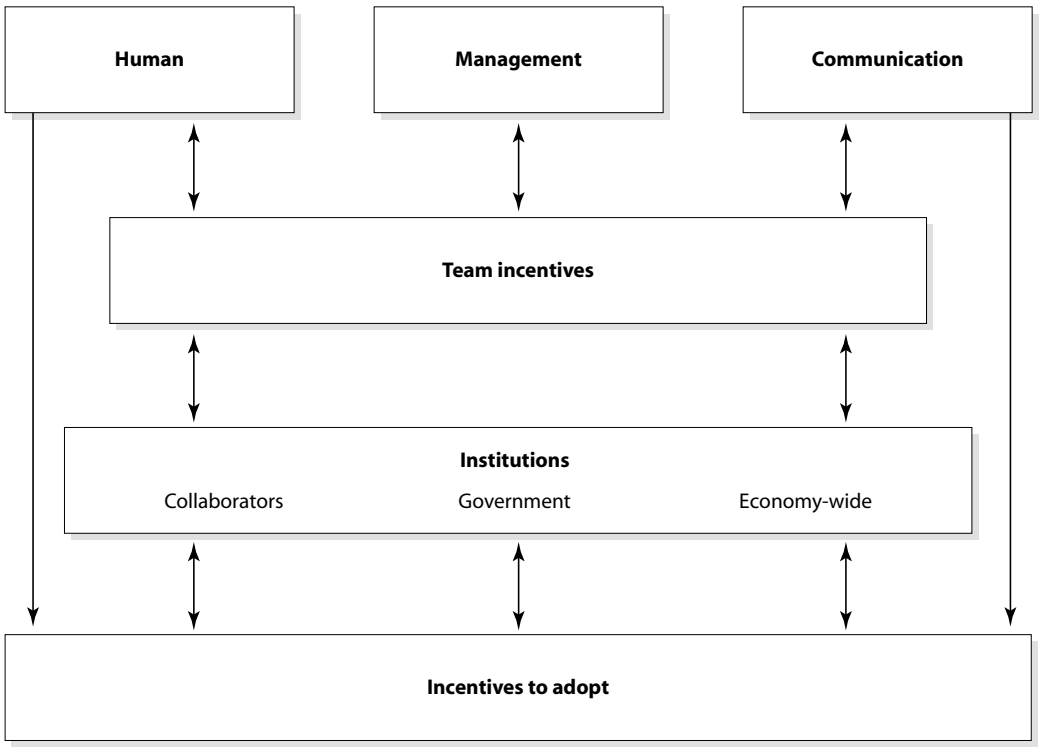

Figure 10. Links between categories of factors that affect each stage of the project cycle, based on lessons learned from previous research projects

Human factors

These factors cover the ability of team members, researchers, counterparts and others involved in a project to communicate and work together harmoniously. They include:

- the personal capabilities of team leaders and managers
- the ability of team members to engage in cross-cultural communication
- various intangible aspects of the mutual regard within a team and between the project and other external organisations.

A number of the survey comments pointed out that the difference between good and bad projects (in the running of the project and in the ability to get results) often turns out to hinge on these 'human' factors. They loom large in any project but, because they are difficult to manage and quantify, their importance is often underplayed. It is worth keeping them as an explicit category.

Management factors

These factors refer to the running and management of the project and include:

- the specification of tasks and goals to all members of the project team
- regular feedback on progress on these tasks and goals
- the broad allocation of time in country for key researchers
- the allocation of the main researchers' time on the project
- the day-to-day running of the project and its general organisation and administration.

Effective management is, of course, a crucial aspect of any research project. The nature of the research ACIAR funds, however, makes management particularly important.

Communication factors

Although in many ways a subset of project management, communication factors are, for two main reasons, worth thinking of as a separate category. First, they arise frequently in comments about the success of projects, and second, the nature of ACIAR projects means that effective communication will always be crucial for success.

These factors cover the approach to communication within the project, including the techniques and technologies for communication within the team, the language capabilities of team members and, more broadly, the clear intent to undertake regular communication throughout the whole team.

Institutional factors

There appear to be two types of institutional factors that have a major influence on project success.

The first type relates to the specific institutions within which the project takes place, in both Australia and the partner countries.

- Is there full support from the Australian and partner-country institutions charged with undertaking and managing the research? Without this, it is much more difficult for individual teams to be effective in their research work.
- Has the right partner institution been chosen for undertaking and disseminating the results of the research?

The second set of institutional factors relates to the broader economy-wide institutional settings within the partner country that are likely to influence project adoption and impact. These include broad market settings, regulations and other policy factors. They also relate to the extent to which the goals of the project align with the overall goals of partner-country governments. Where this is not the case, it is considerably more difficult to achieve adoption and impacts from the project outputs.

Incentive factors

There are two broad sets of incentive factors operating within any project.

The first set relates to incentives to participate in the project and to subsequently disseminate project results more broadly. While incentives are often thought of in terms of stimuli for users to adopt results, it is clear from some of the survey comments that the researchers and project team members themselves have mixed incentives in undertaking the research in the first place.

The second set of incentive factors relates to the economic and other elements motivating users to adopt the output from the project.

Applying the factors to the project cycle

As already noted, the various factors all apply at each stage in the development and execution of a project and, to an extent, have a different specific meaning at each stage. Table 2 summarises how the factors apply at each step in the project cycle.

At the project design stage, lessons about incentives and institutions play a key role. Will users ultimately have incentives to adopt the research outputs or, put slightly differently, is there a clear demand for the research? Related to this, to what extent do institutions within the partner country affect incentives to undertake and ultimately adopt the research outcomes? While it may not be possible to definitively answer these questions at the design stage, being aware of the issues may assist in project design.

Lessons from past projects suggest that management and communication factors need to be carefully considered during the project design stage. The existence of an explicit management and communication plan seems to play an important role in determining ultimate project success, as also does attention to incentives and human factors.

During partner and team selection, the lessons seem to suggest that closely related human and management factors have a significant influence on success. Here too, information on the effectiveness of the proposed partner institutions, along with an understanding of their incentives to engage in the project, may help guide the selection of effective research partners.

Table 2. Framework for considering success at each stage in the research project cycle

Stage in project cycle	Factors affecting success
Problem selection	*Incentives*—what problems need to solved and what demand is there for research outputs? Is the problem demand-driven? *Institutions*—how is the problem influenced by the economic and agricultural institutions within the particular country? Will the institutions enhance or inhibit the research?
Project design	*Management*—what is the proposed approach to management? Will there be clearly specified roles and responsibilities? What plans are in place to monitor performance and receive regular feedback? *Communication*—what is the proposed approach to managing outputs and dissemination? What tools will be used for team communication? *Incentives*—who will use results from the project? What are their needs and capacities? *Human*—what cultural and other factors will influence the project and its conduct? Given the countries and partners involved, what team member characteristics will be most desirable?
Partner and team selection	*Human*—will there be coherence within the project team? What are the capabilities of the team leader? What mix of abilities is needed within the team? *Management*—who will be responsible for management tasks, internal communication strategies and feedback mechanisms? *Communication*—what communication strategies are needed to deal with the selected team? *Institutions*—how effective are the partner institutions? Can their effectiveness be enhanced? *Incentives*—what are the incentives for the partner groups to work together? Do partners face constraints that may influence the conduct or outcome of the project?
Project conduct	*Human*—what is the level of coherence within the project team. How effective is the team leader? *Communication*—what is the day-to-day approach to communication? *Management*—how is the day-to-day running of the project managed? How much time in country do team members have? *Institutions*—is there ongoing institutional support? *Incentives*—why do the partners want to work together?
Managing outputs	*Human*—how willing are team members to communicate? *Communication*—what will be the best approach to communicating the outputs? What are the capacities of the audience? *Institutions*—what partner-country institutions have incentives for dissemination? How can they be involved? *Incentives*—what are the incentives for team members to disseminate results?
Adoption	*Human*—does the dissemination team understand the needs of users? *Management*—is there active management of adoption? *Incentives*—do potential users have incentive to adopt? *Institutions*—how do broader economic arrangements affect adoption (e.g. laws, regulations, tax policy etc.)? Are there partner-country institutions that can take charge of adoption?
Linkages	*Human*—is the wider aid community aware of the implications of the project? *Management*—is there interaction between the ACIAR project and the broader aid agenda? *Incentives*—does interaction with other aid projects affect the incentives to adopt outcomes from the ACIAR project?

The lessons suggest that, during the course of the project, all factors become important in contributing to project success. Careful and explicit attention to each of them seems to contribute significantly to project success, as does the ability to modify the conduct and management of the project if it appears that it is running into difficulties.

When it comes to managing project outputs, human factors appear to play an important role, particularly the willingness of team members to disseminate results. Closely related to this are institutional and incentive factors lying behind the effective management of project outputs.

At the adoption phase, institutions and incentives are crucial in affecting adoption. So too are human and management factors, particularly the understanding of the needs of users and the willingness to actively manage adoption processes.

Ex-ante project analysis

An important question that this view of the project cycle and the way various lessons apply to it raises is the extent of analysis that should be undertaken ex ante; that is, during the project design phase. There are two elements to this: the ability to undertake ex-ante analysis of economic benefits for a project, and the ability to understand the incentives for adoption at the design phase.

Estimating economic benefits in advance

It is evident in some cases that the magnitude of project impacts could reasonably have been anticipated if more economic data had been collected during the design phase of a project. In other cases, however, it is not clear whether such advance information would have made any difference to either the decision to proceed with the project or the benefits that could be derived from it.

Further, there is clearly considerable uncertainty at the design stage as to what the scientific outcomes of the project are likely to be, quite aside from adoption rates and magnitude of impact.

Perhaps the best strategy, given this uncertainty, is to consider undertaking reasonably rigorous threshold analysis at the design stage. Given the projected project spending, threshold analysis would consider the question of what magnitude of impact (and what adoption profile) would be required in order to obtain a net positive benefit from the project. For example, given a relatively simple evaluation structure such as that set out in Figure 1, threshold analysis would consider what magnitude of supply curve shift and which adoption parameters would be needed to achieve a positive benefit:cost ratio.

Understanding incentives for adoption in advance

Closely related to the question of measuring economic benefits in advance is that of the extent to which the incentives for adoption can be understood in advance of a project being put in place.

For any commodity or sector within a country, there will always be a diverse range of information available that can be used to derive views about adoption incentives. At a minimum, it should be possible to compile broad information that will provide an indication as to whether incentives for adoption are likely to be problematic for a project. For example, it should be a relatively straightforward task to obtain a broad understanding of farmer payment systems, land tenure and other institutional arrangements. Certainly, this information is likely to be at least implicit in ACIAR's experience across a number of countries. Similarly, understanding of the formal country extension schemes should be available from a number of sources.

Inevitably, however, there will be a limit to what can be understood before project outputs are clear, particularly for longer term projects. Nevertheless, the discipline of thinking through incentives for adoption is likely to be very valuable at the early stages of project design.

6 Conclusions: applying the lessons

Can these lessons be effectively applied to the future conduct of ACIAR projects? There are two possible responses to this question:

- For a number of ACIAR-funded researchers (as represented by project leaders), as well as research program and country managers, these lessons are likely to already be internalised into routine thinking about projects. For them, it is hoped, the lessons will appear 'obvious'.
- For others, however, including project leaders who are new to work across countries or to designing ACIAR-style projects, the lessons may contain valuable insights that could assist in the design and implementation of projects. Further, there may be organisations other than ACIAR undertaking collaborative international research that may find these lessons valuable.

The following ideas are targeted at the second of these responses.

Use the framework as a checklist at the project design stage

The 'human, management, communication, institutions, incentives' framework set out in Table 2 could be used as a checklist at the project design stage. It would be relatively easy to design a checklist-based tool that would serve as a way of bringing these lessons formally, or informally, into project design activities. The most important result of this would be explicit consideration of the adoption pathway at the design stage of the project. This is not to say that ACIAR necessarily needs to fund adoption (although that may be appropriate in some cases) but rather that the process of adoption needs to be kept in mind throughout the design and implementation of the project.

Consider preparing explanatory publications encapsulating the lessons

It would be a relatively straightforward task to use the lessons learned from past projects to design a series of 'how to' publications addressing aspects of international research collaboration. These publications could cover, for example:

- principles of project design for working in developing countries
- working in multicultural teams
- communication techniques for multi-country teams
- understanding adoption—incentives and limitations in developing countries
- dissemination—government or NGO, principles for choosing
- understanding institutions and incentives in specific countries.

While it may be considered that ACIAR-commissioned research organisations should be well aware of this material, past projects indicate that ACIAR's endeavours are somewhat different to the daily work of most Australian research organisations.

The purpose of explanatory guides would not be to micro-manage projects. That would not be feasible or desirable. Rather, they would aim to raise consciousness about the issues involved and to point to factors that need explicit consideration when undertaking ACIAR-funded projects.

Ensure clarity on ACIAR involvement in adoption

The survey responses and other material presented here show clearly that there is some ambiguity in information about the extent to which ACIAR-funded projects should be concerned with the ultimate adoption of outputs of the research. This ambiguity may be an inevitable consequence of the nature and diversity of the work ACIAR is involved with. It may be possible, however, for ACIAR to provide some broader guidelines to researchers about how adoption should be viewed in the context of its research.

Appendix Survey questions

Following is the list of qualitative questions asked in the survey of project leaders and ACIAR research program and country managers described this report.

- 1. What, in your view, constitutes project 'success'?
  - From an impact evaluation perspective, success refers to the overall achievements of completing the research, using it to produce an output (either a new technique or technology, new knowledge or new policy approaches) and then having this output adopted by users, and having this adoption lead to economic and social benefits.
  - Is this in line with how you think about success, and is there anything that you would add to this understanding?
- 2. What are five factors that in your experience contribute to project success?
  - Can you provide examples of these from specific projects?
- 3. What are five factors that in your experience limit the success of a project?
  - Can you provide examples of these from specific projects?
- 4. What is the most successful ACIAR project you have been involved in?
  - What made it a success?
  - Are the lessons transferable to other projects?
- 5. What is the least successful ACIAR project you have been involved in?
  - Why was this?
  - Are the lessons transferable to other projects?
- 6. Do the lessons set out in the table below[4] resonate with your experience?
  - Which ones are most pertinent from your perspective?
  - Are there lessons missing that you consider should be included?
- 7. Other comments or observations?
  - Would you like to make other comments or observations that are not covered by the questions above?

[4] This is Table 1 in the report.

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IMPACT ASSESSMENT SERIES

No.	Author(s) and year of publication	Title	ACIAR project numbers
1	Centre for International Economics 1998.	Control of Newcastle disease in village chickens	AS1/1983/034, AS1/1987/017 and AS1/1993/222
2	George P.S. 1998.	Increased efficiency of straw utilisation by cattle and buffalo	AS1/1982/003, AS2/1986/001 and AS2/1988/017
3	Centre for International Economics 1998.	Establishment of a protected area in Vanuatu	ANRE/1990/020
4	Watson A.S. 1998.	Raw wool production and marketing in China	ADP/1988/011
5	Collins D.J. and Collins B.A. 1998.	Fruit fly in Malaysia and Thailand 1985–1993	CS2/1983/043 and CS2/1989/019
6	Ryan J.G. 1998.	Pigeonpea improvement	CS1/1982/001 and CS1/1985/067
7	Centre for International Economics 1998.	Reducing fish losses due to epizootic ulcerative syndrome—an ex ante evaluation	FIS/1991/030
8	McKenney D.W. 1998.	Australian tree species selection in China	FST/1984/057 and FST/1988/048
9	ACIL Consulting 1998.	Sulfur test KCL–40 and growth of the Australian canola industry	PN/1983/028 and PN/1988/004
10	AACM International 1998.	Conservation tillage and controlled traffic	LWR2/1992/009
11	Chudleigh P. 1998.	Postharvest R&D concerning tropical fruits	PHT/1983/056 and PHT/1988/044
12	Waterhouse D., Dillon B. and Vincent D. 1999.	Biological control of the banana skipper in Papua New Guinea	CS2/1988/002-C
13	Chudleigh P. 1999.	Breeding and quality analysis of rapeseed	CS1/1984/069 and CS1/1988/039
14	McLeod R., Isvilanonda S. and Wattanutchariya S. 1999.	Improved drying of high moisture grains	PHT/1983/008, PHT/1986/008 and PHT/1990/008
15	Chudleigh P. 1999.	Use and management of grain protectants in China and Australia	PHT/1990/035
16	McLeod R. 2001.	Control of footrot in small ruminants of Nepal	AS2/1991/017 and AS2/1996/021
17	Tisdell C. and Wilson C. 2001.	Breeding and feeding pigs in Australia and Vietnam	AS2/1994/023
18	Vincent D. and Quirke D. 2002.	Controlling *Phalaris minor* in the Indian rice–wheat belt	CS1/1996/013
19	Pearce D. 2002.	Measuring the poverty impact of ACIAR projects—a broad framework	
20	Warner R. and Bauer M. 2002.	*Mama Lus Frut* scheme: an assessment of poverty reduction	ASEM/1999/084
21	McLeod R. 2003.	Improved methods in diagnosis, epidemiology, and information management of foot-and-mouth disease in Southeast Asia	AS1/1983/067, AS1/1988/035, AS1/1992/004 and AS1/1994/038
22	Bauer M., Pearce D. and Vincent D. 2003.	Saving a staple crop: impact of biological control of the banana skipper on poverty reduction in Papua New Guinea	CS2/1988/002-C
23	McLeod R. 2003.	Improved methods for the diagnosis and control of bluetongue in small ruminants in Asia and the epidemiology and control of bovine ephemeral fever in China	AS1/1984/055, AS2/1990/011 and AS2/1993/001
24	Palis F.G., Sumalde Z.M. and Hossain M. 2004.	Assessment of the rodent control projects in Vietnam funded by ACIAR and AUSAID: adoption and impact	AS1/1998/036

IMPACT ASSESSMENT SERIES <CONTINUED>

No.	Author(s) and year of publication	Title	ACIAR project numbers
25	Brennan J.P. and Quade K.J. 2004.	Genetics of and breeding for rust resistance in wheat in India and Pakistan	CS1/1983/037 and CS1/1988/014
26	Mullen J.D. 2004.	Impact assessment of ACIAR-funded projects on grain-market reform in China	ANRE1/1992/028 and ADP/1997/021
27	van Bueren M. 2004.	Acacia hybrids in Vietnam	FST/1986/030
28	Harris D. 2004.	Water and nitrogen management in wheat–maize production on the North China Plain	LWR1/1996/164
29	Lindner R. 2004.	Impact assessment of research on the biology and management of coconut crabs on Vanuatu	FIS/1983/081
30	van Bueren M. 2004.	Eucalypt tree improvement in China	FST/1990/044, FST/1994/025, FST/1984/057, FST/1988/048, FST/1987/036, FST/1996/125 and FST/1997/077
31	Pearce D. 2005.	Review of ACIAR's research on agricultural policy	
32	Tingsong Jiang and Pearce D. 2005.	Shelf-life extension of leafy vegetables—evaluating the impacts	PHT/1994/016
33	Vere D. 2005.	Research into conservation tillage for dryland cropping in Australia and China	LWR2/1992/009 and LWR2/1996/143
34	Pearce D. 2005.	Identifying the sex pheromone of the sugarcane borer moth	CS2/1991/680
35	Raitzer D.A. and Lindner R. 2005.	Review of the returns to ACIAR's bilateral R&D investments	
36	Lindner R. 2005.	Impacts of mud crab hatchery technology in Vietnam	FIS/1992/017 and FIS/1999/076
37	McLeod R. 2005.	Management of fruit flies in the Pacific	CS2/1989/020, CS2/1994/003, CS2/1994/115 and CS2/1996/225
38	ACIAR 2006.	Future directions for ACIAR's animal health research	
39	Pearce D., Monck M., Chadwick K. and Corbishley J. 2006.	Benefits to Australia from ACIAR-funded research	FST/1993/016, PHT/1990/051, CS1/1990/012, CS1/1994/968, AS2/1990/028, AS2/1994/017, AS2/1994/018 and AS2/1999/060
40	Corbishley J. and Pearce D. 2006.	Zero tillage for weed control in India: the contribution to poverty alleviation	CS1/1996/013
41	ACIAR 2006.	ACIAR and public funding of R&D. Submission to Productivity Commission study on public support for science and innovation	
42	Pearce D. and Monck M. 2006.	Benefits to Australia of selected CABI products	
43	Harris D.N. 2006.	Water management in public irrigation schemes in Vietnam	LWR2/1994/004 and LWR1/1998/034
44	Gordon J. and Chadwick K. 2007.	Impact assessment of capacity building and training: assessment framework and two case studies	CS1/1982/001, CS1/1985/067, LWR2/1994/004 and LWR2/1998/034
45	Turnbull J.W. 2007.	Development of sustainable forestry plantations in China: a review	
46	Monck M. and Pearce D. 2007.	Mite pests of honey bees in the Asia–Pacific region	AS2/1990/028, AS2/1994/017, AS2/1994/018 and AS2/1999/060

IMPACT ASSESSMENT SERIES <CONTINUED>

No.	Author(s) and year of publication	Title	ACIAR project numbers
47	Fisher H. and Gordon J. 2007.	Improved Australian tree species for Vietnam	FST/1993/118 and FST/1998/096
48	Longmore C., Gordon J. and Bantilan M.C. 2007.	Assessment of capacity building: overcoming production constraints to sorghum in rainfed environments in India and Australia	CS1/1994/968
49	Fisher H. and Gordon J. 2007.	Minimising impacts of fungal disease of eucalypts in South-East Asia	FST/1994/041
50	Monck M. and Pearce D. 2007.	Improved trade in mangoes from the Philippines, Thailand and Australia	PHT/1990/051 and CS1/1990/012
51	Corbishley J. and Pearce D. 2007.	Growing trees on salt-affected land	FST/1993/016
52	Fisher H. and Gordon J. 2008.	Breeding and feeding pigs in Vietnam: assessment of capacity building and an update on impacts	AS2/1994/023
53	Monck M. and Pearce D. 2008.	The impact of increasing efficiency and productivity of ruminants in India by the use of protected-nutrient technology	AH/1997/115
54	Monck M. and Pearce D. 2008.	Impact of improved management of white grubs in peanut-cropping systems	CS2/1994/050
55	Martin G. 2008.	ACIAR fisheries projects in Indonesia: review and impact assessment	FIS/1997/022, FIS/1997/125, FIS/2000/061, FIS/2001/079, FIS/2002/074, FIS/2002/076, FIS/2005/169 and FIS/2006/144
56	Lindner B. and McLeod P. 2008.	A review and impact assessment of ACIAR's fruit-fly research partnerships—1984 to 2007	CS2/1983/043, CS2/1989/019, CS2/1989/020, CS2/1994/003, CS2/1994/115, CS2/1996/225, CS2/1997/101, CS2/1998/005, CS2/2003/036, CP/2007/002, CP/2007/187, PHT/1990/051, PHT/1994/133, PHT/1993/87, CP/1997/079, CP/2001/027 and CP/2002/086
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