Consultative Group on International Agricultural Research

SCIENCE COUNCIL

Evaluation and Impact of Training in the CGIAR

SCIENCE COUNCIL SECRETARIAT
JULY 2006

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CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH

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Science Council Commentary on the
Evaluation and Impact of Training in the CGIAR

April 2006

The Science Council discussed the report on the Evaluation and Impact of Training in the CGIAR at its 6th meeting held at WARDA in Cotonou, Benin after a videoconference presentation by the Chairman of the Panel, Dr Elliot Stern. The Science Council conveys it's thanks to the Panel Chair and the two members, Dr Lucia de Vaccaro and Dr John Lynam for the commitment they have shown to the study over an extended period of time and for a coherent and logical report that provides a strategic perspective to guide future training and capacity strengthening activities of the CGIAR. The Panel assembled a vast amount of information from 1990 to 2004 on past and current training activities in the Centers and, although as it points out the databases at the Centers were surprisingly deficient and variable, was able to synthesize them in a manner that enabled major trends and issues to be distilled. This provided a useful setting for the field visits, case studies and surveys that the Panel undertook.

The draft Panel report was shared with all CGIAR Centers and the comments received from several Centers were taken into account by the Panel. Unfortunately because of the short time available for finalizing the report not all comments were available for consideration by the Panel in the final report or for discussion at SC 6. The Center comments have, however, been further considered in preparing this commentary.

Panel's Findings

The findings and conclusions of the Panel appear logical and reasonably well founded, in spite of the lack of comprehensive data and systematic analysis on which they are primarily based. Commendably the Panel provides suitable caveats where biases and shortcomings in methods are evident. The major findings of the Panel are as follows:

Relevance and Quality of Training

- The most important single factor that has affected the evolution of training in the CGIAR over the past decade has probably been the increase in project funding and the reduction in unrestricted funds available for training per se. As a consequence, this has lowered the yield on the CGIAR's large investment in training and learning (currently about US$30 million annually; estimated to be about US$380 million for the 15 year period considered in this study[1]) because of (a) difficulties in building a critical mass of scientists and multidisciplinary teams (b) difficulty in effectively funding higher degree studies when projects are of 2-3 years duration; (c) since projects have shorter time horizons, the training activities do not necessarily lead to greater relevance to the institutional or wider needs of the trainees; (d) reduction in pedagogic support to Center research staff; and (e)

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[1] Based on the annual financial reports of the CGIAR Centers in Annex V of the report.

reduction in Centers' capacity to access, adapt, translate and disseminate existing training materials.

- There has been an increase in "informal" and short course training linked to collaborative research. Internationally recruited scientists spend on average 25 per cent of their time on formal and informal training activities and this has increased over the past five years. This may reflect the increasingly inherent role of training and mentoring in collaborative research for capacity strengthening.
- Based on a number of indicators for groups and individuals, formal training quality has been high. The most important determinant of trainee satisfaction is the extent to which their new knowledge and skills were put to use. Unfortunately in many instances this did not ensue. This emphasizes the need to ensure that candidates should be accepted only if suitable post-training provisions are made or are likely. Improved candidate selection procedures were considered by Center staff as one of the most important ways to improve quality.
- There has been an increase in the proportion of shorter training periods and a decline in longer duration training, both for group and individual trainees, with individual training being somewhat stable but involving an increasing proportion of higher degree students and women (40 per cent currently). There is a trend to much larger numbers from SSA than from other regions.
- In some Centers there has been a marked increase in group training involving extension officers and farmers.

Effectiveness of Training

- The effectiveness of CGIAR training as reflected by the perceptions of the persons interviewed and surveyed has been quite high and has been as much determined by the conditions of the NARS as by the relevance or quality of the training.
- There are a number of factors that have influenced training effectiveness: (a) changes in the NARS, with some getting stronger and their staff becoming peers of the Center staff and others getting weaker with different training needs; (b) donor priorities and funding arrangements in the CGIAR; and (c) changes in technology, e.g. information technology opening up the possibilities for virtual delivery of both training and training materials.
- The changes in funding sources available to training and consequent weakening of the Training Units in the Centers in the past ten years has been accompanied by a trend towards the decentralization of training away from headquarters to the regions and from group training to informal on-the-job individual training in the context of collaborative research projects. This has led to a loss of corporate knowledge and best practices, which has made it difficult to maintain consistently high quality standards. Quality assurance protocols for planning, managing and evaluating formal and informal training should be specified and followed routinely. These measures are needed to ensure the system's investment in training is used to good effect, and this requires enhanced training resources and expertise in the Centers.
- Related to the increasing trend to project-related training, some countries, including some of the poorest, have experienced a sharp reduction in training of all kinds. Hence there seems to be no clear relationship between the extent of poverty in a country and CGIAR training investment.

- Records kept are incomplete and inconsistent in many Centers and are not compatible among the Centers in the System. This seems to be one consequence of the decentralization of training and moving it increasingly to projects. In addition, incentives for systematic record keeping and using data for planning seem to have been limited.

The Evolution of Future Demand for Training

- The greatest future demand from NARS will be for capacity building through specialized short courses and individual non-degree and higher degree training, instead of generalized training; in this respect CGIAR could do more on e-learning and support to local universities.
- There is a need for improved coordination of training in the Centers along with enhanced pedagogic expertise.
- The amount of training outside the deemed comparative advantage of the Centers appears to be small, especially with individual training. Training in most Centers is closely defined by their research programs. The Panel considers this a legitimate definition of Centers' roles and they should not be expected to address the NARS' wider training and capacity building needs. It points out though that there is a risk that such an approach better meets the needs of stronger NARS at the expense of weaker ones and hence that specific training needs assessments of the latter should be conducted.

Observations on Findings and Conclusions

The SC is pleased that the Panel implicitly validates the approach that has been taken in the new System Priorities that training and other capacity building be closely linked to agreed priorities and research collaboration between NARS and the Centers. This is in spite of a perception in the report that TAC was not and the SC is not supportive of training and that this has contributed to the decline in unrestricted funding allocated by Centers to training. Certainly the SC agrees with the Panel that training of farmers and extension staff is best left to others with a clear comparative/complementary advantage, with the Centers focusing on scientist capacity strengthening with clear IPG attributes. It seems that this move by some Centers to train farmers and extensionists has been partly motivated by an imperative to focus training on "…downstream dissemination capacity as opposed to research capacity..". The substantial increase in the former in recent years is confirmation of the move by a number of Centers into the development arena, which has been criticized by the SC. In addition, related to these trends are the possible moral hazards associated with encouragement by some donors of the use of performance indicators such as training person-days, and reinforces the SC view that the performance management system must measure real outputs, outcomes and impact and thus create the appropriate incentives. The SC encourages Centers to define clear training and capacity building targets within their research projects.

The SC is not convinced that more systematic training needs assessments are required. By the Panel's own assessment, the Centers have done a good job of identifying the capacity strengthening needs of NARS within the context of trends towards increased consultations, collaborative research projects and partnerships. The SC accepts however that in this process

the weaker NARS may have experienced that their training needs are increasingly unmet. However in the SC's view, the Centers generally do not have a comparative advantage in supplying all the training that the weaker NARS may need. The Centers can however provide useful knowledge through e-based systems as an input for others to provide the training. Additionally, some of the countries with stronger NARS also have the largest numbers of poor people, require more formal scientist training and better capacity to use research for addressing poverty.

The Panel did not discuss the role and achievements of the Centers in providing training materials, and most notably did not mention the initiatives by the Centers in providing global knowledge via e-systems (for example the Rice Knowledge Bank of IRRI, the global training materials of IFPRI and from the erstwhile ISNAR).The report would also have benefited from more details on how the Centers can contribute to and strengthen University-based training in general, and in the context of the virtual university initiative in particular[2].

The Panel seems to overlook the fact that the reason why there may not be quantitative data on the increasingly important component of informal learning in the Centers may be because it is indeed *informal*. This makes it more difficult to document and evaluate per se. While the SC concurs with the Panel's criticisms of the poor state of documentation and evaluation of formal training, their recommendation for more explicit monitoring of informal learning would be more meaningful if they had provided some guidance on how the Centers might go about documenting and evaluating informal training. Indeed it would have been helpful had the Panel indicated what was a minimum data set for all types of training. The SC concurs with the Panel's notion that better documentation of informal training - where and how it takes place – would allow Centers better to incorporate informal learning objectives into research activities and plan these opportunities for addressing capacity building needs.

The study earns high marks as a strategic review of training in the CGIAR. However, as the Panel itself acknowledges, for various reasons it was not able to assess the impact of the investments in training the system has made (currently some US$30 million annually) on the goals of the CGIAR. This is disappointing and raises the question of the value and desirability of undertaking a specific impact assessment of components of the program where the databases might allow such a study. Some of the country case studies in the Annexes to the main report would provide promising starting points. They cite assertions and anecdotal information on impacts, although causalities and attributions are not verified or documented for the most part. An important issue to be addressed in such a study would be the extent to which training by the CGIAR generates private benefits in the form of increased remuneration and advancement opportunities to the trainee, and what additional international public good benefits accrue over and above these to the institutions and the economy to where the trainee returns; and of course importantly to the poor. The high attrition rates of trainees after they return to their home countries and the recognition by NARS that investments in them can be lost to other institutions (see the Bolivia case in the Annex, p. 32), suggest that a large portion of the impacts of training might be private and not public goods. Of course the fact that countries might gain rather than individual NARIs in

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[2] GOAFU, Global Open Agriculture and Food University

such instances does not imply that CGIAR investment in training is not appropriate from a NPG or IPG perspective. However these are researchable issues that deserve to be explored further by SPIA and the SC.

The case studies reported on by the Panel did not include any "strong" NARS. To the extent that training in the CGIAR has increasingly been research- and researcher-led, and most has emphasized host countries as pointed out by the Panel, then maybe the study has not adequately captured those NARS who have benefited most. The SC suggests this offers a further possible rationale for a follow-up study of the impacts of CGIAR training on a selective basis.

The Panel was concerned that most researchers thought there were few positive incentives for them to be involved in training. This would seem to be inconsistent with the figure of 25 per cent of time scientists are currently spending on training and with the sense that this is increasing. However due to the lack of comparable figures from other research institutions, it is not possible to reflect on whether this time is appropriate for capacity strengthening by the CGIAR system. The SC recognizes that some of the time spent on informal training activities with graduate assistants or NARS colleagues during research projects also counts as research time for the scientist, and in fact involves a leveraging of the researcher's time in such a way that research progress is more rapid than if the graduate assistants or NARS colleagues were not present. Thus, the SC recognizes this "double counting" as a potential win-win situation for the trainees, scientists and Centers. The Panel made no attempt to separate these two intertwined products. However the SC believes that both outputs (capacity strengthening and research) and the subsequent outcomes are vital for the system. The SC will review the performance measurement system to ensure that both outputs are captured and rewarded.

The Panel notes the poor quality of the reviews of training undertaken by the Centers, with few conducted by outsiders and the focus being on outcomes rather than effectiveness, efficiency or strategies. EPMRs also did not in general focus on evaluating training. The SC will consider how the latter might be more effectively used to assess training strategies, plans and impacts and encourages the Centers to commission more external reviews of training using independent scientific peers and training experts so that EPMRs can be better equipped to address training in future.

The SC notes the Panel's views on likely future demand trends from the NARS but was not able to discern from the report how these were derived by the Panel. It will be important for the Centers to assess these for themselves as they will undoubtedly vary depending on the NARS concerned and the Center's programs.

Observations on Recommendations[3]

Notably absent from the recommendations is any that relates to comparative advantage of the CGIAR vis-à-vis other sources of supply for training. This is a key issue and one that the

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[3] The recommendations are paraphrased here in italics.

SC believes must receive further consideration. Some recent EPMRs have also raised this question.

The SC has the following comments on the 13 recommendations.

CGIAR System

1. *Formal and full recognition of training as an indispensable component of the CGIAR's activities, both for NARS strengthening and as a contribution to execution of Centers' research. Following this recommendation, at the investor's level, implies finding adequate resources.*

The SC endorses the Panel's reaffirmation of the importance of NARS capacity strengthening as an integral component, and not simply a by-product of the work and mission of the CGIAR.

2. *The System should develop a uniform set of criteria and indicators of training outputs and outcomes. An inter-Center focal group should develop such a set and present it for approval by all stakeholder groups.*

SC recognizes the inconsistencies and voids in information on training activities, outputs and outcomes and the fact that this results in a lack of adequate information on which to plan for the evolution of training in the System, to make it more effective and efficient in terms of the mission and goals of the CGIAR and in terms of supporting the System's new set of priorities. The SC endorses the formation of an inter-Center focal group with possible input from the SC in terms of criteria and indicators for quality and relevance.

3. *The System needs to come to grips with the issues associated with the increasing dominance of short term, restricted funding and the System should make provision to overcome the associated problems.*

SC recognizes the problems of organizing training related to the increasing restricted vs. unrestricted funding as part of a larger issue that needs to be addressed by the System's investors.

NARS

1. *NARS need to develop a clearer understanding of the areas of training in which the CGIAR has a comparative advantage. These areas relate to the Centers' research agenda.*

SC endorses this recommendation and suggests that Centers have a key role in clarifying their comparative/complementary advantages and at the same time can make contributions to the NARS through inputs related to identifying alternative sources of supply for non-CGIAR priority NARS training needs. This recommendation also emphasizes the importance of strengthening the "partnership" approach to training activities in recognition of the fact that System research priorities have been and will continue to be informed by NARS priorities.

2. NARS need to make a stronger effort to clearly articulate their research and training needs. This can improve the effectiveness of cooperation with the CGIAR.

While the SC recognizes the importance of such articulation of needs, it also appreciates that such specification often is difficult, particularly in the weaker NARS and/or where conflicting interests exist and adequate mechanisms for coordination and collaboration are missing. As with the CGIAR exercise leading to the new System priorities, the CGIAR can work with NARS to improve specification of training and capacity strengthening needs.

3. NARS and Centers need to take greater care in selection of candidates for CGIAR training, to ensure that candidates chosen have appropriate qualifications and post-training institutional support and operational facilities.

SC agrees with this recommendation and recognizes that some Centers already have in place fairly strict candidate selection procedures that could be shared more with NARS and among Centers.

4. An implied recommendation is that the Centers should reduce their involvement in direct training of farmers and extension workers, except as an integral part of ongoing Center research.

SC agrees with this recommendation, which is part of the larger debate within the System on the role of the CGIAR in production of IPGs and the optimum position for the CGIAR along the R4D continuum in different circumstances.

CENTERS

1. Centers should adopt a strategic stance that involves:
- Continuing to carry out training and promote learning compatible with their research priorities and develop strategies to do so in ways that strengthen (and sustain) NARS capacities
- Taking into account characteristics of successful outcomes in the System, including: longer term commitment by Centers, longer term funding commitments, existence of local institutional support and leadership, a mixture of formal and informal training/learning activities; and other factors
- Taking into account the need for special strategies for weaker, under-resourced NARS;
- Taking into account the Panel's recommendation to give high priority to support for local universities and establishment of partnerships.

> SC endorses this recommendation, recognizing that some Centers already have developed well-articulated strategic stances with regard to training and have considered many of the factors that the Panel suggests are important. However because training outcomes generally are not monitored, Centers are not learning from both successful and unsuccessful outcomes. The SC believes that there is ample room for greater inter-Center cooperation and collaboration in developing improved strategies and training functions across the System, as well as good opportunity for increased inter-Center collaboration in actual training activities, in the same way that inter-Center collaboration in research is taking place, e.g., through Challenge Programs and other inter-Center programs.

2. *Centers should all develop appropriate quality assurance protocols to be applied at all stages in both formal and informal training; and activities should be subjected systematically to appropriate planning, monitoring and evaluation procedures, as in research.*

   SC endorses this recommendation, which relates to the need for improved and more systematic information gathering and analysis procedures in the Centers. This inconsistency in, and lack of adequate data and information is a particular weakness that the Panel identified as a major one.

3. *The Panel provides suggestions on how the Centers can improve the efficiency and effectiveness of their training functions by taking advantage of opportunities for sharing experiences, best practice, functions and activities among Centers, e.g., through such mechanisms as the ICT-KM Initiative Online Resource Project.*

   SC endorses the suggestion to take greater advantage of inter-Center opportunities to improve training and learning functions and activities of the Centers. In fact, the SC recognizes that the Centers already are moving in this direction and thus endorses such on-going activities.

4. *Ensuring better coordination within and among Centers where this will enhance quality and coherence.*

   SC endorses this recommendation.

5. *To better cater for the heterogeneity of NARS and exploit the advantages of ICT such as e-learning, the Centers embrace the latter more explicitly.*

   SC endorses this recommendation but notes that the Panel has not commented on the possible role of the Global Open University on Food and Agriculture in this context. It therefore would welcome the views of the Alliance Executive on the scope for the GOUFA to provide a vehicle for this.

6. *Closer coordination and cooperation among the Centers in strategic planning of training, assembly of data bases, development of courseware etc.*

   SC endorses this recommendation.

In conclusion the SC encourages the Alliance Executive to consider the value and desirability of a System-wide Capacity Building Program to coordinate and share information among Centers on the training related functions mentioned in these Center specific recommendations, among other tasks.

Transmittal Letter

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Chair, Science Council
Consultative Group on International Agricultural Research
Division of Nutritional Sciences
Cornell University
305 Savage Hall
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27th March 2006
London

Dear Dr Pinstrup-Andersen,

Re CGIAR Training Study

On behalf of the Panel charged with this study, I am pleased to submit our final report to the Science Council of the CGIAR.

As you will be aware the Panel has engaged in an ambitious and wide-ranging review and evaluation in order to identify the contributions and impacts of training and learning within the CGIAR. We very much hope that our report will assist the Science Council in its future deliberations. We also hope it will prove helpful to all those within the System and in the NARS, whom we have met in the course of the study, and who are committed to further strengthening research partnerships between the CGIAR and the NARS through training and learning.

We would like to thank you and your colleagues - including those on the interim Science Council, who have offered wise counsel and shown us patience and courtesy throughout our work. Whilst it might be thought invidious to pick out any for special thanks, we would certainly wish to acknowledge the inputs received from Hans Gregersen, Jim Ryan and Ken Fischer who had the responsibility to steer the study. They did so throughout helpfully whilst showing proper respect for the Panel's independence. Finally I would like to acknowledge on behalf of all of Panel members the generous contributions made by Sirkka Immonen of the Science Council Secretariat. Her diplomacy, technical expertise and knowledge of the System have been invaluable.

I look forward to hearing how the study and its recommendations are taken forward in due course.

Elliot Stern,
Panel Chair

Evaluation and Impact of Training in the CGIAR

MARCH 2006

CONTENTS

SUMMARY AND RECOMMENDATIONS

This study was commissioned by the interim Science Council (iSC) to review training within the CGIAR as it contributes to capacity strengthening in the NARS. The purpose of the study was to evaluate the quality and relevance, efficiency and effectiveness terms of intermediate impacts in strengthening of the NARS and, to the extent possible, impacts in the CGIAR's goals. The study was expected to provide recommendations to help Centers, Donors, the NARS and the System to strengthen and plan their future activities in relation to training and capacity strengthening.

Several issues related to the scope and methodology of the study influenced its design. These issues are discussed in detail in the first Chapter, *Introduction*, and include i) defining training and in particular distinguishing it from learning that takes place informally in work-places and networks; ii) distinguishing training and learning effects from those of Center research and other outputs; iii) country and regional focus; iv) defining capacity strengthening; v) nature of CGIAR inputs and interventions – and distinguishing these from those of other actors; vi) how to judge 'impact'; and vii) scope of data collection. Information for the study was obtained from: existing Center records and surveys carried out by the panel of Center researchers; those in Centers responsible for training, trainees and Center research partners.

The changes in CGIAR context that have influenced the way training has been conducted and resources are discussed in the Chapter 2, *Factors shaping training and learning in the CGIAR*. The factors that have had major consequences for the orientation and provision of training across the CGIAR over the last 10 years include both those internal to the CGIAR System and the broader global changes in NARS, agricultural technologies and funding. Over this period, the NARS have become more differentiated; some gaining strength and taking a role of equal partners, whilst others were more fragile and under-resourced some even becoming weaker. Changes in funding and specifically the predominance of project funding, has forced Centers to adjust the organisation and delivery of training which has become increasingly decentralised to researchers. The role of 'training units' that coordinate training services and plan training provision has diminished. On balance, the panel considered that this trend has had a negative effect on NARS′ institutional strengthening and has curtailed Centers′ ability to fully exploit the considerable investments made in training and learning. New technologies and new public demands have shaped the training agenda to include new kinds of skills in advanced technologies and social sciences. The design of training, including new pedagogical approaches, communication technologies and informal ways of learning, have influenced the way training is now delivered across the CGIAR.

The Panel collected data for 15 years (1990-2004) on group and individual training and its analysis and conclusions are presented in Chapter 3, *Training and learning activities in the CGIAR*. Data were available only for formal training and any quantification of informal training and learning was based on surveys and interviews. The Panel observed considerable deficiencies in the way training records had been collected and databases were constructed, which seriously hindered their use for evaluation purposes or for planning by

Centers themselves. Among the most notable trends discernable, there seem to have been increases in the numbers of group training events and numbers of participants. In some Centers, there has been substantial expansion in group trainee numbers, due partly to training involving farmers and extension workers associated with collaborative research with extension services and post production research. The increase in numbers may also reflect inclusion in records of more different types of events and better overall recording of, for instance, regional training away from Center headquarters. A more stable pattern over the years was observed for individual training. A high proportion of the trainees have come from host countries of the Centers, and a less than clear relationship between intensity of training and poverty levels was observed. Some individual countries, including some of the poorest have experienced a sharp reduction in training of all kinds. The relatively high proportion of developed country trainees was also notable.

The Panel analysed the data for themes to assess the comparative advantage of Centers as training providers and concluded that only a small proportion of the volume of training (in terms of trainee days) has been allocated to topics that are not within the Centers' research capacity and mandate. The themes of Crop Production, Crop Protection and Breeding have continuously been among the most common themes, while the themes of Social Science and Biotechnology have gained in relative importance.

The relevance of training to strengthening NARS' capacity is discussed in Chapter 4, *Relevance of Training and Learning*. The panel found that CGIAR Center training is broadly relevant to the capacity needs of NARS. They concluded that it is appropriate to assess training relevance within the context of the research agenda which centers share with the NARS (i.e. as opposed to a broader definition of NARS training and capacity strengthening needs). However, Centers are formally committed to capacity strengthening and many researchers within Centers as well as those with some responsibility for training and learning are evidently dedicated to helping NARS strengthen their research base. There were perceptions among researchers that relevance may have been reinforced in recent years by the decentralisation of training to Center researchers conducting collaborative research projects. However, the formal commitments of Center managements was not always so clearcut such that research relevance may not necessarily have led to institutional strengthening. Furthermore, where under-resourced NARS were dependent on Center support there might be at risk of distorting NARS research priorities and associated priorities for training in order to access resources. CGIAR collaboration with other agencies with a complementary but more development-orientated mandate is needed to address broader NARS' capacity needs, which are particularly challenging in Sub-Saharan Africa.

The issues of quality are discussed in Chapter 5, *Quality of training and learning*. Perceptions of training quality, gauged through trainee surveys were mostly very positive. Less positive judgements were associated with limited opportunities to apply newly acquired knowledge and skills. It is, however, difficult to extrapolate from past satisfaction ratings to present conditions when researchers are more in charge of planning and conducting training. There were limited quality assurance (QA) systems in place for training in some Centers. The weakness of QA systems is due to the reduction of the capacity of training units or functions and lack of pedagogic expertise among Center staff. Individual and informal training quality is not addressed or monitored by any explicit mechanism. There are many examples of good

practice in place at Centers related to policies, recruitment and selection of trainees, course guidelines, pedagogic support for researchers, collection of trainee feed-back and the use of quality assessment to improve training. To make training quality a priority issue, Center management, and indeed the CGIAR system, needs to communicate its support for training emphasising the importance of quality and provide incentives and funding for quality assurance.

In Chapter 6, *Efficiency of training and learning*, the Panel concludes that the pre-requisites for the efficient management and delivery of training and learning are not in place in most Centers. Examples of good practice are unevenly distributed. The most important deficits are inadequate pedagogic and coordination resources within most Centers and the absence of systematic financial and monitoring data. However, it should be emphasised that the true efficiency of training and learning is its contribution to the effectiveness and take-up of research. The Centers were unable to provide detailed data on the investment in different types of training and the trends over time. From System records and surveys, it was concluded that the investment by the CGIAR in training and learning through formal and informal means continues to be high. About 25% of researchers´ time was estimated to be spent on these activities. However, there is no consistent coordination, backstopping, advice and support in all Centers for assuring the efficiency of training against the investments made. Likewise, the coordination between Centers is a problem especially in Africa where synergies could be achieved. There are instances where Centers have been efficient, for example by adapting specific training 'products' into generalisable 'global' goods thus achieving economies of scale in their production and use. However, it appears that due to the lack of coordination within and between Centers the allocation of resources to training that has taken place has not been always planned in the most strategic fashion. Closer cooperation with NARS is required to ensure that trainees not only come with the necessary pre-requisites prior to training but also have adequate possibilities of putting their training to use afterwards. Centers visited were clearly aware of their particular ´niche´ as providers of training. These niches were consistently recognised by the NARS and in the opinion of the Panel constitute areas of genuine comparative advantage. In general, Centers provide training within their mandate "doing what they do best" – although the Panel questioned increases in volumes of 'farmer training' in some Centers and in some years. The Panel also concluded that Centers should avoid covering resource shortages in NARS out of project funds that cannot be sustained or select trainees without adequate preparation. To address the broader capacity issues, coordination with other stakeholders, especially governments, donors and universities is needed.

The Panel found no evidence to suggest that any single type(or types) of training were more efficient than others. They concluded that Centers should continue to provide a mixture of group and individual training activities, and achieve increases in efficiency mainly by fitting these more closely to trainee and NARS needs.

The Panel's approach to evaluating outcomes and impacts from training and its analysis and conclusions are presented in Chapter 7, *Effectiveness: Outcomes and impacts of training and learning*. The Panel found strong and consistent evidence of the effectiveness of CGIAR investments in training and learning. The case studies in seven countries across Latin-America, Asia, and Sub-Saharan Africa confirmed that CGIAR training has led to impacts for

individuals and institutions. Many of the leaders of national research in agriculture are Center graduates and the agricultural research agendas of NARI, government ministries and other NARS partners have been shaped by Center inputs. In particular CGIAR centers have contributed to the internationalisation of research – linking even fragile NARS partners to international scientific agendas.

Country studies and surveys of NARS partners confirmed the difficulty of separating out training and learning effects from those of research and indeed germplasm distribution. However, survey respondents' perceptions confirm that training was a significant contributor to positive outcomes from research. Country studies also confirmed the growing importance of informal training and learning alongside formal courses.

Contextual factors outside the control of the CGIAR limits the effectiveness of its contributions to capacity strengthening. There are regional differences in sustaining and using training and skills acquired with the Centers and institutional instability is an important limiting factor, particularly in the poorer countries. This is illustrated by ´WASTAGE´ rates among trainees in some countries. However the success and contribution of CGIAR inputs have been striking even under the most adverse conditions, especially when working with innovative local partners and committed donors. The sustainability of the results of past investments in training and learning increases considerably when account is taken of a broader set of 'results' that go beyond intentions and objectives. Projects have left behind a large 'footprint' and many investments in training and learning have had unintended but with hindsight foreseeable positive consequences for NARS.

The serious problems faced by countries where NARS are weak and where Centers in isolation can only expect to have limited impacts, highlight the need for innovative approaches to capacity strengthening. These will need to better integrate training and learning with other capacity strengthening measures and coordinate the plans of more than one Center together with those of other key stakeholders – NARS partners, donors, governments, and universities.

Recommendations

Recommendations can be variously directed to the CGIAR System, the NARS and Centers.

For the CGIAR System, the Panel recommends:
1. Training should be fully recognised as an indispensable component of the CGIAR's activities, not only as a contribution to NARS institutional strengthening, but also as a contribution to the execution and refinement of the Centers' research. At the investors' level, full recognition implies finding, or helping to find, increased resources for basic training support functions in order to optimise yields on the major investment currently made and sustain the reach and effectiveness of collaborative research.
2. Given the investment of the System in training, simple but meaningful criteria and indicators of training outputs and outcomes should be defined and used at the System level, avoiding the current need to present the information in different formats to suit different stakeholders. The definition of these indicators might best be undertaken by an inter-Center focal group, but should be ratified and observed by all stakeholders.

3. The shortcomings of short-term project funding from the point of view of NARS institutional strengthening must be recognised, and provision made to overcome them as far as possible through integrated, longer term center-NARS-investor cooperation and commitments. Training in association with research project funding may be putting the weaker NARS at a disadvantage, and this situation should be revised periodically.

For NARS, the Panel recommends:
4. There should be a clearer understanding among NARS as to the areas of their training needs which can be covered by the CGIAR. These refer to the areas of their research agenda which they share with the Centers, and where priorities are set through mutual cooperation.
5. In some cases, the absence of clear policy and articulated research/training needs on the part of the NARS constitutes an obstacle to effective cooperation with the CGIAR. NARS and Centers should work closely to improve this, possibly by more active intervention at the highest policy level.
6. To safeguard the NARS' investment in training by the CGIAR, greater care must be taken to select candidates with appropriate qualifications in coordination with the centers, and to ensure adequate post-training support and operational facilities. For training to be effective it needs to take place in the context adequate institutional support and where necessary policy consistent.
7. For the CGIAR to support the NARS as effectively as possible, the Centers should not be drawn beyond the limits of their distinctive competence as research institutions, into activities which are the responsibility of national governments. In particular, their work should be complemented by the necessary efforts to ensure downstream dissemination of research products. In this context, the Panel would question the involvement of the CGIAR in the direct training of farmers and extension workers except as an integral part of ongoing Center research.

For the CGIAR Centers the Panel recommends:
8. CGIAR Centers should adopt a strategic stance with regard to the links and potential benefits to NARS of the training and learning activities that they undertake. To this end Centers should:

   a) Continue to carry out training and promote learning compatible with their research priorities and mandates and develop strategies to do so in ways that strengthens NARS capacity. With regard to capacity building requirements which they cannot cover they should cooperate and enable these to be met by other agencies and stakeholders including international donors and national governments.

   b) In developing their training strategies, take into account that cases with successful outcomes encountered by this Panel often had in common: long term commitment by the Centers; a long-term funding commitment; local institutional support and leadership; a mixture of formal and informal training/learning activities, designed to fit specific needs; the formation of multi-disciplinary teams and critical mass of scientists; a latent (or explicit) demand for the technology in question that meets identified needs. These 'conditions' for success are likely to be valid in many NARS scenarios today.

c) Weaker, under-resourced NARS will need special strategies if poverty alleviation objectives are to be met. Interventions at the highest policy level that will often also involve informal learning opportunities (e.g. through policy dialogue) and an emphasis on support for local universities through training and research partnerships may be the options with best potential for long term impact. Close inter-Center cooperation and the development of a common policy for capacity development including training should be considered in such cases. The current distribution of trainee nationalities should be revised at each Center to ensure it is justified on the basis of potential for poverty alleviation.

d) In general, the Panel recommends giving high priority to support to local universities, as probably the most sustainable contribution to capacity building through training. It should also contribute directly to elevating the pre-training preparation levels of CGIAR trainees. Various modes are already in practice, but the Center-north-south university partnerships have particular merits. Partnerships with teaching institutions will also help fill the Centers' gaps in pedagogic skills.

9. CGIAR Centers should ensure that formal and informal training and learning activities should be systematically submitted to appropriate planning, monitoring and evaluation procedures, as is research. To this end:
   a) Quality Assurance protocols should be developed and applied systematically to all stages in planning, managing and delivering training and learning, including needs analysis and the routine specification of learning objectives in all projects.
   b) In-country informal learning built in to projects should be supported by self-evaluation guidelines that can be applied by project partners on a continuing self-help basis.
   c) Training quality should be systematically monitored and evaluated, routinely at the immediate post-training stage. Long-term follow up studies of outcomes and impact are only recommended strategically in samples of areas/projects. However if records are well-kept and systematized across all Centers the present prohibitive costs of follow-up would be dramatically reduced.
   d) Training evaluations should be taken into account in staff performance ratings and used to support the integration of training into research planning and decision making.

Important gains in efficiency are foreseen from ensuring that every Center has access to some form of training and learning function and expertise however organised (the form will need to vary to fit Center mandates and circumstances). In some circumstances these 'functions' may be partly based within Centers and partly outside – e.g. shared among Centers or at a System level as with System's ICT-KM Initiatives Online Resource Project. These functions should:
   a) Provide scientists at each Center with access to expert advice on suitable pedagogic methods and delivery modes for training; retrieving, adapting and disseminating existing training materials; and making materials widely available on-line.
   b) Ensure the coordination of training activities across and between Centers where this will bring benefits of quality and coherence, for example by systematising needs analyses; facilitating inter-Center cooperation; implementing stricter candidate

selection procedures (see above); targeting national universities for training and as partners in collaborative research projects; promoting learning alliances and center-north-south institutional collaboration.

c) Given the heterogeneity of NARS, a variety of training themes, types and delivery modes should continue to be provided, with emphasis on fitting them more carefully to clients' needs, while making full use of ICTs and other contemporary methods. e-learning for example can be a valuable complement within many kinds of training and learning activities and alongside other forms of delivery – face to face, experiential etc. Specific e-courses can also be suitable for certain kinds of learners and for certain kinds of content. The yield from the learning and training resources of Centers will be better exploited in such ways.

d) Closer cooperation and coordination should be achieved in areas such as: strategic planning, including regional/country strategies; the preparation, cataloguing and delivery of materials; data base and financial recording system design to ensure a minimum essential set across Centers in compatible formats; Quality Assurance systems and related protocols; performance indicators; collaboration with other sectors of the CGIAR related to capacity building (e.g. Information, Communications groups), and exchange of best practices. A suitable inter-center mechanism (e.g. focal point) should be set up, with funding, in order to achieve these objectives.

1 INTRODUCTION

This section outlines the terms of reference and objectives of the study, gives some background and contextual information to training in the CGIAR, indicates some of the main design and implementation decisions made in the course of the study and outlines the main sections of the report that follow.

1.1 Study objectives

This study was commissioned by the interim Science Council (iSC) to review training within the CGIAR as it contributes to capacity strengthening in the NARS[4]. When commissioned, the study was seen as part of a broader strategic priority for the iSC: the role of the CGIAR in NARS strengthening.

The main objectives, as stated in the Terms of Reference (Annex I) are to evaluate:
- The relevance and quality of training activities carried out by the CGIAR;
- The efficiency and effectiveness of training; and
- To assess the intermediate impact of training in NARS capacity and, as far as possible, the impact of training on the ultimate goals of the CGIAR.

The study was always intended to be forward looking as well as building on past and recent experience. This was reflected in the expectation in the Terms of Reference that it would help Centers, Donors, the NARS and the System to strengthen and plan their future activities in relation to training and capacity strengthening. This future orientation was also emphasised by the two Standing Panels having oversight of the study during its design stage.

Against this background, the Panel[5] defined the overall aim of the study as follows:

> *To assess how far and in what ways the CGIAR System has provided and can best provide training (based on scientific research) that strengthens NARS' capacity to undertake collaborative scientific research to realize the goals of poverty alleviation, food security and sustainable production.*

1.2 Design and implementation choices and methods

A number of issues were identified in the course of designing and implementing this study that have shaped its focus and outputs. The main design and implementation choices were:

- *Issue:* Defining training.
- *Decision*: To include a full range of formal and informal training/learning activities in order to reflect the range of relevant activities that were encountered in preliminary

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[4] The term NARS has been interpreted throughout this report in the broad sense to include what is sometimes labelled NARES and NARDS. The diversification of NARS and the active participation in national systems of extension sector, NGOs, farmers' organisations and other development actors has been acknowledged in the study.

[5] Biodata of the Panel members is given in Annex II.

investigations and pilot work. This includes learning which takes place in the course of collaborative research, and networking when intended to develop and support training and learning.

- *Issue:* Difficulty separating training and research and other Center inputs (e.g. germplasm supply).
- *Decision*: To retain a focus on training and learning but not exclude activities that are highly integrated with research and to try where possible to assess the value added or contribution of training and learning – whilst not expecting to attribute all results to training.

- *Issue*: Country and regional focus.
- *Decision*: To concentrate efforts in seven small to medium countries in three regions (LAC, SSA and the Greater Mekong Basin within Asia) as these represented the likely current and future locus of most CGIAR capacity development efforts and were manageable within this study's available resources. A pre-requisite for inclusion was that the country should have been a major recipient of CGIAR training, as indicated by the data base compiled for this study. Those selected were: Bolivia, Cameroon, Ecuador, Kenya, Malawi, Thailand, and Vietnam.

- *Issue*: Definition of capacity development.
- *Decision*: To define capacity development (consistent with current understandings) at several levels - in terms of individual capacities and skills; organisational capacities resources and management; and inter-organisational coordination and networking.

- *Issue*: What constitutes CGIAR inputs and interventions?
- *Decision*: To recognise the importance of context. Accepting a broad definition of training 'interventions' (see above) underlines that CGIAR interventions occur in a context of many actors which shape what is achieved and achievable.

- *Issue*: Focus of impact study element.
- *Decision*: To concentrate primarily on impact in relation to NARS´ capacity and then, where possible, on impacts for farmers and CGIAR goals.

- *Issue*: Scope of data collection.
- *Decision*: To gather data at several levels – system-wide, centers, Country/NARS and partners – in order to cross check and be able to trace the factors that shaped outcomes and impacts.

The methods and data sources for this study have included:
- Assembling a data-base on training types, volumes and trends from 1990-2004;
- Secondary sources such as EPMRs, impact studies and other reports and assessments of the CGIAR;
- Case studies of 6 CGIAR Centers – CIAT, CIP, ICRAF, IITA, ILRI, IRRI. These were selected primarily on the grounds of their major contribution to training in the countries chosen for field work, but also because their location allowed travel costs for the study as a whole to be kept within the budget;

- Questionnaires to all researchers and training officers (or those responsible for training) in all CGIAR Centers;
- Questionnaires to those who attended group training in 2003 and as many trainees as possible who received individual training in the period 1993-2003;
- Questionnaires to partners for whom contact information was provided by Centers;
- Interviews and documentary analysis with the NARS at HQ and operational levels in 7 countries;
- Case studies in 7 countries of outcomes and impacts of training/learning including collaborative research that incorporates training or education or informal learning;
- Follow-up or 'tracking work' with CGIAR Partners and Trainees in 7 countries to ascertain the 'survival' of CGIAR trainees within the NARS;
- Feed-back from stakeholders on this report, at various stages of its preparation.

In estimating response rates to the questionnaires a number of caveats are in order. Researcher questionnaires were distributed via Centers and although the Panel is reasonably confident that it was sent to all on regular employment (*circa* 690) there may have been some variation in some Centers. The numbers cited below for trainees and partners refers to numbers distributed drawn from a much larger list. However the lists proved to be highly inaccurate, with many misspellings, old postal addresses and other inaccuracies. It became clear in the course of country visits that many to whom questionnaires were sent did not receive them. Granted these caveats estimated response rates were as follows: Center researchers 690 distributed via Centers, 338 received - response rate 49%; Center training officers and those with special responsibilities in that area, 40 distributed, 38 received - response rate 95%; ex-trainees 2850 distributed 359 received – response rate 12.6%; and partners in collaborative research projects 2470 distributed (nominated by Centers), 148 received – response rate 6%. The Panel concluded that the response rates was good for CGIAR staff but low for partners and trainees - as commonly found in studies of this kind (see Annex III). This probably introduces a positive bias into the results, the magnitude of which cannot be estimated, since those less interested in training or with negative experiences would have been less likely to reply. The bias may have been particularly strong in the case of the research partners, because they were named by the Centers and the less successful and less persistent ones would probably not have been included. Throughout the report, therefore, the Panel has been cautious about basing conclusions solely on evidence from the questionnaires, and tried wherever possible to corroborate from various additional sources the trends which they pointed up. Further analyses were conducted on the some of the survey results to detect the significance of differences due to various sources of variation (e.g. the effect of subject area on trainee satisfaction) using Chi-squared and other tests. Further statistical analyses were undertaken of those who were critical or negative to understand their responses. As has been found in other surveys, there is no reason to believe that the 'negatives' that did respond are atypical of the negatives that did not.

1.3   This report

This report focuses on findings drawing on all the main data sources. It is organised into six main Chapters. These cover:
- *Factors 'shaping' training and learning in the CGIAR*: The report begins with a description of the factors shaping training arrangements, organisation and priorities in the CGIAR over

the last 10 years. This includes changes in the broader context, funding arrangements and developing understandings about how training and learning can be supported in different settings.

- *Training and learning activities in the CGIAR*: Available aggregate data are then presented on trends in formal 'group' and 'individual' training. Estimates of the scale and importance of informal training are also given, based on researchers´ reports of the time spent thereon, and on field study information.
- *Relevance of training and learning*: This section highlights what we are able to say about relevance, understood to include priorities and priority setting processes at Center level. This includes plan-making and consultation with NARS, as well as systematic feedback from NARS and trainees. The section draws on evidence from questionnaire surveys, case studies and country based fieldwork.
- *Quality of training and learning*: This section considers quality both in terms of the processes likely to ensure quality and evidence that such processes are used. It also draws on feedback obtained from ex-trainees as to their judgements of quality.
- *Efficiency of training and learning*: This considers how resources are deployed and how training activities are organised and managed. It draws primarily on Center and country visits conducted by the Panel, and on questionnaire survey results. Existing impact studies are used as a secondary source of information.
- *Outcomes and impacts of training and learning*: This section reports on the effectiveness of training. This includes intermediate 'impacts' of training and learning on NARES capacity, discernable effects for agricultural systems and farmers and where possible contributions to the CGIAR's own goals such as poverty reduction, food security and sustainable production. It draws mainly on the survey questionnaires, country reports and case studies conducted by the Panel, and refers briefly to existing training impact studies.

The final chapter draws together Conclusions and Recommendations. Conclusions are also highlighted at the end of each of the main report chapters. Supporting evidence from surveys, case-studies and country reports are included in the Annexes.

2   FACTORS SHAPING TRAINING AND LEARNING IN THE CGIAR

This chapter briefly sets the scene reviewing the factors that shape training and learning in the CGIAR. It describes:

- the CGIAR commitment to training and NARS capacity-building;
- how training is funded and organised;
- the institutional, funding and wider context within which training and learning is delivered; and,
- the evolution and differentiation in how training and learning is understood in the CGIAR.

The chapter introduces material at a general level that is analysed and discussed in greater detail in later chapters.

2.1   CGIAR commitment to training and capacity strengthening

System-level commitment
The CGIAR has a global commitment to strengthening National Agricultural Research Systems. This is reflected in its stated objectives which have evolved in the course of this study. When the study began these were stated as follows:

> *The CGIAR supports institution building and capacity building—globally, regionally and nationally—to strengthen the evolving international agricultural research community, and enhance the professional development of agricultural scientists in developing countries.*

The latest version of these objectives as they relate to capacity building is stated in the New Research Priorities of the Science Council[6] as follows:

> *The CGIAR priorities maintain the focus of the system on research. However, the conduct of international agricultural research, combined with the provision of world-class opportunities for capacity strengthening, is a comparative advantage of the CGIAR. Enhancing capacity in developing countries has been a major accomplishment of the CGIAR in the past. This approach will continue through program-related opportunities and through involving appropriate partnerships to enhance innovation and learning. Additionally, specific research on institutions is designed to identify the best means for policies and institutions to support new agricultural research and create pro-poor benefits.*

This commitment is formally reflected in the mandates, objectives and activities of individual Centers and in particular in their training and education activities. This is especially so as in

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[6] System Priorities for CGIAR Research 2005-2015, CGIAR Science Council, December 2005.

the CGIAR there tends to be a close identification of training and education with capacity strengthening.

Linking Center research and capacity priorities

From Centers' own plans, objectives and other documentation, the primary purpose of training activities is to enhance developing country organisations, mostly NARS, to be more effective in independently and collaboratively conducting research for solving problems primarily related to agriculture, environment and economy. The Centers focus their training efforts globally and regionally depending on the mandate and focus of their research. However Centers also emphasise the aim to train within their specific area of competence and often the near term purpose is to improve capacity in that particular area of research and activity. So for example IRRI has a general objective to 'generate and disseminate rice related knowledge and technology of short – and long term environmental, social, and economic benefit and help enhance national rice research and extension systems' and sees training and education as central to delivering that objective. Scientists are aware about how training connects with their own research priorities: in the word of one, training is about 'helping (this Center) implement our research that we think is important for the country and has scientific value'. Balancing the needs of their own research and the capacity needs of NARS is one of the challenges for Centers that this study will highlight.

As many researchers also acknowledge, the benefits of engagement with NARS is not one way. Capacity building can variously create capacities to undertake research, give greater focus to research and help in the formulation of new research agendas. This is discussed in greater detail in Chapter 6, see especially 6.2.

Strengthening research capacity and potential 'partnerships'

The Centers aim at improving researchers' skills and knowledge about technologies and methodologies, enabling some at least to become trainers themselves in the future. Improving trainees' capacity to conduct further training is also highlighted by Centers. ICARDA states their aim is the 'enhancement of researcher capacity to identify and overcome constraints to production and understand the processes of technology transfer, adoption and farmer decision making'. Stated objectives include the enhancement of the development, dissemination, adoption and ultimately impact of technologies. One means for achieving this is to establish collaborative partnerships for research and technology development.

World Agroforestry Center identifies institutional strengthening as one of its four themes:
 'We strengthen the capacity of institutions - local, national and regional - to participate effectively in generating and applying innovations in agroforestry, INRM, and environments for improved livelihoods.'

With regard to research systems and institutions it aims:
'to understand the bottlenecks faced by national institutions and to work out joint strategies and programs to address them.'

A strong incentive for Centers is to build partnership between the CGIAR Centers and researchers and organisations, mainly in the developing countries. As one senior center manager put it: 'training is an investment in cooperation'. This also leads to a related purpose: facilitating partnership building between the organisations and researchers receiving training. Training is seen as a two-way process that 'helps the Center streamline its research priorities' (CIP). ISNAR specifically stated that the purpose of training is to understand behaviour and attitudes of those who contribute to research alliances. In addition to partnerships with developing countries, there are currently important efforts by Centers to promote South-North (e.g. CIAT- Makerere University – University of Florida) and South-South partnerships (e.g. joint appointments with Southern universities such as CIAT- University of Nairobi).

2.2   The changing context of CGIAR training

The differentiation of the NARS
Over the period under study the environment within which the Centers developed their training strategies and resource commitments changed significantly.
• NARS in some developing countries significantly strengthened their agricultural research capacity, and moved into newer areas such as molecular genetics and natural resource management. Dependency on external research expertise and support gave way in these NARS to stronger national capacity and nationally determined priorities. This is exemplified in this study in the cases of Thailand and Vietnam.
• Poorer developing economies underwent structural adjustment programs during the 1990's that significantly constrained government spending, especially in the area of

agricultural research. These reductions in resources were accompanied by reductions in agricultural research and in some cases the near-collapse of NARIs and public universities. These problems were compounded in many of the same countries by the toll of HIV/AIDS on agricultural research skills; and by the consequences of political conflicts and civil war.

- Periods of political instability especially in parts of Latin America and Africa, shifts in donor priorities (or in some cases capabilities given their own financial pressures) meant that capacities of these countries significantly weakened during the period. This included capacities within faculties of agriculture in the public universities.

- An important influence on the possibilities of CGIAR 'partnership' working worldwide, was the entry into agricultural research in the 1990s of new classes of institutions – mainly NGOs – often with little research experience, and consequently, making new demands of Centers for training. This was partly a matter of the changing role of the State following on from structural adjustment but it was also the consequence of the CGIAR, donors and NARS becoming more pre-occupied with 'impact' for poor farmers and consumers.

The implications of these contextual changes for the CGIAR were a much more differentiated NARI and NARS – some where capacity had increased, some where it had diminished; that had different needs for training in terms of sometimes more and sometimes less sophisticated skills; and where capacity strengthening includes Universities, NGOs and farmers organisations as well as NARI.

From core to project funding
One of the most potent 'shapers' of Center training over the period was the shift in funding from core resources to project-based funding. Thus:

> 'The ratio of restricted funding to total funding rose to 55% in 2004 from 35% in 1995. Conversely, in 1995, unrestricted funding dropped from approximately 65% of total funding in 1995 to 45% in 2004 due to the high increase in restricted funding …..'
> *(Final Report, Task Force on Funding System Priorities, 2005)*

The way that these system wide changes have impacted on particular Centers varies greatly. However the effect has been to reduce 'unrestricted' funds to as little as 29% for IITA and 30% for World AgroForestry Center (ICRAF) and to maximum levels of 50% and 46% for CIFOR and ILRI respectively. (See Annex IV on funding of CGIAR Centers).

At the same time there have been increases in overall resources available to CGIAR Centers (according to the *Task Force on Funding System Priorities*, an increase of 32% between 2000-2004) however most of this has been in restricted or project funds.

Detailed breakdowns of Center expenditure in terms of the deployment of core (unrestricted) funds to training are difficult to obtain given the way budgets and costs are recorded. However we were able to obtain figures for some Centers which demonstrate different patterns of resource allocation and these are discussed in various parts of the report.

The organisation of training

Changes in volumes and categories of funding had large effects on how training was organized, funded and implemented across the CGIAR. Most Centers found it difficult to fund training as a stand alone activity from restricted project funding. Most of the training funds were therefore incorporated into research project funding. However, this left little for core support to training units, particularly when the limited core resources were utilized to fund administration and longer term research areas such as genetic resources and breeding. Many Centers during this period changed their training organisation and in effect decentralised responsibility for training to research scientists relying on their ability to attract funding for training within their research projects. At present, most Centers retain a Training Units of some kind. Some Centers (e.g. IPGRI, ICRAF and IFPRI) have a capacity strengthening as a project within the MTP portfolio and some (e.g. CIMMYT and IRRI) have training within an MTP Project. However even Centers with Training Units and designated capacity strengthening and training programs may have limited capacity. According to survey data gathered from those responsible for Center training only 7 out of 15 Centers have staff with any qualifications in training, pedagogy or adult education. (The consequences of these organisational and capacity issues are considered in greater detail in various parts of this report – see especially Chapters on 'Efficiency' and 'Relevance'.)

Decentralization of training to researchers and research programs was often accompanied by decentralisation of research and training to national and regional programs. For example:

- In the mid-1990's Centers sought to devolve group training, particularly the so-called production courses, to national partners. Whilst this is seen as a response to resource cutbacks by some it is also viewed as a positive guarantor of the relevance of training to Center mandates by others. Devolution often involved training of trainers in a period of declining national resources. This did not always lead to the hoped-for results, unless the Centers themselves carried out the courses within the national programs. Many 'devolved' courses were taken back by Centers following initial difficulties.

- Survey results and Country and Center fieldwork have suggested that there has been a significant increase in country based (rather than Headquarter based) training which has, however, not been accompanied by the creation of new administrative systems to monitor and manage what was being delivered. This study has found little or no systematic information about country delivered training and learning – a point that is referred to throughout this report. It can even be argued that in-country training has not increased as much as it would appear – only that recording has improved. However respondents to the survey of Training Officers or 'focal points' suggest that in 6 of the 13 Centers which provided information over 50% of their training now takes place outside headquarters. This proportion has increased at 6 Centers, remained about the same in 5 and decreased in 2, during the last 5 years.

- In the 1990s there was also a trend across the CGIAR to create regional research programs, particularly in Africa where the major portion of research funding was being directed. This was intended to give Centers the potential to reach a wider cross-section of clients. It had the consequence of shifting much of the training and capacity building activities, particularly in the regional programs, to building what might be termed an 'impact pathway', that is the extension, farmer, and market capacities to have impact

with new technology. These trends shifted the focus of training towards extension-workers and farmers in addition to scientists employed in NARI.

Emerging issues shaping training

There were many other external 'drivers' shaping Center training profiles in more particular ways. For example Center based scientists cited:

- competition between developing countries;
- the biodiversity convention;
- the emergence of new technologies especially genomics;
- environmental pressures including drought and pesticides;
- producer-consumer market chains;
- the possibilities and potential of IT for training and learning dissemination, management and delivery.

All the items of the above list create new demand for training and in some cases shape how training was delivered.

2.3 The scope of training and learning

The word 'training' is generally understood as instruction or teaching within CGIAR discourse. Such instruction or teaching may take place in courses (in 'groups') or individually. However the system tends to downplay other learning opportunities that are important even in an instructional setting – e.g. interaction with fellow students in a course, experiential learning in a field station or the relationship with supervisors in a graduate degree program. (Chapter 3 has shown the importance of these activities.) There is certainly little explicit acknowledgement of learning that takes place informally, through learning by doing, work experience, learning in seminars and workshops, policy dialogue and in research mentoring or in practitioner networks. These types of learning are not generally monitored in CGIAR nor are they the subject of explicit learning management or quality assurance methods. One indicator of this is that quantitative and administrative data on informal learning is hard to find. This is despite the prevalence of many such learning opportunities in diverse settings among CGIAR Centers. Adopting a broader perspective is consistent with the findings of other studies of vocational training – especially in professional settings - where training and human resource investments are increasingly understood in terms of how and where people learn rather than in terms of what trainers provide.

It became clear in the course of pilot work that many of the benefits of training in the CGIAR derived from these broader expressions of 'learning'. The study has therefore consistently sought to focus on how and more importantly, where learning occurs. It is for this reason that the terms 'training and learning' are used extensively in this report. This emphasizes the importance of learning that takes place outside of formal instruction and which requires a shift in mind-set if issues of quality, relevance, efficiency and effectiveness are to be adequately addressed.

Analytically and based on the case material available it is useful to distinguish between the different 'learning strategies' adopted by Centers or more precisely its researchers and others

who are involved in training and learning activities. On occasions they may indeed be 'instructors' but at other times researchers pursue their learning objectives as managers of networks or collaborative research or as mentors. At the same time there are different learning modes - the ways that those we call 'learners' and those we call 'teachers' interact. Conveying technical content is very different from facilitating experiential learning or facilitating peer learning. Learning or training strategies and different learning modes also tend to take place in different settings and are likely to be appropriate for different learners or trainees. The table below begins to unpack some of these distinctions. It is a framework that has evolved iteratively – beginning from a curiosity about how learning occurs within and around what is called training in the CGIAR. However it was only during fieldwork and interviews that the particular expressions of learning and its delivery became clearer.

Table 2.1 The learning process adopted by Centers

Learning/training Strategies	Learning modes & settings	Who learns	Example
Instructional: The Center knows and the trainee needs to learn	Transmissive/didactic: courses in specialised settings – at (regional) HQ with experienced teachers	Usually the NARI scientist	Germplasm management; biotech techniques
Learning manager: the Center manages opportunities for learning	Mixture of didactic and experiential learning – learning by doing. Setting is more likely to be 'in-country'	The NARI scientist and NARES - and to a limited extent, through research, the Center scientists. Latter lead in agenda setting	Plant breeding that combines a course element and a period on 'station' applying course knowledge; research assignments designed or allocated by Center to NARI
Mentor/advisor/senior colleague: the Center supports learners	Collaborative/peer learning through joint research/activities/projects, mutual exchange between Center/NARS; mentoring and colleague exchange (both individual 'visits' and collective events – seminars, workshops). Technical advice	Both the NARES and Center - the learning agenda is initiated by both	'Farmer participatory selection' collaborative design and customisation of 'tools' methods or models
Network manager: the Center brings together related	Linking together diverse research and development projects so as to help them learn from each others' experience/contexts and make explicit what they know. Meetings, workshops, conferences as learning settings	Limited or no initiation by CGIAR Center. Responsive or dialogical	Networks – made up of different projects/scientists in different countries to which CGIAR scientists are attached

The first column in the table concerns *training and learning strategies*. It progresses from the simplest training setting where those who need to learn are 'instructed' through to more facilitated and network-based strategies where there is less inequality between 'teacher' and 'learner'. The second column describes *learning modes and settings*. Learning modes progress from what in pedagogics would be described as transmissive or didactic (within instructional strategies) where teachers structure and deliver what they know, through to the more experiential and collaborative modes of learning that take place in work settings and collaborative networks. As this column also indicates these different modes are associated with different settings. Transmission is common in classrooms but advisory missions and joint seminars between Centers and NARS partners are more commonly associated with collaborative learning and exchanges amongst peers. The third column focuses on *who learns*. Here also it appears that there is a progression: from an instructional strategy where it is mainly the 'trainee' who learns, though to the more reciprocal learning that happens when Center based researchers working with NARS partners in networks and joint research projects. The final column provides some examples of where these different configurations of learning have been observed.

It is important to recognise that there can be no automatic assumption of 'progression' or 'development' moving down the columns in this table. NARS at early stages of their development may remain dependent on instruction and imported skills and know-how for a long time; and those NARS that have seen their development disrupted by political instability – as in Latin American case-study countries – or by fiscal setbacks, disease and conflicts - as in Africa - may move backwards from peer status and reciprocity to instructional learning strategies and more dependent modes of learning. Nor can generalisations be made even at the level of a single NARS. In some themes or disciplines a NARS may well be relatively strong whilst in others it may lack capacity. It is also true that when new techniques and methods emerge – as has been the case recently in biotechnology applications or post production/near to market methods –there is often a period when a NARS reverts to instructional learning and training strategies or perhaps again works within research projects designed by others.

What the table does suggest however is that NARS with greater capacity will tend to be more autonomous and provide CGIAR Centers with research colleagues rather than trainees and will learn collaboratively rather than through instruction. That is borne out by the results of this study especially when comparing Latin American, Sub-Saharan and Asian experience. Furthermore the table also suggests that there is a probable coherence across the rows. It is difficult to deliver an instructional strategy except through some kind of classroom (although this may come to be a virtual classroom in future as learning technologies and associated skills improve). It is also difficult to imagine collaborative and peer learning succeeding except in work based, joint research or network settings where there are opportunities for learning by doing.

2.4   Conclusions

Overall the changes in CGIAR context - driven sometimes by the CGIAR System and sometimes by broader global changes in NARS, agricultural technologies and funding - have had major consequences for the orientation and provision of training across the CGIAR over

the last 10 years in particular – although some of these developments have had a longer gestation period.

Among the most important changes:
- NARS have become more differentiated - previous Center 'trainees' in stronger NARS have become colleagues and peers whilst some NARS have become more fragile and under-resourced, their scientists still requiring basic training and support;
- Funding constraints have forced Centers to innovate in the organisation and delivery of training in particular through the decentralisation to researchers and to country-based partners;
- New technologies and new public policy concerns – many of them connected with the environment, international markets and poverty reduction - have required the training of successive cohorts of scientists in the technological and social science basics as well as in more advanced techniques;
- Alongside these contextual changes there have been major changes in training and learning – with an increase in informal learning and the growing importance of collaborative research, networks and peer learning alongside formal training courses, whether for groups or individuals.

Not all of this is evident from aggregate data collected at a CGIAR System level and can even be obscured by the way data is (or is not) collected. The next chapter draws together the data that is available on formal training. In subsequent chapters when questionnaire results are presented and discussed and NARS based case studies analysed, there will be more evidence to support this broader typology of training and learning in the CGIAR.

3 TRAINING AND LEARNING ACTIVITIES IN THE CGIAR

This chapter presents the data collected from the CGIAR Centers on group and individual training. The following aspects are described and discussed:
- data collection and problems associated with it;
- volume of training;
- gender and nationality of trainees;
- training themes;
- volume of informal training.

3.1 Data collection

Data collection began in 2001 during a desk study phase of the Training Study. During the Main phase, Centers were asked to provide records for training up to 2004. Records for the early 1990s in particular were difficult to obtain. Several Centers acknowledged that training records were not systematically collected. Data for training outside the headquarters were particularly patchy or altogether missing; and in some cases records had been compiled for annual or other occasional reports and not into central databases. Given the variable availability of specific data items and continuity of the data over the time period discussed in the following, the data should not be regarded as providing accurate results of CGIAR training, but rather as showing likely trends.

Data were originally collected on a large number of parameters. However, due to difficulties in obtaining them, the Panel opted for a minimum set of parameters which include the following annual information: number, length and theme of group training events; number, gender and nationality of group training participants; number, gender, type and nationality of individual trainees and the length and theme of study. To overcome the problems related to gaps in the records, the Panel considered relative data and trends rather than the actual figures when possible. In the trend analysis the Panel observed data in three periods: 1990-92 (considerable gaps in the data) and two six year periods, 1993-1998 and 1999-2004 (good data availability).

The largest gaps were in the records of nationality for group trainees, which were available only for 37.4% of participants. Records on the type of trainee in group training were not consistently recorded although such information was available for some Centers or was occasionally to be found in the title event. The most complete data sets were obtained from CIAT, CIMMYT, CIP, IITA, World Agroforestry Center (ICRAF), ICRISAT, IRRI [two data sets: headquarters (HQ) and in-country (IC)], ICARDA and IPGRI. Data were also available for the Systemwide program on Alternatives for Slash and Burn (ASB). IWMI did not originally provide any data, but some records on individual training were available for 2003 and 2004. CIFOR also did not provide data, and it doesn't view itself as a training Center in a conventional sense. CIFOR, however, provides capacity building both for individuals and through organising occasional group events. ISNAR, which in 2004 became a program of IFPRI, had training and capacity building as a major part of its agenda, but primary data on training were not available in a form suitable for analysis.

3.2   Volume of training

Group training
In 1990-2004 there are records for about 90,000 people who attended group events that Centers have included in the training data. Group trainees included 189 nationalities (see section 3.4). Considering that the records for the early years and, in some cases, in-country training are incomplete the total figure for group participants is certainly much higher than the records show. However, the records for some Centers include very different type of events, from formal group courses to conferences, meetings, field days and study tours, some of which, particularly in the recent years have had a large number of participants as discussed below. This makes an accurate estimation of the volume of group training impossible and complicates meaningful interpretation of the kinds of training carried out, and the types of trainees who were included. It is clear that group training of NARS[7] staff through courses, workshops and seminars is considerably less than the total reported here.

In providing data, Centers did not use similar definition of training (for instance ICARDA and IPGRI data sets consist mainly of formal group training events) and this may be reflected in the increasing vs. stable trends in Table 3.1. In general, the number of training offerings remained at a similar level over 1990-2001 when the Centers organised on average 16 group training events annually. In 2002-2004 the average number of events was considerably higher, about 32 events per year. This reflects a genuine rise in the number of events carried out by ASB, CIMMYT, ICRAF and IRRI-in country (IRRI-IC) (Table 3.1), but also in the latter case, more accurate recording. The trends with group training have not been similar for all Centers.

IITA gradually brought group training to an end in 2001-03. At CIMMYT, ICRAF, and IRRI-IC, group training has increased in terms of number of events in 1999-2004 compared with the earlier years. ASB has also gradually increased the number of events since 1992 when records started. At these Centers, as also at CIAT, IPGRI, IRRI-HQ, WARDA and WorldFish the numbers of participants per event have increased in the last 6 years of the period observed. At CIP and ICARDA there has been a downward trend in the number of training events but the number of participants per event has remained similar. Only at ICRISAT there seems to have been a downward trend in the number of participants per training event.

The summary trends for overall numbers of training participants in group events are illustrated in Figure 3.1. The year 1994 is given as baseline because it is the first year with records from all 14 Centers and the ASB program.

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[7] NARS is here considered to include NARI, relevant government departments and institutions, universities, NGOs and the private sector. The sectors include agriculture, forestry and fisheries.

Table 3.1 Changes in group training events and participant numbers 1990-2004

	1990-1992	1993-1998	1999-2004
Events (annual average)			
Increasing trend currently			
ASB	..	10	21
CIAT	12	5	13
CIMMYT	9	14	41
IFPRI	..	10	14
ICRAF	8	8	47
IRRI-in country	8	23	54
WorldFish Center	..	26	39
Stable or decreasing trend currently			
CIP	46	47	40
ICARDA	41	39	31
ICRISAT	12	12	10
IITA	15	15	4
ILRI	11	4	4
IPGRI	5	22	17
IRRI-HQ	18	11	15
WARDA	4	6	6
Participants/event (annual average)			
Increasing trend currently			
ASB	..	9	28
CIAT	11	16	26
CIMMYT	20	17	26
ICRAF	22	23	30
ILRI	15	12	18
IPGRI	14	11	18
IRRI-HQ	16	19	28
IRRI-IC	29	22	26
WARDA	20	25	30
WorldFish Center	..	20	31
Stable or decreasing trend currently			
CIP	21	25	24
ICARDA	14	15	16
ICRISAT	11	10	6
IFPRI	..	21	22
IITA	17	16	18

In the recent years changes can be observed in some Center's training that are difficult to interpret as the increase may be due to a number of factors. At CIAT, CIMMYT, ICRAF, IRRI-IC, WorldFish Center and ASB total numbers of participants in group training have gone up in recent years and were on average 5.5 times higher in 1999-2004 than in 1993-1998. The sharpest rise was observed at ICRAF, ASB, IRRI-IC and WorldFish. In 2003-04, ICRAF trained over 4000 group participants annually, compared with an average of 150 in 1990-2001 (data for 2002 missing). ASB trained 700-1800 participants annually in 2001, 2003 and 2004, compared to an average 113 over the previous 10 years. IRRI-IC events involved 2300 to 8400

participants annually in 2002-2004, compared to 380 on average in 1990-2000 (data for 2001 missing) and, according to IRRI, the increase is due to systematic collection of records in recent years. WorldFish trained 1200-1500 participants annually in 2000-2002 compared to 330 on average in 1993-1999 (data for 2003 and 2004 not available).

Figure 3.1 Relative change in the number of group training participants
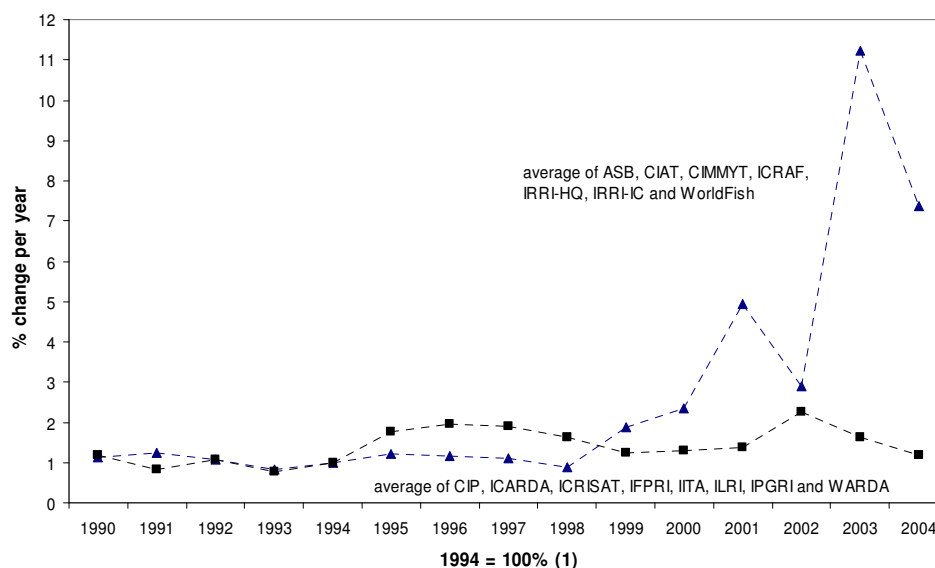
Some available records were omitted from the analysis because they represented what appears as exceptional kind of activity and involved very large numbers of participants. In addition to the IRRI-IC data considered here, the PETRRA[8] network involved about 24000 participants in 2001-2003 in some 420 events. In 1994, WorldFish involved some 1100 farmers in a "farmers' rally" and IRRI's in-country training event of one day on integrated pest management involved 1440 participants. For CIMMYT, parallel recording in 2003 showed that group training targeted to NARS participants included 58 events and 1918 participants[9], while a more comprehensive set of records covering a diversity of events and including, for instance farming family training, contained 141 events with 9600 participants.

These figures reflect the same phenomenon discussed above of including in training records wider range of events with larger numbers of participants from broader circles of stakeholders than in previous years. Events geared towards farmers and extension staff on hand and program, regional and international meetings on the other hand may have become more frequent, or at least more frequently recorded. It could be assumed that events involving very high numbers of participants were shorter than others, but records on event length are not consistently available in these cases.

The sharp changes in trends in the recent years appear to reflect the inclusion in training records of a wider range of events with larger numbers of participants from broader circles

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[8] Poverty Elimination through Rice Research Assistance
[9] Included in this analysis

of stakeholders than in previous years, particularly those geared to farmers and extension workers. An example taken from ICRAF shows that 29 of 171 events in 2003 involved 50 participants or more, and that farmers were identified as the participants in 10 of these, accounting for a total of 1300 trainees, but on average these events lasted less than 2 days. In 2004, one single training event, "Introductory agroforestry, nursery management and aspects of HIV/AIDS relationships with agroforestry" accounted for 555 participants. In WorldFish Center's training data the peaks in 2000-2002 cannot be explained by increase in farmer training. Rather the records show a high proportion of workshops and meetings, which characteristically may have involved more participants than courses. For the earlier years, such detail on the nature of the events was not available.

Some of these increases, or possibly the more comprehensive recording, may have been triggered by the performance indicators used by the World Bank in 2003[10], which included trainee days as one indicator and which were used for funding decision on a small part of the World Bank's total allocation to the CGIAR. In any case, records of farmer and extension events and program, regional and international meetings involving very large numbers of participants influence the general data and make interpretation of trends difficult when differentiation of different kinds of training is impossible or cumbersome.

Figure 3.2 Long training events as % of total number of events
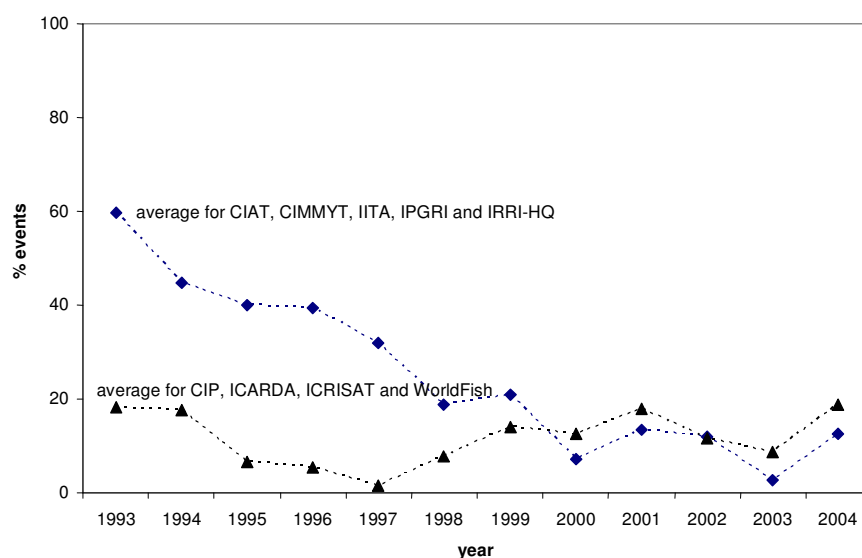
Length of group training events
Data on the length of group events were available for 98% of the records of 10 Centers for years 1993-2004, which were included in the analyses. Such data were available only for some events or not at all for IFPRI, ILRI, IRRI-IC and ASB. In the analysis, events longer than 30 days were considered long, and events of 10 days or less were considered short. In the first half of the 1990s several Centers (CIMMYT, IRRI, ICRISAT and IPGRI in particular) were offering long courses, which in 1999-2004 have accounted for only 10-20% of group

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[10] In 2004 and 2005 a CGIAR tailor made performance measurement system was introduced and volume of NARS training was not longer an indicator.

events (Figure 3.2). At the same short group training events (≤10 days) have become relatively more common in most Centers; at CIAT, CIMMYT, IITA (before group training stopped) and IPGRI. In the commodity Centers this trend may reflect the decline in long term breeding and production training.

Individual training

In 1990-2004 the CGIAR Centers trained about 13,000 individuals. Records for at least some of the years included in the study were available for 14 Centers. WorldFish did not have usable records for individual training. Records from CIFOR and IWMI were very limited and from WARDA covered only some of the parameters considered. Comparing the periods 1993-1998 and 1999-2004, the annual numbers have not changed with about 960 individuals per year. In the earlier years fewer individuals were trained, which may reflect gaps in records. Centers where comparison of the two periods shows more than 20% increase in average annual training of individuals comparing the two periods include CIP, CIFOR, ICRAF and ICRISAT. At CIMMYT, IITA and ILRI individual training has dropped more than 20% from 1993-98 to 1999-2004.

The training records for individuals include long term on-the-job and degree training and short term orientation and specialization training. Centers have classified individual training in varying ways. A standard[11] that was introduced by the IARC/NARS Training Group in early 1990s (database updated till 1996) has not been followed by other Centers except ILRI that was the host of the database. Furthermore, in some cases, depending on the status of the individuals, Centers included them in a visitor database, rather than in the training records.

Individual training has ranged from very short duration to several years. The length of is clearly correlated to the type of training. The shortest duration, ≤ 10 days stay, has increased among non-degree trainees. Training of 2 years of longer has decreased among degree trainees. More than 50% of the degree students for whom data were available, spent more than 1 year at the Center, but from 1990-92 the proportion of those spending more than two years at the Center has diminished.

Table 3.2 Changes in length of individual training

Length of stay	1990-92		1993-98		1999-2004	
	% non-degree trainees	% degree trainees	% non-degree trainees	% of degree trainees	% non-degree trainees	% of degree trainees
≤ 10 days	6.5	2.1	9.7	0.3	14.1	0.6
>10 days ≤ 30 days	33.7	0.6	25.3	1.2	24.6	1.4
1-6 months	45.7	12.8	44.3	17.7	43.3	19.6
6-12 months	8.2	13.4	13.2	15.1	12.0	25.2
1-2 years	5.3	18.9	5.2	17.7	4.5	17.4
over 2 years	0.7	52.1	2.3	48.1	1.4	35.8

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[11] Graduate fellow, research fellow, senior research fellow, student associate, technical associate, visiting scientist.

Relatively complete records on degree and non-degree training were available for 5 Centers, and for 10 Centers data were available with gaps. The analysis of the 5 Centers' data show that the relative number of degree students has increased from about 40% of trainees in 1990 to about 60% in 2003.

3.3   Trainee gender

Data on gender of the participants in group training events were available for 8 Centers for most years (CIAT, CIP, ICRISAT, IFPRI, IITA, ILRI, IPGRI and IRRI-HQ) and for ICARDA in 2001-2004. In the period 1990-2004 the proportion of women increased from 17.1% to 20.7%. IPGRI (30%), CIAT (26.9%), IRRI (26.4%) and IFPRI (25.1) have trained relatively more women than the other Centers observed, while at ICARDA the proportion of women in group training is relatively low (15.7%; data for 2001-2004).

Among individual trainees (records available for 89%) the proportion of women has been considerably higher than among group participants and has increased from about 30% in 1993-98 to about 40% in 1999-2004. CIFOR, CIP and ICARDA have had the highest proportion of women (45-50 %), while at CIMMYT and WARDA female students have been less than 20% of individuals. There has been fluctuation from year to year, but in general the proportion of women has increased or remained the same in all Centers and at CIAT, CIP, ICRISAT about 50% of individual trainees were women in 2004 (at IWMI the ratio was also nearly equal at 43% women).

3.4   Nationalities trained

Nationality information was available for group trainees from 10 Centers[12] covering about 37% of all group trainee records and 59% of participants of these 10 Centers, and for 95% of the individual trainee records from 13 Centers. For some Centers individual records in general were available only for a few years (WARDA, CIFOR, IWMI). Overall, Centers have trained nationals from 194 countries. The distribution of nationalities by region and Center in individual training is shown in Table 3.3.

For group training the data on nationalities were too limited to permit meaningful conclusions. Particularly the absence of in-country training records in many cases renders the nationality information less useful, as it is likely that in-country training reaches different nationalities in different proportions compared with headquarters events[13]. The records from CIP, ICARDA and IRRI, where the volumes of group training were highest, dominated. The data suggest that CIAT, CIP, ICRISAT, and WARDA have trained predominantly host region nationals and also at ICARDA, IITA and ILRI host national were the largest group also less than 20% of trainees. In CIAT's case the extent of regional training in Africa for instance, in unknown. CIP's training records show more global reach in its group training than with other Centers: Only about 62% of the group training participants were from Latin America.

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[12] 80-100%: CIAT, ICARDA, ICRISAT, IITA; 60-80%: CIP, ILRI, IPGRI, IRRI-HQ; 20-30% IRRI-IC, WARDA
[13] IPGRI is an exception as it has only in-country training while records are centrally collected.

The second most common region for CIP's group training was Asia (19%) and about 12% of CIP's group trainees came from SSA.

Table 3.3 Distribution of nationalities of individual trainees by region and Center[14]

Center	n	Asia and Pacific %	Latin America and Caribbean %	Sub-Saharan Africa %	CWANA %	Developed countries %
CIAT	1608	2.7	77.9	3.0	0.3	16.0
CIFOR	132	24.2	11.4	13.6	0.0	50.8
CIMMYT	1962	29.1	29.1	24.6	7.5	9.7
CIP	1669	6.0	81.2	5.5	1.6	5.6
ICARDA	1681	2.0	0.0	8.5	85.1	4.4
ICRAF	627	14.1	11	56.4	0.3	28.1
ICRISAT	1736	61.2	1.3	23.4	4.3	9.7
IFPRI	189	14.3	3.2	63.5	1.1	18.0
IITA	837	0.5	1.0	86.1	0.6	11.8
ILRI	767	1.2	0.7	82.9	0.4	14.9
IPGRI	518	20.8	23.4	18.3	10.1	23.4
IRRI-HQ	1114	81.7	0.7	3.1	2.8	11.7
IWMI	38	34.2	0.0	36.8	0.0	28.9
WARDA	73	1.0	0.6	83.5	0.3	14.6
Total	**12951**	**23.3**	**26.2**	**24.9**	**13.8**	**11.9**

In terms of which Centers provided most group training in specific regions, the data show that IRRI, IITA, ICARDA and CIP have been the most prominent providers in Asia, SSA, CWANA and LAC, respectively. CIP also trained considerable numbers of group participants in Asia (16%) and SSA (15%).

Among individuals trained, nationals from LAC, SSA and Asian countries have been trained in approximately equal numbers (23-26%). It is noteworthy that the CGIAR Centers have trained nearly as high a number of individuals from developed countries as from the CWANA region. The proportion was highest at CIFOR, but in terms of numbers, CIAT led with some 250 developed country trainees, CIMMYT and ICRAF trained about 190 each and ICRISAT about 170.

The five most common nationalities for both group and individual trainees are listed in Table 3.4 for all Centers for which any records were available. The percentage of trainees from host countries is also shown.

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[14] CIAT, CIP, ICARDA, ICRAF, ICRISAT, IITA, ILRI, IPGRI, IRRI: data for 1990-2004

CIMMYT and IFPRI: data for 1993-2004

CIFOR: data for 1995-2004

IWMI, WARDA: data for 2002-2004

Host country nationals account for a large proportion of Centers' group trainees although these results are likely to be influenced by incomplete data, particularly for in-country training. Individual records, however also show the predominance of host country nationals, which for CIAT, ICARDA, ICRISAT, IITA and ILRI accounted for 30-50% of trainees.

Judging by the data for individual trainees, training in the Asian, CWANA and Latin America regions has concentrated on one or two nationalities, namely India, Syria and Peru and Colombia, respectively. In SSA three countries, Kenya, Ethiopia and Nigeria account for 45% of individual trainees. USA, Netherlands, Germany and France account for 50% of the individual trainees from the developed countries.

Table 3.4 Predominant nationalities, including host country* of group and individual trainees

	Group training	Individual training
CIAT	Colombia (66.1%), Ecuador, Nicaragua, Venezuela, Peru	Colombia (47.1%), Brazil, Ecuador, Venezuela, Germany
CIFOR		Indonesia (25.4%), France, USA, UK, Brazil/Cameroon
CIMMYT		China, Kenya, Mexico (7.8%), India, Ethiopia
CIP	Peru (69.2%), China, Colombia, Bolivia, Uganda	Peru (25.4), Ecuador, China, Kenya, Chile
ICARDA	Syria (14.9%), Egypt, Iran, Afganistan, Morocco	Syria (41.3%), Iran, Ethiopia, Jordan, Egypt
ICRAF		Kenya (17.3%), Indonesia, Rwanda, Netherlands, Uganda
ICRISAT	India (40.4%), Myanmar, Bangladesh, Vietnam, Malawi	India (46.8%), Germany, Sri Lanka, Sudan, Vietnam
IITA	Nigeria (16.7%), Ghana, Kenya, Uganda, Mozambique	Nigeria (36.3%), Cameroon, Ghana, Benin, Belgium
ILRI	Ethiopia (19.0%), Kenya (13.8%), Tanzania, Uganda, Nigeria	Kenya (26.1%), Ethiopia (19.7%), Nigeria, Uganda, Germany
IFPRI	Kenya, Malawi, Bangladesh	Uganda, Malawi, China
IPGRI	Philippines, Bolivia, Malaysia, Mexico, Vietnam	Colombia, Kenya, Peru, Ecuador, India
IRRI	Philippines (22.0%), Cambodia, China, Bangladesh, India	Vietnam, India, Philippines (10.9%), China, Bangladesh
IWMI		Sri Lanka (15.8%)
WARDA	Cote d'Ivoire (52.0%), Guinea, Ghana, Mali, Burkina Faso	

* Percentage of host country national given in brackets

The countries chosen for visits and country study were also among those that had received a relatively high volume of individual and group training from more than one Center[15].

The relative changes within each region are shown in detail in VI. The training of Indian nationals has increased and was in 1999-2004 nearly 50% of all Asians. Training of Chinese and Indonesians has also increased, while training of Vietnamese and Philippine nationals has decreased. In Latin America the relative increased has been highest in Colombia, while most others have decreased, including trainees from the countries chosen for case studies, Ecuador and Bolivia. In Sub-Saharan Africa the training of different nationals has remained at similar levels with a slight increase of Kenyans and a slight decreased of Ethiopians. In CWANA training of Syrians has decreased in relative terms in 1993-1998 and 1999-2004 as compared to 1990-1992 while training of Iranians increased.

All Centers have been training individuals in Asia and SSA. In terms of which Centers were involved in training in each region, individual trainees from Asia were trained by ICRISAT (34.4%), IRRI (29.7%) and CIMMYT (19.2%). The contribution of the other Centers ranged from 0.1% to 4.9%. In SSA WARDA and ILRI both trained 20.4% of the individual trainees, followed by IITA (16.9%), CIMMYT (13.3%), ICRISAT (9.5%) and ICRAF (8.8%). In Latin America, most individual training was been done by CIAT (37.9%) and CIP (36.2%). Except for CIMMYT (18.5) and IPGRI (4.7%) the contribution from other Centers was 1% or less. In CWANA ICARDA trained the vast majority of individual students (77.8%) followed by CIMMYT (8.8%), IPGRI (5.7%) and ICRISAT (4.1%). All Centers trained developed country nationals, CIAT (14.7%), CIMMYT (11.6%) and ICRAF (10.6%) being the biggest contributors.

3.5   Training themes

The training themes were analysed for group and individual training on the basis of the course, thesis or job title provided in Center records. Training was classified in 12 general theme categories: Agroforestry, Breeding, Biotechnology, Crop Production, Crop Protection, Genetic Resources, Livestock, Methods, Natural Resource Management (NRM), Post-harvest, Seed and Social Science. All training topics not specific to any particular area of research were classified under Methods. In individual training Methods accounted for a very small proportion (see section on *Themes in Individual Training* below).

Theme information was available for the majority of group events and individual trainings. Because both the group training events and the individual study periods were of highly variable length, the volume of training in the different themes was analysed as trainee days and as number of participants[16]. Total trainee days reflects the actual volume of training more accurately than the number of events or participants, while the latter is a better reflection of the breadth or coverage of the audience trained. The results of the group and

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[15] In Asia: Vietnam (4th most common nationality considering all records), Thailand (7th); Latin America: Bolivia (3rd), Ecuador (4th); in SSA: Kenya (1), Cameroon (8th), Malawi (9th).

[16] Trainee days data for themes were available for 54% of the group and 76% of individual trainings; participants data for themes was available for 81% of the group and 78% of individual trainings. For group training the trainee days could not be calculated for IRRI and IPRGI. For individuals, the data on length were very limited from CIMMYT and ICARDA. Livestock is probably underrepresented, because records for ILRI seemed to be missing.

individual training are given in Tables 3.5 and 3.6, respectively. Data are presented in overall percentages for each theme for the period 1990-2004 as a whole, and then ranked in order of relative importance for three periods: 1990-1992 when records tended to be erratic, and in 1993-1998 and 1999-2004 when records were judged to be relatively complete. Details of themes by Center are given in Annex VII.

Analysis of the data by length of training gave similar results for group and individual training, but analysis by number of participants showed different themes as the most common ones, as illustrated in Table 3.5 for group training and Table 3.6 for individual training.

Themes in group training
As the data in Table 3.5 show, even in the absence of IRRI data[17], there has been a clear predominance of Crop Production and Breeding in each of the three time periods in terms of trainee days, although the relative numbers of participants fell in recent years and also the volume of training in Breeding fell. Methods was important throughout, and ranked highest overall in numbers of people trained, accounting for 16.2% of the total training 1990-2004. The main change was the relative increases in terms of volume in Social Science (from rank 9 to 6 to 2) and Livestock (from rank 12 to 10 to 5) and relative decrease in Crop Protection (from 5 to 4 to 9). The change in livestock is partly explained by missing data on course length in the early years and by the events having been relatively long.

The most important changes over time in the coverage of people trained were the relative increases in Seed, Social Sciences and NRM, with decreases in Crop Production, Breeding and Crop Protection. Agroforestry became the second ranking theme in numbers of people trained in 1999-2004, due to the vastly increased training of ICRAF. In some cases the breadth of coverage was not reflected in the amount of time (i.e. trainee days) dedicated to the theme. This indicates that the nature of training may be different depending on the themes; training of Breeding, Biotechnology and Livestock involves more often long study periods for relatively few people with an aim at in-depth competence in the theme, while training of Agroforestry, NRM and Methods may have been more orientational, or aimed at enhancement of a particular skill or aspect of the theme. Genetic Resources, then, is a theme where the target audience is smaller than for the other themes.

A breakdown of the Methods category, shown in Annex VIII, indicates that Statistics/Data Management accounted for the highest numbers of participants and trainee days, especially if added to Experimental Design, which was classified separately. Together these sub-themes explained about 30% of the Methods category in terms of trainee days and numbers of participants over the whole period.

The theme Methods could be considered least associated with the research activities of the Centers. It has, however, remained a common theme accounting for over 11% of all group training in 1999-2004. The prevalence of this theme does not seem to reflect the shift of training function and funding to research programs as it has remained near the top among

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[17] Trainee days could not be calculated

group training themes as judged by participant numbers and even in terms of group training volume. In volume, the emphasis has been in methods, such as Research Management/Process, Experimental Design and Statistics/Data Management, where the Centers may have particular expertise and relevant orientation due to their research agenda. The Centers may be the sole providers also in themes such as Information Technology, Scientific Writing and Training & Education, which are among common Methods taught, even if these training themes may be completely removed from the Center's research focus.

Table 3.5 Relative importance[18] of different themes in group training, in terms of trainee days (td) and numbers of participants (p)

	1990-2004		1990-1992		1993-1998		1999-2004	
	% td	% p	ranking (td)	ranking (p)	ranking (td)	ranking (p)	ranking (td)	ranking (p)
Crop Production	25.6	13.5	1	1	1	4	1	4
Breeding	13.4	5.8	2	5	2	8	4	7
Social Science	12.1	9.2	9	8	6	7	2	5
Methods	11.3	16.2	3	2	3	1	3	1
Crop Protection	6.4	8.5	5	4	4	3	9	8
Biotechnology	6.1	3.1	10	12	5	10	7	10
Livestock	6.0	1.2	12	11	10	12	5	13
NRM	5.9	12.7	8	6	7	2	6	3
Seed	4.6	8.7	4	3	8	5	8	6
Post-harvest	3.2	3.8	7	9	9	9	11	11
Genetic Resources	2.7	6.5	11	10	11	6	10	9
Agroforestry	2.0	9.4	6	7	12	11	12	2
Other	0.7	1.5	13	13	13	13	13	12

Themes in Individual Training
In individual training Crop Protection, NRM and Breeding were outstanding in importance, with little relative variation over the three time periods. In 1993-3004 Biotechnology ranked third in terms of participants. The main changes were shown in the decrease in the relative importance of Crop Production and Livestock. In contrast to the picture shown for group

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[18] Importance here refers to prevalence over the study period, and it is recognised that while themes may be of equal importance the target audiences are not equally large for each theme.

training, Methods was of only moderate importance for individuals, especially in terms of trainee days (3.2% of total trainee days).

Table 3.6 Relative importance of different themes in individual training, in terms of trainee days (td) and numbers of participants (p)[19]

| | 1990-2004 | | 1990-1992 | | 1993-1998 | | 1999-2004 | |
	% td	% p	ranking (td)	ranking (p)	ranking (td)	ranking (p)	ranking (td)	ranking (p)
Crop Protection	18.7	17.3	2	1	2	1	1	1
NRM	17.3	12.5	3	4	1	4	3	4
Breeding	15.6	14.8	1	2	3	2	2	2
Biotechnology	11.1	12.5	6	8	6	3	4	3
Social Science	9.5	8.3	5	7	4	7	5	5
Crop Production	7.9	6.8	4	3	5	8	8	8
Agroforestry	6.0	3.4	9	12	8	9	6	9
Genetic Resources	5.8	7.3	8	10	7	5	7	7
Methods	3.1	8.2	10	5	10	6	9	6
Livestock	2.1	3.2	7	6	9	11	13	11
Post-harvest	1.5	2.0	12	11	11	12	10	12
Other	0.7	0.7	13	13	12	13	12	13
Seed	0.7	2.9	11	9	13	10	11	10

3.6   Informal Training

Informal training and learning has not been documented traditionally in the CGIAR, and this report appears to be the first that has attempted to quantify its importance. As will be shown in Chapter 6, researchers estimate that they spend an average of 12% of their total time on this, which is about the same as on formal training activities (13%). To gain some insight into what informal learning opportunities have arisen in the course of a collaborative research project, an example is shown in the Ecuador Case Study 1, which describes Center staff leadership and advisory roles, as well as visits to and from the Center for purposes other than formal training. Taken together, the activities described suggest an extremely important

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[19] Data on length were very limited from CIMMYT and ICARDA that have the highest individual trainee numbers. The volume of breeding, crop production and protection, and NRM, that have been frequent themes with those two Centers, may therefore have been even higher than shown here.

learning contribution through leadership, advice and mentoring. It is significant that one of the most consistent features of the Country visits was the importance trainees and partners attached to the informal learning which takes place through, for example "learning from colleagues on the job" or the long-term working relationships which have frequently developed between Center staff and trainees. Testimony to this effect is provided in the case studies (e.g. Bolivia, Cases 2, 4). Given the importance of this activity in terms of staff time, and its perceived value to the trainees, it is inconsistent that there are apparently no processes in place in the Centers to plan, document, monitor or evaluate it.

3.7 Conclusions on data and data collection

Conclusions on data systems
Data bases have not been kept systematically by all Centers. Some were discontinued during the 1990's, presumably in association with the reduction of core funds to training, and although others have been introduced recently, there is still no minimum essential data set recorded routinely across the CGIAR Centers, or even within most individual Centers. Consequently, basic information required for decision making on training within the CGIAR system is lacking. One of the most significant gaps is meaningful information on who has been trained, and their functions in the overall system. For example, it would be useful to have a breakdown between policy makers, researchers, extension workers and farmers. The records available at present have been collected for a particular purpose, such as annual or project reports, and records contributing to the analysis in this study were for some Centers obtained from many different sources. Commonly, fields in a database have not been filled. Spelling mistakes and entries in variable formats (e.g. dates) can make sorting and querying impossible. Lack of information on the costs of training also reflect a disconnection between financial planning and reporting and program planning and reporting.

Overall these shortcomings seem to indicate a lack of appreciation of the benefits of systematic record keeping, lack of communication between database managers and those organising the training events, or entry of data after an event when details are no longer available. There is a clear need to define a minimum data set for use across the Centers, with simple but useful classifications of key items (such as trainee type) which will permit easy sorting and meaningful interpretation of the results in future. These should be agreed upon by stakeholders so that improvised requests for information in different formats are avoided. Implementation of such classifications will need to be backed up by systems capable of delivering information with consistency and accuracy.

The current state of data-gathering and monitoring systems with regard to training and learning in Centers also seems to reflect a lack of incentives to do this well and a perception that this is not an activity valued by the CGIAR as a whole.

Conclusions on available data
Among the notable trends in the results, there seem to be increases in the numbers of group training events and numbers of participants in about half of the Centers, some of which have showed a massive expansion in group trainee numbers, due partly to training farmers and extension workers. A more stable pattern over the years is shown for individual training. The information on nationalities shows a high proportion of host country trainees at most

Centers, and a less than clear relationship between intensity of training and poverty levels. However, the latter may reflect a relatively lower number of suitable candidates from the poorer countries, rather than a lack of intention to support them on the part of the Centers. But the fact is that some individual countries, including some of the poorest (e.g. in LAC, see Country Studies) have experienced a sharp reduction in training of all kinds. The relatively high proportion of developed country trainees (12%) is notable. It may be partly due to donor preferences and availability of suitable scholarships to support the trainee, as opposed to Center policy, but appears to have reached levels which merit revision in some Centers. With respect to training themes, one of the most controversial aspects refers to those which are often considered outside the Centers' comparative advantage. The present results suggest that these in fact correspond to a small proportion of total trainee days, especially in the case of individuals.

With respect to training themes, the results show distinct trends over time in their relative importance for group and individual training, although the traditionally predominant themes in both cases remained fairly stable. Thus, the rise in relative importance of themes such as Social Science (group) or Biotechnology (individual) was not at the expense of drastic declines in the older subject areas such as Crop Production (group) or Crop Protection (individual). One of the most controversial aspects refers to the subject areas which are often considered outside the Centers' comparative advantage. The present results suggest that these in fact constitute a small proportion of total trainee days, especially in the case of individuals.

4 RELEVANCE OF TRAINING AND LEARNING

This chapter assesses the relevance of training and learning to strengthening NARS capacity. It begins by discussing how relevance and capacity are understood in the CGIAR and more widely; reviews the evidence collected in the course of this study as to the commitment of Centers to capacity strengthening; the perception of relevance by the NARS; considers some of the factors that appear to be shaping NARS prioritizing and which constrain what Centers are able to achieve; and finally draws overall conclusions and suggests measures that the CGIAR Centers might adopt to further improve the relevance of their training and learning activities to NARS strengthening.

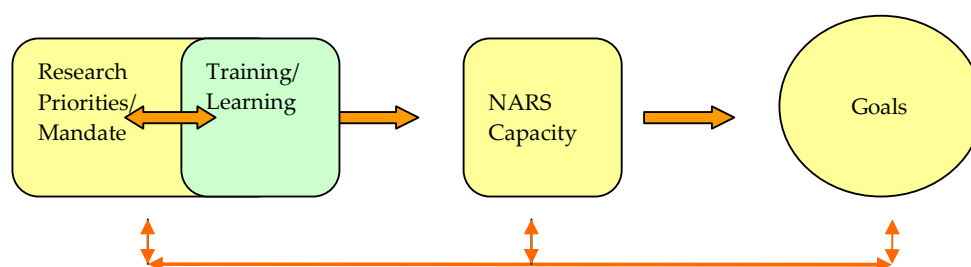### 4.1 Defining the relevance of training and learning

The Panel defined the relevance of training in terms of ´its applicability to strengthening NARS capacity to undertake collaborative scientific research to realize the goals of poverty alleviation, food security and sustainable production´. Consonant with the global mission of the CGIAR, training activities should also meet the ´international public goods criterion´ (Inception Report, 2004).

Implicit in this definition are assumptions regarding:
- The role and contribution of training and learning in capacity strengthening;
- The nature of 'capacity' itself; and
- The goals being pursued and to which ends capacity is deployed.

Thus capacity is viewed in terms of its contribution to NARS being able to undertake agricultural research; and links are made to the broader goals which NARS indubitably share with the CGIAR in relation to hunger, poverty and environmental sustainability. In the CGIAR where training and learning is nowadays mainly decentralised to researchers and closely integrated with Centers own research strategies and mandates many interconnections need to be taken into account. A simple model would then link the four elements of training/learning, research strategy, capacity and goals as shown in Figure 4.1.

Figure 4.1 Model of training relevance

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In this representation training and learning related activities, in the context of Center research priorities is directed at strengthening NARS capacity, which then allows the NARS to pursue the shared goals. Relevance is a process of delivery (large arrows) and alignment, as indicated by the smaller, feedback arrows. Alignment refers to a matching process that requires information, gathering, prioritisation and mutual adjustment. Whether or not the contribution of Center training and learning outputs is relevant to capacity strengthening of the NARS, depends partly on judgements about what is delivered but also on the robustness of the mechanisms in place to decide on priorities. The next section of this chapter therefore considers what Centers see themselves as delivering by way of capacity strengthening and then assesses processes of alignment – the decisions made intended to ensure that training is consistent with the needs of NARS.

What is delivered through the means of training and learning to strengthen NARS capacity depends on how capacity is conceived. In the wider literature on institutional capacity strengthening (see for example: Capacity Development, UNDP Technical Advisory Paper 2 1997, Horton, Douglas et al Evaluating Capacity Development ISNAR, IDRC, CTA 2003), it is common to conceive of capacity at three different levels:
- individual capacity and skills;
- organisational capacity, including management arrangements; and,
- inter-institutional capacity, including networking.

All of the above are embedded in an 'enabling environment'. The panel has considered all three levels of capacity – the individual, organisational and inter-organisational in questions asked in questionnaires and the checklists for NARS fieldwork and case studies. The wider 'enabling environment' has also been taken into account in national overviews and in comparing training and learning results at a regional level in Africa, Latin America and Asia.

For CGIAR Centers, training activities nowadays derive from and are usually integrated with Center mandates and research priorities. Decentralisation to researchers and research programs is the norm. However there are also the goals of other parties to consider. In the first place NARS have goals - which may be better or less well articulated - and which may or may not overlap in their entirety with Center mandates and priorities. Furthermore there are the main goals of the CGIAR – sustainable agriculture, poverty reduction and food security – the salience of which will differ across different Centers and different parts of their research and training portfolios. Thus whilst in both figures below there is a high level of coherence between Center mandates and training and learning inputs, there is a greater consistency between NARS priorities and needs and Center training and learning inputs in Figure B than in Figure A. It is also assumed in Figures A and B that CGIAR goals are always broader than those of any one Center.

The implications of the different configurations represented in Figures A and B are discussed below.
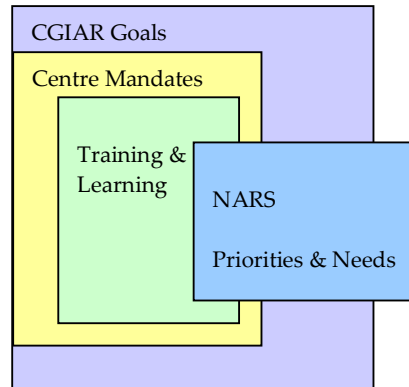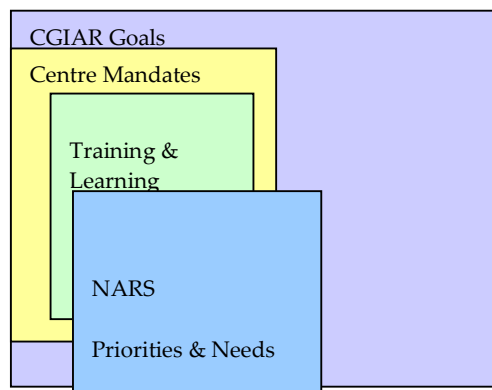
Figure A

Figure B

4.2   NARS capacity strengthening as a Center priority

Questionnaire surveys and case studies of NARS and Centers all confirm that NARS strengthening – including through training and learning - is a priority in the CGIAR. This is reflected in policy and strategic plans and backed up by the views of researchers. When asked to rate the importance of 'training and structured learning activities aimed at NARS strengthening' for their Center over 85% of researchers responding to questionnaires rated this as 'important' or 'very important'. When asked to assess the importance of capacity strengthening for their own research, 68% rated it as 'important' or 'very important'. Outcomes of training and learning were also reported by researchers responding to questionnaires to include all the different aspects of capacity strengthening from 'trainees' career opportunities are improved' to 'new capacities and skills embedded in NARS' and 'new networks created'.

Similarly, according to Training Officers (or focal points) institutional strengthening is judged overwhelmingly (by 96%, 29 out of 30 respondents) the 'most important output of

Center training'; and the two most important criteria in deciding the kinds of training that takes place are 'Center's mandate' and 'Demand from NARS'. This is reinforced by the trainee survey data: most trainees were employed by NARS when beginning their training and most of them were encouraged to participate in training and learning by their employers.

Perhaps the main inconsistency between the Centers' declared commitment to training and what happens in practice, is evidenced by the generalised reduction of unrestricted funds to training during the 1990´s, which affected the training units, services and support. Given the budget reductions, Centers chose to channel funds out of training to sustain other activities. Some of these, such as gene bank maintenance which was also severely underfunded, are far less resilient than training to budget fluctuations, and in this sense the decisions were justified. But the experience suggests that the Centers´ commitment to training has in fact been strong up to the limit where the continuation of training related activities puts at risk other vital long-term functions which are even more essential to the research mandates. A second inconsistency is that a majority of researchers (55%) report that there are few positive incentives in Centers to become involved in training and learning activities. This was explained and elaborated in open-ended comments:

Performance evaluation is stacked grossly in favour of research, very little to gain by doing training - No clear institutional messages that training is important - No or very little funds - Institutional culture views capacity building as soft and not important

Upper management never mentions training. General feeling is that training is no longer considered a priority. That functions as a potent disincentive.

We, at (Center X), consider training a very important function. Past decisions to stop training and close the training unit have been detrimental to (our) linkages with NARS and have hindered important gains in our capacity development role.

The importance given to the production of refereed Journal papers is too high in comparison to the importance given to the impact produced by contributing directly to partners through training.

However, against this, there is also the evidence that researchers have spent increasing time on training in recent years (see Chapter 6.2) and that a high proportion of them consider training an essential component of executing and refining their research. So the lack of incentives described above may well have dissuaded researchers differentially. (See below section 4.3 for more detailed analysis.)

The above paints a fairly consistent picture of the Centers' formal commitment to capacity strengthening often expressed through training and learning activities which are, in turn, perceived as relevant to the needs of the NARS. However as we have seen in practice Center policies are not always consistent with the formal commitments expressed.

Capacity strengthening cannot only be addressed through training and learning. Capacity also involves resources, equipment, management arrangements, policy support etc. Centers endeavour to enhance the relevance of the training through various strategies to cover the other capacity strengthening requirements e.g. by including them in collaborative project planning. Evidence on this is given, for instance, by the increasing amounts of 'flow through' funds managed by some Centers (e.g. up to 80% of a given project's funds goes to NARS at ILRI). At the same time 72% of researchers regarded 'inadequate resources in NARS/NARI' as constraining the take-up and impact of their research. Furthermore in the course of field-work in SSA the Panel encountered many instances where those trained were unable to use what they had learned because of lack of operational resources – a reality affirmed by questionnaire results, and discussed further below in relation to outcomes and impacts (see Chap. 7).

A major concern expressed in the Center interviews concerns the relevance of present-day training through project funding to longer term institutional capacity needs. In the short term, project funding may help ensure that inputs such as equipment and operational resources are provided to complement the training provided. But over the longer term, the strength of the institutions may suffer because it has become more difficult to form a 'critical mass' of researchers in a given area, or to form multidisciplinary teams who would sustain research and be a force to influence institutional and political change. The importance of these contributions is illustrated in some of the cases studies which had major impact at institutional and field level (e.g. Bolivia, Case studies 1, 2). At the same time, projects are frequently too short to accommodate higher degree training, which may be in the best interest of the trainee and their institution.

4.3   Criteria for judging relevance

Relevance is generally judged by Centers in the context of their collaborative research programs with NARS. Both CIP and IRRI for example regard training as relevant to those areas of NARS research which are shared with the Center. Relevance here is both in relation to implementing research (i.e. ensuring that data can be collected and field-trials organised) and encouraging the adoption of new techniques and knowledge. This view is supported by many researchers:

> *Training & capacity building are essential complementary to research and are essential for enhancing food production and facing starvation in most of the developing nations. Quality research cannot be implemented without qualified staff members and therefore more funding and other resources need to be allocated to these important activities.* (Open ended comment in Researcher Questionnaire)

A deeper analysis of questionnaire data as to the rationales of researchers for undertaking training and learning activities, throws further light on their perceptions of relevance. Researcher responses suggest that:

- Those who regard formal training as important for NARS capacity strengthening are highly likely to regard skill shortages in NARS as a constraint on the take-up and impact

of their research (p < .000). On the other hand those who regard skill shortages as a constraint may still spend less time than average on formal training.

- Those who consider the lack of skills in NARS as an important constraint for research, also consider informal training and learning as important (p <.002). However as with formal training this does not mean that the researcher concerned spends a high proportion of his or her time on informal training/learning activities.

These results tend to confirm that for researchers the justification for training and learning activities with NARS is complementary to their research.

However, a much wider interpretation is assumed by some of the NARS. This is reflected in the report of the recent internal review of ILRI´s Capacity Strengthening Unit, which quotes criticism from NARS representatives that the training is too project-driven, rather than needs-based (Youdeowei *et al.,* 2005):

> *'The majority of the training programs were not directly related to the needs of the NARS programs. Rather, most of the training programs are based entirely on ILRI's approved research projects. The effect of this bias for ILRI's research program focus in training, has tended to limit the impact of ILRI's CaSt activities on livestock development in the region.'*

If relevance is assessed in terms of the extent of overlap of Center research goals and associated training with NARS needs – and the career needs of NARS researchers - then most CGIAR training can be judged as relevant.

However, when the needs of the NARS extend beyond Centers´ research priorities, as they often do, different conclusions can be drawn, as suggested by the ILRI case cited above. Nevertheless, given Center mandates and funding, it would be unrealistic to expect a response to the broader NARS´ needs in such instances. Training outside the bounds of the research agenda would, by definition, be outside the Centers´ distinctive competences. But in SSA, in particular, this poses strategic questions for the CGIAR as to whether more can be done to reconcile poverty reduction (including the toll of HIV/AIDS) and the Centers´ mandates narrowly defined. The Panel heard different priorities voiced by NARS' representatives as to criteria against which the relevance of CGIAR training should be judged. Some clearly wanted Centers to respond to NARS needs even if they fell outside of Center research mandates, often regarding Centers as among the few agencies with a capability to respond to their needs.

Other problems of 'relevance' arise when the NARS re-orientate their priorities to match the priorities of the CGIAR Centers. The concern here is: what does the NARS give up in order to pursue priorities such as 'building capacity in molecular biology' in Africa? Is it to the detriment of national institutions? Does it divert their efforts from what they ought to be concentrating on? This can be regarded as a NARS problem of inadequate priority setting. However when resources are very limited, quite modest funding can be sorely tempting for NARS. Similar dilemmas face the weaker NARS in Latin America.

4.4   Priority setting in Centers and the NARS

NARS have different capacities, strengths and deficits, which also implies different capacity strengthening needs. Furthermore capacity needs change over time as priorities shift and countries and their NARS develop – or experience setbacks. The ability of Centers to differentiate between the needs of different NARS and to shape and adjust their inputs as needs change, is therefore an important indicator of relevance.

The alignment of training and learning with NARS needs and priorities can be assessed in a number of ways, including:
- The existence in Centers of training plans that are regularly updated and that specify priorities at a sectoral and national/regional level;
- Regular consultation with NARIs and other partners as to priorities which may be both formal and institutional or occur among scientists working together in networks or collaborative research;
- Integrating training needs analysis into project planning.

Surveys of those responsible for training in Centers indicate that:
- Of the 12 Centers identified, 7 report that they have a training strategy or plan – others report that this is incorporated into broader Center strategies and plans;
- Most report that their strategies have been updated within the last 2 years;
- Regular consultation with NARS is rated as an important influence on these strategies.

However, those responsible for training (training Officers/focal points) are less confident that consultation with NARS occurs in practice even if it is regarded as important: 17 out of 29 respondents said that 'regular needs analysis and priority setting with partners' did *not* usually take place in their Center.

Since the demise of most Center training units and programs and the insertion of training into projects, the processes in place to ensure the relevance of training have changed. Some Centers that the Panel visited, such as IRRI and CIP, retain center-wide procedures for assessing training needs and rationalising activities across subject areas and across regions. Even in these cases, some difficulty has been experienced in applying these procedures routinely, because of the decentralization of training. More commonly, needs assessment is carried out at the project level and the effectiveness with which this is done is, consequently, variable between projects within a given Center as well as between Centers.

Case studies at CGIAR Centers confirm these general findings. For example:
- There are well developed consultation procedures – at least on paper -with NARS in most Centers visited by the panel. Annual bilateral consultations; questionnaires to NARIs; consultative groups or committees are said to be used to identify priorities.
- There is evidence that Centers shift the focus of their activities, between topics and between NARS as needs change and as they respond to feedback. Thus IRRI has reduced activities in Thailand and Vietnam but increased efforts in Cambodia and Laos.

The panel also noted in the course of field visits that well-documented procedures for consultation and prioritisation in Centers are not always consistently followed, e.g. a supposedly annual process might not be implemented for several years.

4.5   Factors shaping NARS priority-setting

Where Centers work with NARS to set priorities for capacity strengthening and training and learning, they are dependent on the NARS´ ability to undertake a national needs analysis and set its own priorities. This does not happen effectively in all NARS. Thus in Bolivia, a country that has experienced considerable political turmoil in recent years, the national agricultural research institution (IBTA) was dissolved in 1998. Despite the creation of decentralised, market-driven successor bodies, it was the view of country based informants that there was now no 'voice' or coherent expression of demand across the country. International research trends and project funding were seen as the main determinants of training 'needs'. The lack of firmly articulated priorities also explains, at least partly, the few cases encountered by the Panel where there was a perception on the part of the NARS that Centers impose their priorities, or even make use of the NARS for carrying out their own agenda (e.g. Ecuador Country Study). This kind of institutional weakness observed in certain cases in SSA and LAC contrasts with the situation in the Greater Mekong Basin. In the latter case, relatively strong NARS claim to have been able to articulate national priorities more effectively. As one government official observed: 'Whatever training the CGIAR does in this country is consistent with national priorities and has been agreed with (the NARI).'

It is difficult to generalise about the extent to which training priorities integrated with research priorities become distorted by the availability of donor funding for projects. Survey results for TOs and focal points, suggest that whilst donor priorities are not very important (an aggregate score of 3.5 on a scale of 1-5) availability of funds is seen as more important (4.3 on the scale). Case studies of Centers suggest that the non-availability of funds is the most likely explanation of what occurs on the ground. From country based partners there was more awareness of this actually or potentially occurring, and some evidence that it was skewing the priorities of Centers. Certainly the highly erratic peaks in certain kinds of training activity shown in Chapter 3 suggest a response to funding opportunities rather than the result of systematic planning.

NARS ability to undertake needs analyses and put forward a coherent plan also interacts with the security as well as the scale of funding. Strong NARS with secure own funding and support at policy levels are better able to plan and prioritise than those without secure funding or political support. Similarly those with longer term project funding from a donor that 'is in it for the long-term' are better placed than those dependent on short-term funding. Donors such as Rockefeller Foundation in Sub-Saharan Africa and the Swiss Development Corporation in S.E. Asia and LAC were among those identified as supporting NARS over the long-term and thus allowing NARS to develop reasonable planning horizons.

4.6   NARS' perception of relevance

Given the obstacles faced by both NARS and Centers in defining appropriate training plans, the Panel collected evidence from various sources on the NARS' perception of the relevance of the training actually carried out.

In the first place, as mentioned above, most of the NARS' trainees who responded to the survey, undertook their training with encouragement from their employers, which suggests confidence on the part of their institutions that the training would meet their needs. The trainees themselves reported reasonably high rates of positive outcomes at the personal, institutional and broader levels as shown in Chapter 7. However, as pointed out initially, some positive bias must be included in these results, and the proportions of negative perceptions varied from about 30% to about 60%, depending on the criterion and the region These cases could be considered attributable to lack of relevance, but they were often associated with a lack of opportunity to put trainees' newly acquired knowledge and skills to use afterwards (7.2). So it is arguable that inadequate post-training provision and inappropriate candidate selection were as much to blame as irrelevance of the training. A similar interpretation seems valid for the different levels of trainee 'wastage' described in the country reports. Thus, high levels of wastage in Ecuador or Malawi (DARS) contrast with excellent retention rates of trainees in Bolivia (PROINPA) or Thailand for reasons more likely to be related to institutional health than to different degrees of relevance of the training. This is consistent with the 'model' outlined at the beginning of this chapter which suggest the difficulty of isolating training and learning from the way provision is aligned with 'needs' and ultimately the ability to use what has been learned. (This latter topic is further elaborated in Chapter 7.)

Additional evidence was obtained in the Country Case Studies. Significantly, two cases where the training was initially considered not relevant to local needs at all, were eventually recognised to have highly successful institutional and field outcomes (Bolivia, Case 1; Ecuador, Case 3). In others, there was some perception that the training satisfied the needs of the Centers' research agenda more closely than the needs of the NARS (Ecuador Country Report; Bolivia, Case 4). This contrasts with the very high degree of relevance evident in the Kenya dairy case study (which became a model in tropical livestock production. While this evidence is anecdotal, it raises again the issue of the precision with which NARS define their needs, against which the relevance of the CGIAR training can be judged, but cases where there is perceived to be a clear contradiction have, in the Panel's experience, been rare.

4.7   Conclusions

In general the Panel concluded that CGIAR Center training is broadly relevant to the capacity needs of NARS. Centers are formally committed to capacity strengthening; and many researchers within Centers as well as those with some responsibility for training and learning (Training Officers and 'focal points') are evidently dedicated to helping NARS strengthen their research base. It has also been argued by some researchers that relevance has been reinforced in recent years by the decentralisation of training to Center researchers

who are now more closely involved in specifying training to match the needs of collaborative research projects.

This broadly positive assessment needs to be qualified however, in three ways:

- First, what happens in practice does not always match formal commitments. There are few incentives to become involved in training and learning according to a majority of Center researchers. The close-down of training units and programs in many Centers has reduced the ability of Centers to plan, coordinate and monitor relevance. Long established processes of joint planning and consultation between NARS and Centers are in some Centers now less used than they once were.
- Second, funding arrangements and in particular the growing dependence on project funds can affect relevance. In some Centers project funding has been said to increase relevance as researchers are now more committed to training and learning activities that are integrated into collaborative research. However the short term nature of some project funding can undermine NARS' capacity by reducing the time horizons for planning and investing and by subsidising operational investments that are not sustained once the project ends. Where NARS are weak and under-resourced it is also possible for Center led project priorities to distort NARS own priorities – pushing them in the direction where funds are available.
- Third, judgments as to relevance depend on the criteria used. Judgments are most positive if one stays within the parameters of Centers' research mandates. However where the needs of NARS do not closely overlap with Centers judgments will be less positive. This may be the case if NARS's priorities are broader than those of any one, or all, the Centers, even though coinciding with broader CGIAR goals such as poverty reduction or alleviating hunger.

The Panel takes the view that it is justifiable to assess the relevance of training within the parameters of the Centers' research programs. This does not imply ignoring broader NARS' capacity needs, but these must be addressed in collaboration with other agencies with a different, complementary or more development-orientated mandate. The challenge is greatest in SSA and a commitment to capacity strengthening in this region may require innovative approaches to the delivery of training that goes beyond the strict requirements of Center mandates. The most immediate way to improve relevance is put in place standardised needs-assessment protocols across the full range of the Centers' collaborative research projects. At the same time, there is an evident need to assist some NARS in the establishment and articulation of valid priorities, which the CGIAR can then seek to complement and support.

5 QUALITY OF TRAINING AND LEARNING

This chapter assesses the quality of teaching and learning in the CGIAR. It begins by reviewing how quality is defined in the field of vocational education and training (VET) considering both outcome and quality assurance (QA) approaches. This sets a framework for the evaluation approach adopted in this study by the Panel. The chapter then considers the QA methods that are used in Centers including how they are applied and to what types of training and learning. Feedback from ex-trainees is discussed in terms of their satisfactions with training quality and the utilisation of what is learned. Finally in the concluding section recommendations are outlined as to how training quality might be improved.

5.1 Defining quality

Quality in education and vocational training is difficult to define, describe and measure for a number of reasons. There are fundamental differences in approach between those who favour an output model[20] that looks for quality criteria against standards and a process model that seeks to establish that procedures are in place to assure quality. Output models confront questions about what standards and criteria to use – knowledge acquired, student/trainee satisfaction, competencies, usefulness in post-training settings; and whose judgements count most: trainers, trainees, employers and at what point in time these judgements are best made. (For example there are many evaluations in training institutions including IARCs that depend on end of course responses rather than longer term follow-up.) Process models follow training through from needs analysis to trainee selection, course design – including pedagogic aspects, delivery, feedback etc. These approaches also have their difficulties – although they have become the preferred approach to evaluate education and training[21]. In particular linking processes with outcomes has in practice proved to be difficult: how do we know whether a pedagogically 'good' course leads to better outcomes.

As was noted in the Inception Report for this study the diversity of training – which includes PhDs, Masters Degrees, training of trainers, group courses, experiential/informal and work-based learning – poses additional difficulties in assessing training/education quality in the CGIAR. It was seen as unlikely that identical judgements could be reached for all the different categories of CGIAR training and learning – as has proved to be the case.

The 'model' adopted in this study is a pragmatic compromise among the alternative and sometimes contested approaches referred to above. This consists of:
- *An assessment of the ways in which Centers implement training and learning*. This relies mainly on an examination of the systems in place to assure quality from trainee selection through to curriculum development, delivery and follow-up. This assessment draws mostly on case-studies of CGIAR Centers, questionnaires to Training Officers/focal points and where available EPMRs and 'impact assessments'.

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[20] The most well known example of an 'output' model is probably that associated with Kirkpatrick (1967) although competency models that focus on the capability of trainees (Marrelli, 1998) have now become more accepted.

[21] See for example the EU's 'Copenhagen' Process. (Copenhagen Process: First report of Technical Working Group European Commission, Brussels, October 2003.)

- *Feedback from trainees and partners*. This includes feedback on their satisfactions and assessments of quality as well as the reports on 'outcomes', e.g. usefulness of what was learned for their subsequent work and careers. This relies mainly on questionnaires to ex-trainees and partners and some contact with trainees in the course of fieldwork in Centers and Countries.

5.2   Methods of quality assurance in Centers

The survey of Training Officers (or 'focal points' where no such role existed) were asked how the quality of training was assured in their Center.

Table 5.1 Training officer survey: question 18

By what means does your Center assure the quality of the training it provides? (N=36)	
Feedback from individual learners	27
Feedback from partner organisations	19
Peer review of training materials	18
Feedback from University partners for PhD & MSc students	14
Updating trainers´ methodological skills	11
Indicators as part of an evaluation system	9
Independent evaluations	7
Applying an explicit, written QA system	6
No explicit quality assurance	3

Obtaining feedback from learners, feedback from partners and peer review of training materials were reported as the most common approaches to Quality Assurance (QA). However there was much less priority given to obtaining feedback obtained from PhD and MSc students than from course attendees.

In the course of visits to Centers the Panel was able to confirm that these means of QA did in fact occur. However field visits to Centers and Countries also highlighted difficulties in practice. For example:
- There was less feedback obtained from individuals and very little from those involved in practical experience-based learning e.g. in field-stations or labs.
- There was virtually no feedback from in-country activities, which given decentralisation and their importance in CGIAR training and learning, constitutes a major gap in coverage.
- Nearly all QA processes referred to, applied to course attendees – there was little or no QA for other forms of training, education or learning.

With the decentralization of training to researchers, the results of whatever feedback is obtained remain in the scientists´ domain and are not necessarily incorporated into institutional measures to improve training quality.

The table above also suggests that independent evaluations play a minor role in quality assurance. This was corroborated by the Panel. In their view, EPMR´s have generally paid very little attention to training quality or to processes in place at the Centers for monitoring

it. At the same time, Centers have made relatively little use of internally commissioned reviews to cover this area, and those carried out have, in many cases, had two defects: first, a lack of independence and second, the reliance on survey data without due recognition of the positive bias in the results which this is likely to produce (see Annex III for a summary).

Those responsible for training and learning in Centers were also asked in questionnaires to rate what they regarded 'as important to support training quality' and to contrast this with what happened in practice. There were some notable discrepancies, particularly so for the following items:
• 'Regular needs analysis/priority setting with partners';
• 'Training/learning expertise to advise on training methods';
• 'Training facilitated by specialists in adult learning';
• 'Screening of applicants to get the right trainees'.

All of these were seen as important for quality but not occurring in practice by a majority of respondents. The absence of pedagogic expertise - in training methods and adult education is especially striking.

Deficits in quality were often attributed to the demise of training units and training officers in many Centers. Strengthening training units is also seen as a priority by researchers responding to the Researchers' Questionnaire Survey – although from discussions with researchers the kind of training units foreseen are different from those that previously existed. Results for researchers who responded to questionnaire items on quality are shown in the table below with their rating of factors seen as most important to raise quality ranked from the highest to the lowest.

There is only limited agreement between researchers and those responsible for training as to many of the ways that would ensure quality. Furthermore aggregate results for researchers are less emphatically positive, probably because of differential levels of involvement in training activities. Researchers are most keen on measures that involve them and less enthusiastic for those that might imply an enhanced role for a training unit.

When visiting Centers the panel encountered many specific examples of good practice in quality assurance. These were most evident in Centers that had retained some kind of central Training Unit or function. Examples of good practice include:
• Involving a training unit/department in the design stage of research projects to clarify learning objectives;
• Manuals and toolkits for trainers – often geared to the needs and experience of researchers who will be responsible for course delivery and made available also to regional programs by HQ staff;
• Systematic feedback gathered from trainees at the end of courses and the maintenance of accurate trainee records allowing for the periodic or occasional follow-up of alumni;
• Providing a resource person who is a pedagogic expert to facilitate researchers – work alongside them – in preparing and delivering their courses;
• Setting up an electronic resource of courses and training materials, which can be consulted, downloaded and re-used.

Table 5.2 Researcher survey: queston 13.

Which of the following do you see important to ensure training quality?*	Important	Neutral	Not Important
Opportunities for researchers to update scientific content	48.9	24.9	26.2
Researchers involved in course planning	46.9	27.9	25.2
Screening of applicants to get the right trainees	46.5	23.5	29.9
Standardized record keeping of training and trainee related data	38.9	29.6	21.5
Systematic collection of feedback from trainees	36.6	25	38.4
Regular training needs analysis/priority setting with partners	33.8	31.9	34.3
Effective backstopping from training office/unit	29.9	24.8	45.3
Training/learning expertise to advise on methods and delivery	28.8	26.4	44.7
Development of best practice guides for systematic use	27.5	24.6	46.9
Training facilitated by specialists in adult learning	26.0	23.0	50.0
External evaluations of training (additional to EPMRs)	22.5	24.4	53.1

* N=204-220 depending on item; values show % total replies for each line item

Examples of Center Good Practice

1. CIP. The Center's strategy for improving quality and outcomes includes incorporating the Training Department from the start of project development, so that the necessary steps from training analysis and needs assessment to evaluation are systematised. All training activities using unrestricted funding are now written in log-frame format with specific goals, outputs and indicators of achievements. The Training Department is in the process of adapting Kirkpatrick's four levels of evaluation for CIP's training activities and implementing the ISO 9001:2000 guidelines for quality management in education. To cover informal training, there is a proposal for learning objectives to be written routinely into collaborative research projects, and for these to be monitored and evaluated as are the research results.

2. IRRI. The Training Center aims to 'facilitate' researchers in various ways. Materials are available to support course design these cover, for example, preparing a class room; designing training events; how to engage (motivate); and presentation skills. The TC does not use professional trainers – although TC staff may deliver some 'generic' courses, nor does the TC use 'training of trainer' approaches. More recently a new member of the TC with pedagogic skills has been recruited to work alongside researchers to help them improve the quality of what they do.

3. ICRAF. Course demand comes from the regional programs and the central Training Unit backstops training activities carried out in the regions. This includes both short courses and thesis research of degree students. The focus is very much on building capacity in the region to carry out training activities through training of trainers. The Training Unit has developed a toolkit for trainers running from theories on adult education through, stakeholder analysis, teaching methods, to evaluation and assessment. Content is provided by ICRAF and national scientists working together around skill needs identified in the region. There is a large participatory element within course development and use of national expertise. New courses are developed in curriculum workshops, where specialists in the subject both contribute to the content and become trainers themselves.

As noted above, these examples rely heavily on some kind of central training unit, department or resource which nowadays only exist in seven of the Centers. In addition the Panel identified major problems with the quality systems that are in place:

• Researchers are not required to follow guidance or advice and in some cases do not;
• Obtaining periodic feedback from subsets of trainees after course completion – when trainees return to work - is not common, even though this is recognised as 'good practice' and often more telling than feedback obtained on course completion;
• There appears to be little or no quality assurance systems in place for those involved with degrees, on-the-job or informal learning – even though these are major elements in the CGIAR training and learning offer;
• There is a particular problem with ´quality on entry´ of trainees due to deficient basic training of applicants from many countries where the CGIAR is engaged (e.g. see Country reports: Cameroon, Bolivia), as well as to lax selection procedures;
• Generally poor record systems for in-country trainees, with one or two notable exceptions and very little follow-up at country level.

Many of these problems echo the findings of previous internal reviews carried out by CGIAR Centers. (See Annex III, for Summary of Internal Reviews.) With regard to the quality of training these reviews concluded:

Quality ratings were (also) consistently good to highly favourable. However, specific recommendations were made about systematic quality monitoring, and the need to determine whether learning objectives had been met. One study pointed up differences in quality between in-country and headquarters courses, and that the perception of quality varied according to the trainees´ previous level or preparation. It also traced trends in quality of courses over time and found no indication of improvement. A common recommendation was the need for greater post-training follow up and direct support to trainees.

The issue of how to implement QA (and quality control) for informal learning and training is more challenging than for traditional training courses. However this is an undoubted priority in the CGIAR and there are a variety of methods that could be adopted. Surveys of partners and trainees used in this study are one method dependent of course on the maintenance of contacts detail records. There are also instances of good practice already

emerging such as CIP's intention to incorporate learning objectives routinely into collaborative research projects.

Comprehensive QA systems systematically applied are not the sole determinants of quality. There are within the Centers visited enthusiastic researchers with their own innovative ideas about learning who appear to inspire learners and adopt effective pedagogic methods. However without effective systems it is difficult to consistently guarantee quality.

5.3 Feedback from ex-trainees, partners and NARS

Questionnaire surveys of ex-trainees and research partner were used by the Panel to obtain feedback on the training and learning that has taken place. The positive bias which is likely to occur is survey information is fully recognised, since the less satisfied would tend not to reply. To counteract this, the Panel conducted interviews widely with alumni, partners and their superiors in the countries which they visited, which gave a more representative sample, albeit on a smaller scale.

A series of questions were asked in the surveys about trainee satisfaction both for those who attended courses and for individual trainees. The overwhelming majority of trainees were satisfied and many were strongly positive. However there are differences in levels of satisfaction for different items. Course attendees for example were most satisfied with course content, quality of teaching, organisation of course and quality of equipment, but least satisfied with the balance of country specific and international content and the balance of theoretical and practical knowledge imparted. The latter items raise particular quality concerns.

Table 5.3 Trainee survey: question 5

Satisfaction with Aspects of Course (Course participants*)		
Areas of satisfaction	Completely satisfied (%)	Satisfied (%)
Course content	55	91
Organisation of course	51	91
Quality of teaching	47	90
New training skills acquired	30	80
Opportunities to interact with trainers	36	75
Opportunities to interact with others on course	41	79
Balance of theoretical /practical knowledge	29	75
Quality of course material	44	87
Balance of international/country specifics	21	63
Quality of equipment	50	85

N is between 194/284 depending on item

Individual trainees also rated their training/educational experience positively – even if slightly less so than course participants.

Table 5.4 Trainee survey: question 6

Areas of satisfaction (Individuals*)	Completely satisfied (%)	Satisfied (%)
Research opportunities at center	58	83
Support from supervisor or mentor	56	84
Cooperation with host university	37	63
Interaction with researchers at Center	38	69
Availability of equipment, facilities, resources	55	70
Learning/working with experienced researchers	37	69
Balance of international/country specifics	27	67
Availability/access to information/publications	56	82

N approximately 170, depending on item

Fieldwork at Centers confirmed these aggregate results. For example in one focus group of 11 learners taking MSc or PhD courses, overall satisfaction was consistently high and interaction with supervisors was especially praised. In another case, the trainees pointed out that the content of their training was uniquely appropriate, because the IARC's are now probably the only institutions worldwide where molecular genetics and traditional plant breeding are dealt with in an integrated fashion. It is also significant that training quality was very seldom brought up as an issue in the Country study interviews, leading to the conclusion that it was generally considered to be satisfactory.

At the same time for individuals as for there are items which raise questions about aspects of training quality. In particular there appear to be reservations about cooperation with host universities, the balance of international and country specific content and the opportunities to work with experienced researchers – including researchers at Centers. The matter of balance between international and country specific content, which featured for both individuals and course participants, highlights the tension between the global role of the CGIAR and trainee demand for 'local' or regional content. Ex-trainees in Vietnam and Thailand touched on similar topics in the context of country-based training and the likelihood that this would be more relevant to their needs than that delivered in Center HQs.

An analysis was conducted of the minority of trainees who were consistently negative (or more precisely 'not positive') in their ratings of the training they had received.

Table 5.5 Trainee survey: analysis of negative replies

Difficulties using knowledge/skills x Positives/Negatives (Trainees)

Positives /Negatives	Means	N	Standard Deviation
Negatives	3.69	68	.868
Positives	4.39	252	.730
Totals	4.24	320	.812

P < .000

This analysis showed that the single most powerful predictor of negative ratings by ex-trainees was their *difficulties in using knowledge and skills.*[22] These differences were statistically significant across all outcome and quality filters. In brief:

- Dissatisfaction with training is greatest among those who report they have had too few opportunities to use what they have learned.
- Negative ratings of training quality were also strongly correlated with few opportunities to use what they had learned.

There is also a clear thematic or disciplinary divide in levels of satisfaction expressed by trainees. As the table below indicates, the most positive ratings are made by those with a background in Livestock, Fisheries, Crop Protection, Genetic Resources etc; and the least positive among Social Sciences, Policy, Economics. Research Management etc.

The table shows a trend towards higher degrees of satisfaction in the biological than in the social sciences. The differences were not always statistically significant, depending on the numbers of observations, but in the larger classes of Crop Protection, Genetic Resources and Crop Breeding, where the proportions of positives were 80% or more, these exceeded the values for Economics, Policy or Social Science (67-71%) at levels of probability between 0.05 and 0.01. No differences were found involving NRM, another of the larger classes, or the other classes with lower total numbers of responses.

Table 5.6 Responses by training theme

Proportions (%) of positive responses, by training theme[23]					
Theme	**n**	**Positives (%)**	**Theme**	**n**	**Positives (%)**
Livestock	30	87	NRM	104	77
Fisheries	9	86	Agroforestry	63	76
Crop Protection	125	85*	Research Man.	61	75
Genetic Resources	144	85*	Economics	49	71*
Forestry	28	82	Policy	35	69*
Crop Breeding	156	80*	Social Sciences	43	67*

n= total number of responses

* Themes where proportions of positive responses are significantly different (P= 0.05-0.01)

These finding is open to several interpretations:

- Course content and training opportunities are better developed for the themes on the left of the above table (e.g. livestock, crop protection, genetic resources etc.) than those in the column on the left (e.g. social scientists, policy specialists, economists etc);
- The judgments of social scientist, policy analysts and economists are also influenced by their need to become familiar with biological topics;
- Those who are negative come from disciplines more likely to be critical about courses;

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[22] Negatives were collated from different parts of the trainee questionnaire and respondents were scaled according to the consistency of their dissatisfaction. This was then correlated with new multi-item variables for 'outcome' and 'quality'.

[23] Note: Respondents were able to identify themselves with more than one theme

- There is also less of a correlation with opportunities to use what has been learned and opportunities for using what they know among social scientists when compared with those involved in crop-breeding. This may also have to do with the state of social sciences in some NARS which offer limited research opportunities.

The partner questionnaire survey did not explicitly ask for satisfaction ratings or about the details of training and learning quality, even though many were ex-trainees. However in the course of country fieldwork which always involved interviews with NARI and NARS more generally, consistently positive views were expressed by partners' representatives. Issues of quality were not raised, but quality was assumed to be positive. This would be consistent with trainee findings insofar as partners, by definition do have opportunities to apply what they learn – whether through courses, individually or informally.

A recurring theme in the Country studies was the value to local researchers of the informal learning which occurred in the course of collaborative work, or due to the long-term contacts established between local researchers and Center staff after formal training. Many perceived this informal learning to be more important to them than the formal activities. Testimony of this is given in many of the Case studies annexed to this report. (Annexes IX-XX; see Bolivia Case Studies 2 and 4).

5.4   Conclusions

Ex-trainees were highly satisfied with different aspects of training quality, including course content, quality of teaching, opportunities to interact with others etc. The minority of trainees who were not satisfied appeared to be influenced by what happened after they completed their training; not being able to apply what had been learned was a powerful predictor of dissatisfaction. Given the highly subjective quality of these judgments the Panel would view training quality to be generally but not uniformly good. More positive conclusions would require confidence in a CGIAR-wide quality assurance system. Most of the views refer to past training, i.e. before decentralization. Now researchers are more or less solely responsible, and it is difficult to extrapolate from the past degree of satisfaction to the present prevailing conditions.

QA systems for training even though they exist, are partial in their coverage and unevenly applied across CGIAR Centers. Systems that are in place are not always implemented and not all Centers have them. QA systems have been weakened by the reduction in specialist training units or functions and the lack of pedagogic or adult education expertise among Center staff. QA systems that do exist are applied mainly to courses. Informal training and learning and individual training, both degree and non-degree, is not within their scope. Country based training and in-country project based learning, more common because of decentralisation and the integration of training into collaborative research, are not covered by the QA systems that do exist. Although there are examples of good practice in Centers, it is difficult to be confident that quality issues are being monitored and that systems are being 'steered' as a result. The Panel has concluded that at the very time that decentralised modes of training delivery are challenging researchers to expand their pedagogic understandings, there are fewer and fewer back-up resources available.

Explanations of these developments are often linked to lack of core funding. However they can also be linked to a lack of prioritisation by Center management and by the CGIAR more generally. More consistent and positive messages would have to be circulated within the CGIAR for Centers to make training quality a priority area, in which they would be willing to invest limited core funds and seek out additional project funds that could be used for supporting training quality. Whatever the intention, Centers (and in particular those in Centers with a strong commitment to training and learning and capacity strengthening) have picked up messages from the days of the TAC onwards that what they do is not valued and is seen as competitive with research priorities rather than complementary. (Even though TAC's main argument was that training/learning was not the main bottleneck in NARS capacity strengthening, which raised questions about the worthwhileness of expenditures.) The belief that Center 'management' does not support and in recent years has reduced support for training and learning is widespread. Such perceptions were reinforced following ISNAR's closure and further reinforced in the course of recent discussions about proposals from the Science Council on 'System Priorities'.

On the basis of examples of good practice identified and what happens routinely in some Centers and for some target groups, it is possible to specify protocols for a QA system that would conform to international good practice standards. Such a protocol would include standards and norms for:
• Explicit training policies that set targets and link training and learning objectives to research priorities;
• Procedures and criteria for the recruitment and selection of trainees agreed with NARS
• Course design including pedagogic guidelines;
• Pedagogic support and skills training for researchers in teaching and learning methods;
• Reinforcing the support/training of researchers by feedback from trainees at course end routinely and for a sample at least at follow-up periods;
• The specification and monitoring of learning quality and effectiveness in informal learning situations;
• The feedback of QA system results to Centers so that planning and prioritisation of training and learning is improved.

All of the above ways of assuring quality would require the existence of training support resources and expertise in Centers. This might not be equivalent to resuscitating an earlier generation of 'Training Units'. Such resources would, for example, have to work in tandem with researchers and in-country collaborative projects and be attuned more closely to the priorities and needs of NARS actors. However given the continued high volume of training and learning activity within the CGIAR it will be difficult without such a system to be confident that this investment is being spent to good effect for enough of the time, in all Centers and for all types of learning and training.

6   EFFICIENCY OF TRAINING AND LEARNING

This chapter begins by discussing different understandings of efficiency, their applicability in the case of CGIAR training and learning and how issues of efficiency have been approached by the Panel. The chapter then considers resources allocated for training purposes; coordination within and among Centers; evidence of economies of scale and of specialisation. It concludes with an overall judgement as to current levels of efficiency and what more can be done.

6.1   Understandings of efficiency

Definitions of efficiency at their most simple are about how money is used: the ratio of inputs to outputs. More complex definitions elaborate more on the input or the output end of the equation, without loosing touch with this basic formula. Thus the World Bank Independent Evaluation Group refers to the 'extent to which objectives have been (or are expected to be) achieved without using more resources than necessary'; and the Development Aid Committee of the OECD defines efficiency in its evaluation glossary as: 'A measure of how economically resources/inputs (funds, expertise, time etc.) are converted to results'.

There are a number of problems applying these definitions to training and learning in the CGIAR:
- First, there is little data available on 'inputs' in terms of budget, expertise, manpower, courseware or classrooms. There is certainly no data that allows for a systematic comparison of inputs over time and across Centers.
- Second, what constitutes training as has already been demonstrated is diverse and even where data exists in aggregate terms for some periods of time in some Centers they do not allow for the requisite degree of differentiation.
- Third, now that researchers rather than specialist trainers lead on most training and collaborative research projects contain most of what constitutes informal learning, it has become difficult to break down their time. Training and research activities are so closely bound together as to be indistinguishable in terms of inputs – and arguably purpose also.
- Fourth, what training and learning is attempting to achieve is similarly diverse and is both difficult to isolate from particular settings (e.g. eco-regional locations; crops and commodities; and techniques and know-how) and difficult to attribute in isolation from the actions and inputs of many others.
- Fifth, the benefits to the Centers themselves of carrying out training are seldom fully considered in discussions of efficiency.

This latter point is especially important. Efficiency cannot simply be assessed on the basis of what Centers achieve to the benefit of the NARS. From the outset, the Panel believes it is important that any discussion of efficiency should fully recognise the benefits of training to the Centers themselves (as was touched on briefly in Chapter 2). In the course of their Center visits, Panel members found convincing accounts of why scientists considered training to be an essential activity for them, quite apart from the benefits to the trainees. It extended their capacity to carry out research, improved the effectiveness of partnerships and thereby increased research impact, kept them abreast of modern scientific developments and

in touch with reality at field level, and in certain cases, even facilitated access to donor funding.

To partially overcome the difficulties identified, new data was gathered - through questionnaires and case studies, and existing data - available statistics and reviews - were further analysed. However none of this allowed the Panel to undertake a classic input/output efficiency study at a CGIAR 'system' level. It would have been possible to focus resources on one or two specific cases but even this would in our judgement have had limited yield given the integration of training and research and the many possible and actual outcomes of training and learning.

Given the circumstances, the Panel therefore fell back, as elsewhere in this study, on a relatively pragmatic approach to gauge efficiency. It concentrated on what Panel members considered on the basis of wider experience were likely to be the correlates of efficiency, including:
• The way resources are deployed;
• Coordination and economies of scale;
• Concentrating on areas of specialisation or 'comparative advantage'.

It also sought the views of CGIAR stakeholders – researchers, trainees and partners to clarify how they understood efficiency.

6.2   Deployment and targeting of resources

As CGIAR Centers have undergone reductions in core funds and in particular in unrestricted funds, they have reallocated their resources in response. There is a perception that training has been a major target of cuts which has been associated with closure of some training units or departments, closure of training programs, the integration of training into research and in some cases the devolution of group training to national partners. Figures on funding of training were difficult to obtain, but at the System level such data are available on research "undertakings" up till 2002 (Annex V). These figures show a slightly increasing trend, but there are known instances where they do not correspond with the information available at the Centers and there appears to be no standard practice as to how staff time or indirect costs are accounted for. In addition, it can be difficult to disentangle training costs undertaken as part of research from the overall research budget. As pointed out in Chapter 2, restricted/unrestricted funding data for training are not available from all Centers, so there is no reliable basis at present for estimating either the System's overall financial investment in this activity, or the real trends in 'core' funds.

Cutbacks in dedicated training units have been reflected in reductions in the numbers of persons with specialised training and adult education skills working in Centers. From the responses of Training Officers to the questionnaire survey – and to which the response rate was very high – it appears that such expertise is confined to only seven Centers. In CIAT, for example, there were 22 professionals in the Scientific Training and Conferences Program in the late 1980's, funded mainly from unrestricted core funds; 6 in the early 1990's and none today with a specialised adult education background.

Despite the reduction in specialist pedagogic skills there has not been an overall reduction in training activity (as was evident from the figures cited in Chapter 3). However the inputs in training provision and in support for informal learning are now more likely to involve researcher than specialist trainer time.

One piece of evidence on this score is that the proportion of researcher time devoted to training has not apparently fallen over the last 5 years despite the various cutbacks reported.

Table 6.1 Researcher survey: question 4

Proportion of Researchers Time Spent on Training		
Proportion of time spent on training	In the last 1-2 years (N = 275)	5 years ago (N = 175)
Less than 5%	16.7%	19.4%
5-15%	37.5%	43.4%
15-30%	31.3%	26.9%
30-50%	8.7%	5.7%
More than 50%	5.8%	4.6%

Researchers were asked to estimate the percentage of their time spent on different categories of activity - formal and informal training, research and 'other'.

Table 6.2 Researcher survey: question 7

Percentage Time of Researchers		
Activity	Mean % time	Standard Deviation
Formal training	13.2	13.7
Informal training	11.8	9.9
Research	44.9	24.0
Other	26.2	22.3

The 'mean' responses among researchers revealed a high proportion of time under both formal and informal categories, some 25% of time compared with 45% for research. It is because of responses like this – both in interviews and questionnaires - that it is reasonable to assume that most estimates of resources expended on training based on formal training are underestimates. These figures also suggest that reports at system level of the CGIAR's investments in training are understated. The likely reason for this is the consistent under-reporting of informal learning and training activities, which are increasingly important in CGIAR.

Researcher questionnaire responses also clarify the perceived connections between formal and informal training and learning.
- Those who consider formal training as important also spend above average time on formal training (significant at the .048 level).
- Those who consider formal training important are highly likely to consider informal learning as important – and the converse is also true. (This is highly significant, p < .000).
- Those who judge the outcomes of training and learning as positive for capacity strengthening see this as a combined effect of formal and informal means: it is only those

who consider both as important who regard training and learning as having a positive outcomes for NARS (p < .01).

As pointed out above, detailed analysis of the deployment of resources to training is partly difficult because of the way management accounts are kept. It is however possible to obtain useful cost data in Centers – something that we would recommend for future efforts to monitor training efficiencies at a system level. Thus in one Center that has retained a central training function we were able to establish that between 2000-2004:
- Training costs were split approximately 50/50 between research program and the central training function;
- Over the same period core funds accounted for only 5% of the research program total;
- The central training budget was made up of a number of elements of which coordination (including course administration and support) was only 10% - the other elements being a separately funded PhD program, generic short courses and ICT systems.

A number of efficiency question are raised by this example.
- How far are restricted or project funds able to be spent for purposes consistent with research and training priorities?
- How far are core funds deployed to ensure that training activities are well-focussed?
- What are the costs and benefits of coordination?

In the particular example cited above it was consistently asserted by researchers and Center management that donor priorities did not skew research priorities in approximately 80% of cases and that donors were especially keen on training and skill enhancement. In another Center however it was reported that there had been a change in the mix of training as a result of funding reductions and re-structuring. There was now less disciplinary research and training – this being previously supported by core funds, and more of a move towards commodity research and associated training.

Targeting and re-allocating resources is one indicator of efficiency. There are many examples of this:
- Reductions in long courses and in courses in Headquarters;
- Increases in the number of short courses – many in-region;
- Growth in informal learning integrated into research;
- Switching resources between countries depending on NARS needs;
- The growth of networks as vehicles for training and learning.

There are two reasons that resources might be re-allocated in these ways. First, Centers might be responding to financial pressures. This would imply the primacy of the input side of efficiency rather than outputs or results. A second rationale for re-allocating resources is that NARS needs and contexts and the potentials for partnership have changed. In order to achieve results different forms of training become salient. Examples of this would include:
- Increases in in-country training because of the identification of capacity needs in the extension system and as a way of gaining access to more trainees at a lower cost per trainee;
- Shifts of resources between countries, following reassessments of their needs and capabilities and consultation with NARS and partners.

Although the Panel was able to find many examples of this occurring the weaknesses already identified in systematic joint needs analyses with NARS partners does not give confidence that this always occurs.

On the other hand, the expected increase in efficiency due to some of these measures may not be fully realised. For instance, while in-country training may increase coverage at lower cost, there was ample evidence in the Case Studies of the distinctive value which trainees attached to headquarters training, which extended well beyond the particular subject area in question; thus, the values of headquarters and in-country training were not perceived to be simply interchangeable. Second, field evidence certainly supported the growth of networks, and they may have a specially critical role in combating the problem of high staff turnover rates, as for example, due to disease in Africa. But at the same time, they can only prosper to the extent that their individual members are strong and the Panel found evidence that the weaker members may be at a special disadvantage (e.g. Ecuador Country Study).

Types of training and learning

For active researchers and leaders in technology transfer, there seems to be consensus that a combination of training types fitted to their specific requirements will continue to be necessary. These are likely to concentrate on specialized short courses, specialized non-degree individual training and higher degrees. At the same time, evidence from Ecuador underlines the importance of informal training and learning experiences, and of long term contacts with the centers. The advantages of the networks should continue to be exploited fully, but their success depends on the stability of the members and the extent to which they meet the needs of individual partners, particularly the weaker ones, merits revision. A variety of training delivery modes will continue to be needed, with increasing use of on-line materials and e-learning, but this must not be at the expense of deterioration in quality in areas where practical experience is essential.

The proper selection of training and learning modes and methods of delivery is one important determinant of efficiency. The Panel has not taken the view that short or long courses are of their nature more efficient or that individual degree courses are better than non-degrees or periods of work experience. Rather it has been assumed that different training modes are suited for different purposes in different contexts. This is well summarised in the Ecuador country report.

The key issue is whether systems are in place to choose between modes and to match trainees to these modes. The evidence we have is that these systems do exist and examples can be found that appear to work well. For example:
• One Center, that still provides training courses, has a clear anticipation of demand for more short specialised courses and individual non-degree and degree training, but a reduction in longer more general courses;
• Centers operating in SE Asia have adapted their 'offerings' to move from training to collaborative networks;
• The selective use of e-learning and downloadable websites to support researchers improve and systematise their training and support self-directed learning.