

Innovation systems and capacity development: an agenda for North-South research collaboration?

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The papers in this volume explore the issue of North-South research collaboration and ways of enhancing its contribution to sustainable development. The scope and diversity of such collaboration is broad. Questions addressed here, however, specifically concern development assistance, and how North-South research collaboration can best be understood and promoted in ways that are consistent with the policy goals of Southern partner countries. These questions are critical, perhaps as never before, in a global society where knowledge access and ownership provides enormous economic advantage, but could yet further widen the disparity between the North and the South. The growing economic importance of knowledge has forced many analysts to revisit the concepts underpinning our understanding of the ways it is produced and used. The papers in this volume are all, if in various ways, informed and shaped by recent thinking that stresses the contextual nature of knowledge – the realisation that the way it is produced, understood and used is highly dependent on its context and the factors shaping that context. In many senses, this contradicts the underlying principles of much of the North-South research collaboration that has conventionally been premised on the assumed neutrality of knowledge and, therefore, its transferability.

This new thinking has important implications for development assistance involving research collaboration. It would appear to suggest that such capacity development concepts need to be increasingly concerned with strengthening the social networks or systems in Southern countries that interface between research and society and which can promote learning and innovation. In the past, the knowledge transfer perspective left unquestioned the way new knowledge or skills would fit into existing systems and agendas in national settings and how these settings would impinge on the effectiveness and outcome of these transfers. The core theme of the four papers in this volume concerns what in practice capacity development in these new systems terms might mean for North-South collaboration and how it can be planned and evaluated using this perspective. Baud and Velho explore in their respective papers the conceptual debates on the issue of North-South research collaboration with reference to international experience. The contribution by Hall and Sulaiman is empirical, based on an analysis of innovation processes in relation to the design of a research programme supported by British development assistance. The paper by Clark *et al.* provides a contrasting empirical account of the approach to biotechnology capacity development adopted by a Dutch development assistance programme.

The purpose of this overview is to provide a conceptual orientation for the rest of the papers and to distil the main arguments and lessons presented. The concept of an innovation system is introduced as a framework to help explore critical issues. Its value lies in its emphasis on the relationship between innovation and its

evolving context. This perspective draws together many of the elements of contemporary thinking on the production and use of knowledge, much of which appears highly relevant to the topic of North-South research collaboration.

North-South research collaboration

What are the issues at stake in North-South collaboration; and why should a systems conceptualisation of innovation be expected to enhance effectiveness of planning in development assistance? A useful place to start is the shared point of departure for all the papers in this volume: namely, the challenge to the linear model of knowledge production and the perceived need to replace it with something that allows research to be considered in a holistic and interactive sense. The conventional (linear) view would have us believe that knowledge is created in specialised research organisations and is universally useful. The holistic approach, on the other hand, emphasises the importance of social networks that connect research to knowledge users. In the context of North-South research collaboration, the difference of views as to how knowledge is generated and applied creates a difficult dilemma for both the scientists and bureaucrats involved in the collaboration process. Where the conventional norms are applied, success is judged quantitatively in terms of outputs, i.e. new technologies, policies, and the number of trained scientists and scientific publications. On the other hand, the emergent view would stress linkages and relationships between different elements of the system underlying the production of knowledge and its use. It is this system, which has its roots embedded in national cultures and institutions, and is responsive to indigenous knowledge and perspectives, (usually understood to be exclusive to Southern partners), that is crucial for the production and effective use of knowledge in developing countries.

All the papers in this volume deal with the dilemma of understanding the mechanisms underlying the production and use of knowledge in various ways. For example, both Velho and Baud contrast the systems view with the asymmetries of conventional North-South research collaboration. The latter is shown to have involved resources and priorities that tend to be skewed towards the interests of Northern partners. It is also shown to have often involved a narrow group of research stakeholders who define the research problems and evaluate progress through disciplinary peer review based on Northern standards. Moreover, training programmes are often conducted in Northern countries according the rigours of scholarship that reflect Northern bias.

The challenge for development assistance agencies from the North has, therefore, three elements. Firstly, how can North-South collaboration initiatives contribute to systems changes through interventions that abstract from the very context in which they seek to develop capacity? Secondly, how can normal bureaucratic controls that tend to reward tangible predetermined outputs cope with interventions at the systems level that may be open-ended and unpredictable in terms of outcomes in the conventional sense? Thirdly, even if the need to create behavioural changes in national systems is recognised, how do Northern agencies contribute to systems in the South over which they have little influence, and possibly also only a limited understanding?

It is perhaps not, therefore, surprising that the effectiveness of North-South research collaboration has been variable. As Velho points out, while North-South partnerships are certainly critical for building development-orientated capabilities,

not all such collaborations, however, lead to desired impacts. Baud and Velho note the need for an institutional understanding of North-South collaboration and the way this relates to local social systems and networks of researchers and research users. This calls for an analysis of the behaviour, norms and practices and relationships that account for the emergence of new systems capacities adapted to the evolving development imperatives of Southern countries. But this, of course, begs the question of how such an understanding can be arrived at and how it can be used in programme design and evaluation. Velho argues that at present, the only tools available are little more than a checklist of 'good practice', and that a useful way forward would be to adopt the innovation systems framework. How has such a framework emerged and what does it entail?

Emergence and significance of innovation systems perspectives

The attraction of the innovation systems framework stems from the way it engages with the political, economic and social dimensions of knowledge production and its use at a time when these concerns are occupying a central position in the development debate. The issues at hand are clearly moving on from research as a basis for scholarship and the development of new technologies – although both ultimately remain important. The term 'innovation systems' – used in the sense of new creations of wider socio-economic significance – helps us break away from these confines.

The origin of the innovation systems thinking can be traced to the idea of a 'national system of innovation' proposed by Freeman (1987) and Lundvall (1992). At its simplest, this concept states that innovations emerge from evolving systems of actors involved in research and the application of research findings. Lundvall identifies learning and the role of institutions as the critical components of these systems. He considers learning to be an interactive and thus socially embedded process, which cannot be understood without reference to its institutional and cultural context, usually in a national setting. The innovation systems concept is now widely used in the policy process in developed countries, but has only recently started to be employed in relation to research policy in the South (see, for example, Hall *et al.*, 2001).

Another way of making a similar point is proposed by Gibbons *et al.* (1994) in their much cited discussion of 'mode one' and 'mode two' production of knowledge. In *mode one*, knowledge is generated, often with government assistance, by a research community accountable to its disciplinary peers. The Gibbons' thesis is that institutional changes in Western societies (particularly where the market has started to eclipse the state as the primary decision-maker) have forced science to become more socially embedded and less hierarchical, thus defining the *mode two* type. The important point is that as societies and economic systems become ever more complex, the *mode one* type of production of knowledge would become less able to respond to rapidly changing user contexts. Only by assuming the features of *mode two* production of knowledge can systems be designed to cope with complexity and rapid change.

The innovation system concept therefore provides a framework for: (i) exploring patterns of partnerships; (ii) revealing and managing the institutional context that governs these relationships and processes; (iii) understanding research and innovation as a social process of learning; and (iv) thinking about capacity development in a systems sense. On this last point, Velho observes that national

systems of innovation, made up of actors which are not particularly strong, but where links between them are well developed, may operate more effectively than another system in which actors are strong but links between them are weak.

The lesson for North-South research collaboration is that new capacities for producing socially relevant knowledge need to be characterised by evolving systems of partners in which institutional change plays a large role in making these partnerships as well as the system as a whole more effective – the corollary to this being that success is achieved when the wider institutional context is recognised and accounted for in planning and implementation processes, and when institutional learning is used to generate pragmatic research approaches to deal with evolving development imperatives. How do the systems perspectives compare with existing models of North-South collaboration?

Models of North-South research collaboration and the innovation systems perspective

The papers in this volume provide a wealth of information on historical and contemporary models on North-South collaboration. Baud gives a comprehensive account of the research and capacity-building arrangements in the Netherlands. This is based on the experience of research conducted by Northern researchers in universities, and fellowship programmes designed for training Southern researchers. It appears that while there has been a shift to programmatic support as a way of making research more multi- and interdisciplinary, its outputs remain limited primarily to publications for academic audiences. Less emphasis has been placed on linking research into non-research networks and contexts, particularly those in Southern countries. One consequence of this is the difficulty that North-trained researchers have in being absorbed back into these systems when they return to their own countries.

By contrast, the other Dutch model that Baud describes seems much more in step with innovation thinking. This concerns country-specific programmes like, for example, the South African-Netherlands research programme on Alternatives in Development (SANPAD). In these programmes, explicit attention has been given to improving the interaction between researchers and policy-makers in the South. Joint committees of Dutch and Southern scholars and their local secretariats coordinate these programmes. The projects that are commissioned through this process combine an agenda of developing scholarship and academic rigour – often through interaction with international disciplinary communities – with stronger linkages between research and local research users and stakeholders. The emphasis on embedding the programme in these local contexts is an important development. Similarly, the establishment of the Netherlands Development Assistance Research Council, with membership from the North and the South, has been an important forum for debating the evolving *modus operandi* of such collaboration.

The paper by Clark *et al.* describes another Dutch programme, which is even more strongly of an innovation systems type. It involves a biotechnology initiative in India that appears to view capacity development as much in terms of institutional change and social capital as it does in terms of new science. In a far-sighted way, the Dutch seem to have recognised that the successful use of biotechnology in Indian smallholder agriculture will require a series of institutional innovations that will link research with a range of technology stakehold-

ers in an integrated way. Realising that these innovations need to emerge indigenously from within the Indian agricultural science community, the programme has concentrated on creating opportunities for scientists to work in new and experimental ways with NGOs and farmers. A critical way of contextualising this process has been the almost complete autonomy that the Dutch have given to the Indian programme committee, particularly in terms of defining problems identifying priorities, implementing projects and evaluating progress. This seems an unusual, though successful, approach to North-South collaboration, and one that is tackling head on the need to develop context-specific learning systems to generate locally relevant innovations of both technical and institutional kind. It also requires a long-term commitment on the part of development assistance agencies – at least ten years, in this case.

The paper by Hall and Sulaiman discusses a more conventional type of North-South collaboration dominated by disciplinary research and Northern researchers. What is interesting about this case is the way many of the deficiencies of this approach became all too apparent to the British development assistance agency involved. As a result, purposeful steps were taken to address this problem, including the use of the innovation systems framework as a way of thinking about the nature of partnerships and how they operate in particular institutional environments. As in much of the contemporary North-South debate, the real task at hand was to 'unpack' the concept of partnership and consider how this related to the efforts and systems promoting pro-poor sustainable development in specific country contexts. It was here that the innovation systems framework proved valuable. The practical outcome in this case was a shift in focus towards developing coalitions of Southern research partners and undertaking research that explores both technical and institutional aspects of pro-poor innovation. This new approach identifies itself with an agenda that is simultaneously research and capacity development, seeking to strengthen local innovation systems through new knowledge, skills and relationships.

New agenda for North-South research collaboration?

What emerges from the discussions of the papers in this volume? The overall impression is that a significant shift does need to take place in the way North-South research collaboration is conceived. Already, the beginnings of this shift have started to be detected. This is not to suggest that many of the existing forms of collaboration – fellowship programmes, scientific networks and disciplinary research – will not continue to play a role. These will undoubtedly remain important. The change that is detected, however, is one where increasingly, emphasis is being placed on building the networks and systems of partners and institutions that can respond to contemporary demands of sustainable development. This new focus is consistent with emerging trends in development assistance, in general, where the importance of relationships is one aspect of the agenda for collaboration that is less concerned with creating deliverable products, and more concerned with introducing behavioural change (Mosse 2001).

There is still, however, a long way to go. This is particularly so for development assistance agencies responsible for science and technology, where professional norms seem to perpetuate the myth of the linear transfer of technology model of innovation. The innovation systems framework at least offers a tangible alternative to deal with many of the problems that those working in the

sector know only too well. Examples include: shelves of unwanted technologies and unread policy briefs; partnerships that are both inequitable and unaccountable; unresolved contentions between science and society such as those seen in the polarised debates associated with biotechnology or the environment; and questionable impacts on developmental goals. It is acknowledged that the innovation systems framework presents some significant challenges for both scientists and bureaucrats; but these simply have to be faced.

This has important implications for three aspects of development assistance supporting North-South research collaboration. Firstly, capacity development needs to be thought of in evolutionary systems terms where the emphasis is on creating socially embedded systems of learning and innovation. In practical terms, this means supporting the development of networks of partners from across the research and research user divide and developing institutional mechanisms that ensure priorities and procedures are socially relevant. Ways of achieving this will always be country-specific and experimental, but the innovation systems framework does highlight what some of the fundamental properties of these systems should be. For example, attention specifically will need to be given to the nature of partnership and the influence of institutional arrangements, particularly if pro-poor development is to be promoted. Another example is the need to build in processes of institutional learning and change. While this mainly concerns the roles of Southern partners and relationships in Southern innovation arenas, further thought will also have to be given to the most appropriate role of Northern research partners in developing these new systems competencies.

The second implication is that development assistance agencies will also have to change the way they are organised in order to accommodate this new thinking. For example, the sharp distinction that usually exists between programmes responsible for research and those responsible for capacity development will have to be blurred. Similarly, the distinction between research and general development assistance becomes less relevant as learning and capacity development assume an integral role in innovation and change. This also has implications for how development assistance bureaucracies deal with accountability and monitoring and evaluation (M&E). This systems perspective on North-South collaboration suggests that it is behavioural and institutional changes that are going to be the key measures of achievement. M&E systems are often poorly adapted to deal with the qualitative nature of such indicators. Also, the preoccupation of many agencies with measuring the impact of programmes as a way of justifying past decisions needs to expand to a more learning-orientated focus that helps address deficiencies and design better approaches (Horton and Mackay 1999).

The third implication is that even formal capacity development (in the training sense) will need to go beyond its current focus on predominantly disciplinary expertise. While such expertise is clearly still important, Southern innovation systems also require broad-based professionals who can apply their disciplinary expertise in ways that recognise the systems nature of innovation and change and its relationship to the needs of society. Clark (2002), for example, argues that there is a desperate shortage of such human capital, particularly in the policy arena.

While significant challenges clearly still remain, the papers in this volume give hope that changes are starting to take place, and that these will help realise the promise that North-South collaboration holds.

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