

## Chapter 4 Research Quality and Scientific Achievements

### 4.1 General Issues

- 4.1.1 Overall research direction was given by the “Yellow Brick” in 1994. Much thought by a then strong natural resources research community in DFID went into the formulation, supplemented by input from DFID advisers located in DFID country offices. We have been unable to ascertain whether any independent input from developing country scientists and research and policy communities went into the formulation of The Yellow Brick, beyond mostly informal discussions held at country level between DFID country advisers and local research groups.
- 4.1.2 At the two major changes to the aims of RNRRS – towards poverty reduction in 1998 and more capacity building in 2001 – the new directions came from political considerations within the UK political environment and DFID itself. It is conceivable that a regional and bottom-up design approach involving developing country scientists in leading roles may have led to suggestions for different scientific research priorities and procedures for a RNRRS. When similar exercises were carried out in e.g. the CGIAR system, new research priorities and modes of operation were identified (CGIAR-NARS Meeting of Minds I, II and III, 1999-2001).
- 4.1.3 As indicated in Section 2.5, the Evaluation team used a number of approaches to assess the quality of the scientific output of the RNRRS. These include an objective measure (citation analysis of publications), and a number of subjective assessments by the Specialists and the Core Team.

### 4.2 Programme Content

- 4.2.1 In the period since 1994, the RNRRS framework has been characterised by the generally short-term nature of projects supported and changing political aims within DFID as a whole. DFID has also undergone a string of internal reorganisations. This has had repercussions on the geographical spread of research of the RNRRS programme and impacted severely UK institutions with significant dependence on DFID as a major source of development research funding.
- 4.2.2 Programme Managers and Programme Advisory Committees appear to have adapted the project portfolio and individual projects very capably to these changing political signals. For example, social science was seriously under-represented in early years but has progressively consumed a larger proportion of the resources, reducing the natural science components, a shift confirmed by the citation studies (4.4).
- 4.2.3 From the interviews conducted by the Core Team, it is apparent that any early reluctance among scientists to move from the more basic toward the applied end of the research spectrum has been overcome. Initial frustrations about the increasingly applied nature of research, even moving into development, have been transformed into significant enthusiasm about the potential for concurrent, direct impact on science policy and on livelihoods of poor people. The Cluster approach has been a good mechanism for achieving this mix.
- 4.2.4 An issue arises with DFID-dominated development research financing of UK-based science. With its holistic emphasis on poverty eradication it may have reduced its contributions to more basic research in this field. Contractors and researchers involved in development research are certainly challenged in meeting the demands of other funding sources, which rely heavily on the scientific publication record and cutting-edge research and for which poverty eradication is not a goal.
- 4.2.5 The Plant Sciences Programme has a particularly impressive publication record with widely quoted articles. Housed in a traditional university environment it is not unnatural for a university-managed research programme to take this line. Similar tendencies are seen with other university-based programmes: aquaculture and animal health are examples. Smaller programmes, like the Post Harvest Fisheries Programme, have few refereed publications.

- 4.2.6 Most programmes that are not managed from a university environment seem to have relatively fewer and less quoted refereed publications. It must be understood that the career incentives in universities are likely to be more closely linked to academic publications than in research institutions and consultancy services. These may prioritise customer contacts, inventions, and the creation of successful spin-off enterprises.
- 4.2.7 The level of multidisciplinary research that has been achieved at project level across RNRSS represents a good example of modern scientific approaches to development studies. This achievement is notable both in the UK and in cooperating developing-country institutions. The Core Team believes that RNRSS has contributed significantly to this mode of conducting research in natural sciences. Interestingly, all programmes appear to have embraced much more interdisciplinary approaches than were common in participating institutions prior to RNRSS.
- 4.2.8 These approaches may have arrived earlier in Southern institutions as a result of RNRSS than might otherwise have happened. A natural resources and fisheries project on controlling stream flow in the floodplains of Bangladesh – a co-operation between a government research institution, a Bangladesh NGO and a CGIAR institute – won an international award for its work, which was very much on the applied side. This is in line with the aims of both the Yellow Brick and the later poverty reduction orientation of RNRSS.

### 4.3 Project Time Frames

- 4.3.1 The current RNRSS structure leads to short-term projects yielding limited research continuity (although some projects have covered the entire 10-year period through extensions) and of too short a duration to tackle fundamental problems. Very few projects have truly moved research frontiers significantly, although some failed projects tried hard to do so (failure in such cases is within the accepted scope of research risk taking, e.g. nitrogen-fixing cereals in plant sciences that did not work). Projects have been forced to concentrate on issues where intensive, short-term research may be expected to reach tangible results. This initially favoured well-defined natural science-based approaches whereas social science aspects and implications normally require longer periods of observation and research, making a significant challenge in including social science, which has ultimately been met by all programmes. However the shorter timeframes have enabled research streams to keep up with changes in policy and development thinking.
- 4.3.2 The Core Team received consistent comment from PMs and whilst overseas that the 3-year cycle for competitive grants, even when renewals were obtained, has led to limited research continuity. Three years (in effect often 2, with start-up and reporting phases) is too short in duration to tackle fundamental problems. As an example: the commercialisation of a promising animal vaccine in Indonesia suffered from this.
- 4.3.3 Short-term funding encourages drift towards the applied side of the research spectrum, to look for immediate impacts, including in this case impacts on the poor. Ensuring the sustainability of research findings and strong poverty reduction, therefore, usually fall outside the scope of short-term projects.
- 4.3.4 Short term funding also creates employment uncertainties for project staff, both in the UK and among developing country partners. A five or 10-year period for RNRSS grants may have yielded a distinctly different family of projects, and had different effects on the sustainability of actions arising from RNRSS research. In addition it may have led to more capacity building both in the developing countries and in the UK. Against this must be seen the diligent closures of less successful projects done by PMs and PACs, avoiding further investments in less than promising research endeavours, and any legal challenges arising from premature termination of long-running projects. Shorter-term projects on the applied side may also give better scope for participation by smaller research partners. The Core Team saw this in livestock projects in India.
- 4.3.5 Short-term funding also influences the level of ambition of research. The Specialists' reports, without exception, note that risk-taking in the actual research projects has been moderate to low. Focus on impact from short-cycle projects naturally encourages "safe bets". Programmes that have initiated and developed high risk basic research, have had to draw on other funding sources to support the longer timeframes and the higher investment costs required..

#### 4.4 Quality of the Science, Contribution to New Knowledge

- 4.4.1 All programmes and most projects have been conducted well or very well. Programme leadership has been stable, project leaders have been chosen with care, and although many different models for science management have been used, they have all produced satisfactory results. A common factor seems to be that the quality of science leaders determines, more than any other factor, the quality of the research. In this respect RNRRS has been both very capable in its choice of science leaders, and well served by those appointed. Scientific standards have been generally high and occasionally very high. The highly competitive arena in which RNRRS funding has been allocated, and the close attention paid by PMs, has ensured that all research has been conducted to very high standards. None of the Specialists found major errors of process or procedure.
- 4.4.2 Whilst the Specialists and Core Team members may at times differ on the consequences of the observed drift in the OECD R&D spectrum, there is little doubt that a very great deal has been achieved. RNRRS has established itself globally as possibly the leading research programme in natural resources management. This is a major achievement. It may be that this perception is more strongly held abroad than in Britain, which should be seen as an additional compliment.
- 4.4.3 RNRRS research has produced a very large number of publications. Some are scientific publications in internationally refereed journals and books, others are nationally refereed, while some are direct project documents without peer review outside the projects or programmes. In addition less orthodox media presentation of research work has been undertaken (BBC World Service and local radio programmes, films and videos shown nationally, as with animal health programs in India, newspaper articles, cartoons, street theatre, also in India and drama competitions in East Africa).
- 4.4.4 In relation to the quality of science, peer reviewed articles in journals and books constitute a standard measure against which to judge one aspect of science quality (but there are clearly others also). With the wide scope of RNRRS, many types of publication play important roles but peer-reviewed articles remain one classic measure. The Core Team commissioned a citation index study on a sample of 500 projects from all 10 programmes. Publications naturally tend to appear towards the end of projects, so emphasis has been put on later years. Many PMs have informed us that substantial numbers of publications are still in press or in preparation. The details of the citation analysis of 2,792 refereed RNRRS publications are summarised in Table 6. Full details are given in Annex 11.
- 4.4.5 The citation analysis undertaken within the evaluation is only for use as a guide. It was never the intention to compare the individual programmes within the RNRRS with each other. The sampling methodology for published articles varied between programmes due to the information obtained from the programmes through DFID, programme managers and the specialists. Under the AFGRP, FMSP and PHFRP programmes publication data was available between 1990-2004, and for the PSP programme publication data was available between 1995-2004, however, citation analysis for all 4 of these programmes was only carried out for articles published post and including 1997. For, CPP projects were only sampled between 2001-2004, according to information provided by the programme managers and the specialist, and for FRP citation analysis was only carried out for 9 sample projects.
- 4.4.6 Publications in refereed journals can arise from all research projects, as there are journals for virtually any type of research or dissemination activity. Variation in the number of refereed publications between programmes is therefore an indication of the relative importance given by the programmes to scientific publications, thereby subjecting research and dissemination output to review by peers, as well as a reflection of the programme strategy.
- 4.4.7 Attempts were made to review all publications of the programmes starting two years after the onset of the RNRRS, i.e. from 1997. However data could only be compiled for fewer numbers of years for some programmes (Table 6). Data on citations is from the Institute for Scientific Information (ISI) database.
- 4.4.8 On the average 20% - 40% of authors of published articles are partners from the “south” showing the RNRRS programmes have integrated their partners in all aspects of the programmes including the publications of journal articles. This was confirmed during the in-country visits, and there were hardly any complaints from stakeholders regarding co-authorship of publications.

- 4.4.9 The percentage of projects with publications in refereed journals varied widely by programme, from 65% for AFGP to 10% for CPHP. The low percentages for CPHP and NRSP are a cause for concern, as they may indicate that these programmes do not submit the majority of the outputs from their projects to scientific review by peers, or that there is a high rate of rejection of articles submitted to journals. The FRP figure is based only on a sample and hence the low figure for the percentage of projects with refereed publications is not directly comparable. Since all RNRRS programmes have significant numbers of their projects involving dissemination activities, the variation in percentages may also be an indication of the interest that different programmes have in publications in refereed journals. Given the resources and time available, it was not possible for the Core Team to determine precisely which of the above reasons is the most important.
- 4.4.10 For the projects that published articles in refereed journals the number of refereed publications per project shown in Table 6 (average publications / 3) indicate an average of 0.6 to 1.1 publications per year, taking an average of 3 years duration for each project. It is difficult to say whether that is an adequate rate of output by comparison with other institutions. However, the average would be considered on the low side by universities, or by CGIAR institutions engaged in similar research. For ICRISAT staff members, the average output was 2.0 journal articles and 2.5 conference papers per scientist per year, with a substantial variation in average number of publications per year per scientist, ranging from 0.14 to 7.43 for journal articles, and 0.4 to 14.0 for conference papers for staff who had spent at least 2 years at the Institute (ICRISAT EPMR, 2003). In ICARDA during the 1994 to 1998 period the figures were as follows: germplasm enhancement - 2.6; production systems - 1.6; NRM - 0.5; and social sciences 0.4. For IITA, which was considered to have a low output, the figures were: crop improvement - 1.6; NRM <1; socioeconomics <0.3; (IITA, 5th External Program and Management Review, 2001).
- 4.4.11 The average Impact Factor<sup>9</sup> for the journals in which articles are published, and for journals in which citations occur, range from 0.9 for CPHP to 3.4 for FMSP. These indicate that in general, RNRRS programmes are publishing their articles in respected journals, and they are cited in respected journals. PSP and FMSP get their publications into the highest rated journals, while CPHP does not do so well.
- 4.4.12 The number of citations gives an indication of how highly peers regard the information in the journal article. Programmes where less than half of the published articles are cited (AFGP, PHFRP) should examine whether their publications are reaching their targeted scientific audience. The publications of some programmes (e.g. PSP) are much cited and are clearly having great impact on the scientific community.
- 4.4.13 From the above analysis, one can say that the quality of scientific publications from RNRRS programmes has been good. Some programmes (PSP, FMSP, AHP and AFGP) score well, while others may need to pay more attention to this area. The evaluation team has greater concern about the quantity of scientific output, which it considers as low in some programmes, but which may merely be a reflection of the increased attention paid to non-scientific publications in recent years.
- 4.4.14 The record of publications in referred journals discussed above points to the fact that some RNRRS programmes have made significant contributions to new scientific knowledge. As expected, examinations of sample projects by Specialists show that this contribution has varied between projects and programmes. Overall, the Evaluation Team believes that, for the reasons laid out above, RNRRS has only been able to make an average contribution to development of new scientific knowledge. This is to be expected from a research programme that has been increasingly designed to be mainly applied in nature.

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<sup>9</sup> A journal  $\square$  helps evaluate a journal's relative importance in its subject area.

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**Table 6 Citation analysis of publications from a sample projects in selected years by programme**

Programme	Years	Tot Proj <sup>1</sup>	Proj Pub <sup>2</sup> %	No Pub <sup>3</sup>	Avr Pub <sup>4</sup>	Pub IF <sup>5</sup>	PWC <sup>6</sup>	Tot Citations <sup>7</sup>	Avr Cit <sup>8</sup>	Cit IF <sup>9</sup>	% South <sup>10</sup>
AFGP	1997-2004	51	65	105	3.2	1.4	14	379	3.6	1.6	30
AHP	1999-2004	43	53	75	3.3	2.1	19	326	4.3	2.7	30
CPHP	1997-2003	127	10	23	1.8	0.9	11	63	2.7	1.2	30
CPP	2001-2004	93	26	52	2.2	1.6	17	98	1.9	2.0	30
F MSP	1997-2004	25	60	40	2.7	3.4	9	89	2.2	1.2	30
FRP <sup>11</sup>	1996-2004	69	13	21	2.3	2.5	8	98	4.7	1.4	30
LPP	1997-2004	63	30	33	1.7	1.2	13	127	3.8	1.3	30
NRSP	1997-2003	122	16	42	2.1	2.3	14	180	4.3	1.6	40
PHFRP	1997-2004	12	50	10	1.7	1.3	3	32	3.2	1.9	20
PSP	1997-2004	98	62	158	2.6	2.6	37	1,396	8.8	2.3	20

<sup>1</sup> Total number of projects in operation during the period reviewed (NARSIS database)  
<sup>2</sup> Percentage of projects with publications in refereed journals  
<sup>3</sup> Number Publications in projects reviewed  
<sup>4</sup> Average number of refereed publications per project reviewed  
<sup>5</sup> Average Impact Factor for journals with the articles  
<sup>6</sup> Number Projects with Citations (in period of assessment)  
<sup>7</sup> Total number of citations for published articles  
<sup>8</sup> Average number of citations per publication  
<sup>9</sup> Average Impact Factor for journals with articles citing the referenced publications  
<sup>10</sup> Proportion of authors who are from the "south"  
<sup>11</sup> Sub sample only, there are many more publications that were not subjected to analysis

- 4.4.15 Those programmes with a higher proportion of their research portfolio in more “basic” research (e.g. PSP, AFGP, AHP) have scored higher in this respect. Notable contributions to new knowledge identified by Specialists include PSP’s participatory crop breeding techniques, which have been published in high profile scientific journals such as *Euphytica*; PSP’s work on marker assisted breeding, and establishment of the genetic map for pearl millet, a very important crop for poor farmers in semi-arid areas, as well as crop transformation research with publications in *Nature*; AHP’s work on sequencing of the *Theileria parva* genome, and the epidemiological evidence of linkage between bovine tuberculosis and poverty.
- 4.4.16 Research results have been well publicised in the international scientific environment, with creative use of both older-style scientific publications and the new media. There has only been moderate to poor dissemination in developing countries but this is often due to factors beyond the responsibilities of RNRRS (eg poor access to expensive journals, poor internet connectivity). Some outstanding dissemination achievements in the South, using the new media but also unorthodox methods (eg cartoon strips and radio soap operas in LPP and CPP, street theatre and drama competitions in NRSP and CPP), have been noted. These have often had their origins and design from Southern partners.

#### **4.5 Creative use of existing knowledge**

- 4.5.1 *Problem solving and removal of constraints.* Where they have not contributed new scientific knowledge, Specialists have assessed many of the projects and programmes as making creative use of existing knowledge. Examples can be found in all RNRRS programmes. AHP/LPP’s feeding habit study of tsetse flies, which has led to the development of reduced costs for insecticide treatment of cattle is a good example.
- 4.5.2 CPP projects evaluated are not dominated by cutting-edge natural science with new high risk technology, but made innovative use of crop protection methods through good research, such as biological control of pests, that proved to be successful in other tropical and sub-tropical areas. Such projects have generally removed constraints faced by small-scale rural and peri-urban farmers in the project region, e.g. the work on cassava virus and sweet potato diseases in Eastern Africa.
- 4.5.3 PSP’s “seed priming” research has provided information to break an important constraint to very simple existing farm technology of seed soaking for a number of cereal and legume crops that has significantly reduced the risk of using the technology by extension systems.
- 4.5.4 CPHP’s diatomaceous earths clusters project, which uses non-conventional methods to protect cereals and pulses, is assessed as a major success story. It has excellent applied research credentials, good publications, a good profile, and is award-winning. It evolved into a highly successful implementation phase and has the environmental, economic and social benefits rarely seen in a short term project using modern science.
- 4.5.5 The NRSP review provides other good examples - the Participatory Action Plan Development method used in Bangladesh is now being used in similar projects in India and Vietnam, the methodology being used by the World Fish Centre in poverty-oriented fish farming projects, and the Tanzania rainwater harvesting projects which are now stimulating similar developments in other East African countries.
- 4.5.6 This creativity has extended beyond research as purely defined, into areas of institutional arrangements for research, as well as dissemination and communication systems. CPHP’s Innovations Systems cluster which has developed and applied a new conceptual framework for the analysis of partners and innovation processes was rated as representing a major shift in the way research for development is conceived, commissioned, conducted and exploited. It is a brave and novel departure, although the jury must be regarded as still out as to whether the benefits outweigh the transaction costs.

- 4.5.7 *Production systems perspective.* One of the guidelines provided in the “Yellow Brick” at the onset of the RNRRS was that research should focus on seven defined production systems. This was intended to ensure that technologies developed would be relevant. All RNRRS programmes have followed the guidelines but have innovatively adapted and adjusted the defined production systems in ways with which the Specialists and Core team have generally agreed. NRSP, which has the most direct focus on production systems, works in all systems but in response to a query from DFID in 1999, it reduced the number of countries per production system from 2-6 countries per system to 3 countries and reallocated funds to better reflect the “needs” of each based on DFID’s priorities.
- 4.5.8 The relatively small AFGP and FMSP have also reduced their coverage over time to allow better focussing of research funds. The Core Team concurs with these moves which are likely to have had a positive effect on science quality, and believes that further consolidation should be considered in future (see discussion of issues of balance in Chapter 7).
- 4.5.9 *Multi-disciplinary approach.* The degree of multidisciplinary work at the onset of the RNRRS was high in programmes that have a systems focus such as NRSP, but much lower in the commodity programmes such as LPP and PSP. The degree of multidisciplinary research has significantly increased in all programmes in recent years, however, with increasing participation of Southern partners in projects and the drive towards more dissemination and impact focussed projects, even in the so-called commodity programmes.
- 4.5.10 For example, prior to 1999, LPP’s research was largely commodity-based and researcher-driven, the principal aim being to provide technologies that would result in efficient production of livestock commodities for four production systems. In order to make projects demand led, LPP promoted multi-institutional and multi-disciplinary project teams. Successful applicants of concept notes were obliged to convene a stakeholder meeting in the beneficiary countries in order to promote ownership of the research process and set up multi-disciplinary research teams.
- 4.5.11 With the poverty reduction slant now dominating RNRRS, such science quality criteria constitute only one of several measures of success. Also, given the rapid spread – also in and to developing countries – of web-based publishing (and all RNRRS programmes have good to very good web sites, some even at project level), traditional journal publishing is playing a decreasing role. Indeed, many developing country scientists have lamented to us that by publishing results in international journals the developing country readership is almost excluded due to inability to pay subscription fees. Although Internet connectivity may still be poor in some areas, particularly in Africa, several RNRRS programmes have donated and installed Internet facilities to partner institutions in the South, also to encourage web-based science exchange.
- 4.5.12 In the view of the Specialists, the majority of multidisciplinary projects have performed satisfactorily. The broad multidisciplinary approach has enabled many RNRRS projects to address livelihood issues that could not have been tackled with a narrower focus. This success has not, however, been always easily or fully achieved. There are still cases where the Specialists have indicated that social science disciplines are under-represented in project and programme portfolios.

## **4.6 Innovation and scientific risk taking**

- 4.6.1 Noting the earlier comments on the low-risk approaches engendered by short-term funding, this trend caused conflict as programmes faced the challenge of finding solutions to problems of the poorest farmers in the world. This has often meant having to find ways of moving forward where earlier initiatives, including initiatives of RNRRS predecessor programmes, have failed. There were often no obvious solutions, and innovation was necessary. Attempting to be innovative always increases the risk of failure. As there has been stronger engagement with beneficiaries, and more complex project clusters, with sometimes less easily defined targets, the level of research risk of projects has increased. Overall, one can conclude from the analysis by Specialists and observations by the Core Team that the degree of innovation and scientific risk taking in RNRRS has been average but the trend is to increasing risk as multidisciplinary clusters arise and this risk requires active management.
- 4.6.2 It is to the credit of RNRRS that so many of the projects have yielded results in scientific terms, although as is shown later, economic benefits of the outputs have yet to be systematically determined.

## 4.7 Inputs and processes

- 4.7.1 The quality of any scientific study should be determined from the quality of its outputs, which, in turn, depend on the extent to which the study has followed the steps of good research process (e.g. correct formulation of objectives/hypotheses, objective-driven research protocols, generation of high quality data, correct data analysis and interpretation of results.) These in turn depend on the quality and professional competency of staff conducting the study. Science quality is therefore heavily dependent on inputs and processes. Research quality control through project cycle management is discussed in Chapter 6.
- 4.7.2 The measure used in this evaluation to assess one of the most important research inputs - the quality of research staff in RNRRS, is the awareness and use of current scientific knowledge. With only very few exceptions the view of the Specialists was that RNRRS programmes had adequate knowledge and made appropriate use of global scientific knowledge. This was particularly true in long-running projects where researchers had acquired and used vast amounts of information over time.
- 4.7.3 The only caveat to the above generalisation is the situation of “newer” southern partner institutions, especially where non-traditional partners, such as NGOs, have been brought into the knowledge generation systems in response to demands for more stakeholder participation. A number of PMs indicated difficulties with getting enough qualified researchers from the south. This has meant that PMs have to carefully select Southern partners, and may partly explain why some institutions in the South have had an apparently disproportionate share of RNRRS projects. It has also sometimes necessitated the addition of some short-run capacity building activities into projects (methodology workshops and seminars, etc.), and in a small number of cases resulted in promising concept notes not being developed to project proposal stage. However, this problem has not been of such magnitude as to change the trend to an increasing number of projects being led by institutions from the South.
- 4.7.4 The balance between Northern and Southern institutions is related to the type of research, nature of the problem, demonstrated accountability of the potential partner, flexibility in relation to nationally-agreed programmes of work, and several other factors. In the RNRRS, both LPP and CPHP have high proportions of Southern project leaders while FRP has a very low proportion. This is conditioned by the weak accounting capability of Southern forestry partners and the relatively more accountable by the more policy-related work under FRP while CPHP and LPP are more traditionally technology-focussed. FRP, however, may have much larger numbers of Southern partners in a project, even if it is led from the North. The key issue in sharing responsibilities for research initiatives is developing high levels of participation throughout the project cycle.

## 4.8 Monitoring and Evaluation of Science Quality

- 4.8.1 Whilst it may be argued that quarterly and yearly reports from projects and programmes using logical frameworks constitutes de facto monitoring, formal M&E has been largely absent. There has been a scarcity of internally commissioned external reviews, or external reviews commissioned by others (including DFID). It is most unusual for a strategy of the magnitude of RNRRS not to have instituted formal M&E procedures from the start. Indeed, it is unfortunate that the current evaluation at the very end of the RNRRS period is, for most programmes, the only evaluation to which they have been exposed.
- 4.8.2 The value of M&E is largely to be found in the impact findings have on on-going research. Ex post facto M&E cannot be used to improve current research efforts. Nevertheless, the Core Team noted considerable praise being expressed to programme managers for their close supervision of ongoing research activities. Indeed, project leaders and participants in developing countries samples, have repeatedly acknowledged the assistance given by programme managers or their senior staff throughout the period of a project, both by personal visits and telecommunication.
- 4.8.3 The core team concludes that programme leaders have gone to great length to support and quality-control projects, particularly in developing countries. The secret of the success of RNRRS may in part be found in this most responsible behaviour of programme managers. One programme has also operated a decentralised regional support system with considerable autonomy – project leaders have reported favourably on their functioning.

## 4.9 Concluding Remarks

- 4.9.1 The overall conclusion of the Evaluation team is that taken as a whole the quality of science in RNRRS has been high. With very few exceptions, peer reviewed publications have appeared in reasonably high Impact Factor journals. Most programmes have substantial numbers of projects that successfully use existing scientific knowledge in creative ways, with a few projects having made significant contributions to new scientific knowledge. DFID should be proud of the overall scientific quality of RNRRS research.
- 4.9.2 RNRRS has been a major scientific success, particularly in applied research, with significant results although ground-breaking research findings have been uncommon. When activities have fallen into the development part of the R&D spectrum, with limited research content, the impacts e.g. on poverty alleviation may nevertheless have been worthwhile. The overall management of programmes has been good, although there has only been limited inter-programme cooperation. Significant differences in programme management styles do not seem to have impacted negatively on the research quality. Short-term duration of projects and the absence of monitoring and evaluation procedures have not created optimal conditions for research into long-term challenges of the natural environment.
- 4.9.3 There is a strong consensus among Southern and Northern partners that continuation of RNRRS-like activities, with more cross-linkages and better coordination, would be advantageous for research of this type.
- 4.9.4 The RNRRS is a leading player globally concerning the basic applied research continuum. At this stage in the strategy timeline it has managed to develop and promote ways to manage scientific research to impact on the lives of poor people.

## 4.10 Key Findings on Research Quality and Scientific Achievements

- All programmes and most projects have been conducted well or very well. There has been uniformly high quality leadership. A key component to the successful management and outcome of the programmes is simply down to the high quality of science leaders.
- Although there has been only average generation of new knowledge, there has been excellent creative use of existing knowledge, extending into research management, dissemination and communication systems.
- RNRRS structure leads to short term projects, restricting the ability to tackle some core problems although it may favour engagement of smaller NGO players, and limiting research aspirations.
- Short term projects and policy/structural changes in DFID have required PMs and PACs to adapt, which they have done very capably.
- University based programmes appear to have greater “science” impact than others, due to the pressures inherent within the university system. There are few issues of science quality but some programmes appear to be rather short on the quantity of publications in the more formal press.
- Good multidisciplinary approaches have been developed and well managed in all programmes, especially in recent years, in response to changing needs, providing significant contribution to wider global perspective on tackling RNR research.
- Scientific standards have been generally high, occasionally very high. RNRRS is now seen as a global leader in RNR research.
- All programmes have integrated their “Southern” partners well, with 20 to 40% co-authorship and in some cases 50/50 funding.
- There is scope for increasing the social science support base in some programmes although the overall level of global knowledge awareness within all programmes is high
- Programme leadership has been efficient and effective. The lack of formal M&E structures has been remedied by active engagement of programme managers ensuring good support and high level quality control. There is, however, still a requirement for future strategies to formalise monitoring, evaluation and impact assessment and to resource it adequately.
- The process of reviewing and selecting project proposals has been transparent and well received by potential contractors from north and south.

- Cross-programme coordination has been limited and the discontinuation of the coordinating function has not helped in this regard.
- With the exception of a small number of advisers, DFID country offices have taken surprisingly little interest in RNRRS.
- The RNRRS is a leading player globally concerning the basic applied research continuum. At this stage in the strategy timeline it has managed to develop and promote ways to manage scientific research to impact on the lives of poor people.
- International organisations such as the CGIAR have strongly applauded RNRRS.