

SCIENCE AND TECHNOLOGY

How can DFID to increase access to and utilise agricultural science and technology?

Moderator's final summary

A. Agricultural science and technology (AST) issues and research

Preamble

1. In the moderator's introductory brief for the Science and Technology theme, the assumption was made that the importance of S&T for agricultural development was universally recognised, as was the role of agriculture as the engine for overall economic growth including industrialisation. On the basis of this, the suggestion was made for participants in the E-forum to focus on such issues as how DFID should access and use knowledge on agricultural science and technology (AST) in its mainstream development programmes, and whether it supported the generation of new knowledge, and related issues – in other words, to emphasise the “how”, “which” and “who”, rather than “What”.

2. While participants responded to the issues suggested, many also felt that it was essential to re-state the importance of “What”, and provided their views on the role of agriculture in development, as well as general and specific ideas on priorities that needed to be addressed. As anticipated, there has been considerable overlap between themes in the E-forum on these more generic issues, reflecting the extent of their interdependence. Agriculture in terms of this Forum has been broadly defined to include crops, livestock, forestry, fisheries, and natural resources management.

3. In the summary that follows, the sections are grouped into topics that contributors felt that DFID needed to consider in developing its AST agenda.

Priorities for AST that DFID needs to consider

4. Several contributors considered that the world food situation, in the face of continued population growth from 6 billion to 9 billion people over the coming decades, had received insufficient attention from donor agencies, and was in their view the most significant overarching problem. There were varying opinions on whether priorities for AST should be demand-led or supply driven, and the emerging consensus was that these were complementary to one another, with the former having greater relevance to local or national problems, and that latter to those of regional or global significance.

5. A number of contributors stressed the need to put AST into a broader developmental context, considering other sectors and in particular highlighted the interdependence of agriculture and health. It was felt that DFID had failed to do this adequately, and concerns were expressed by one contributor that this was again reflected in DFID's new draft research framework for 2005-7. The need for multidisciplinary approaches to AST was emphasised by many contributors, given the

complexities of the livelihoods of the poor in terms of their on-farm and off-farm activities, markets, trade, as well as more basic issues of health and education and so on. This highlighted the importance of building a strong socio-economic component into all AST programmes and projects. Modelling was seen as a useful tool to help identify the contributions that different factors make to the complex livelihoods of the poor, and the merits or otherwise of particular technology or policy interventions. Having said this, it was considered important that the limitations of modelling were also pointed out to those using the outcomes – who were seen as intermediaries rather than the poor end-users.

6. A number of contributors addressed the issues of AST and the needs of the urban and rural poor. They expressed concerns at the separation of the two, pointing out that there was a rural-urban continuum in terms of agricultural activities, and that research and development needed to reflect this.

7. Many contributors commented on the relative priority that ought to be accorded to smallholder versus commercial-scale farming. The majority felt that the emphasis needed to be on the former, if DFID was indeed focussing on the poor, while some others believed that the two were complementary with the level of investment in each to be determined on a country-by-country basis. In both cases, contributors stressed the need to consider all pro-poor AST in terms of the value-chain from the farm to the consumer. There was considerable emphasis on food staples for food security, but the importance of income generation from cash crops, as well as on-farm value adding to produce, was also stressed if farmers were to make the transition out of extreme poverty. The need for AST on “orphan” crops not included in the mandates of the CGIAR centres was emphasised by several contributors. One participant pointed out the scope for making tropical commodities more competitive internationally by improving quality and other desired traits through new technologies, and suggested that DFID could launch such an initiative by supporting some pilot examples.

8. The increasing significance of livestock in the developing world through changing consumption patterns was highlighted by some contributors. Livestock represented significant assets for the very poor, and it was felt that far greater attention needed to be given to AST that addressed the complex needs of pastoralists in Africa.

9. While AST to increase production of crops, especially of food staples, was accorded high priority by many contributors, a number pointed out the need to emphasise human productivity. This social dimension assumes special importance for the very poor, as their own labour is a major asset, and also brings gender issues to the forefront. In this regard, one contributor pointed out the importance of bridging the yield gap between the best producers and others through appropriate technologies that reflected best practice

10. Several contributors felt that water resources management had been inadequately addressed in terms of the AST agenda, and that this needed to be considered in a multi-sectoral context that also included water and health, water and domestic/industrial use and so on. Broader issues of environmental sustainability were raised by one contributor, who pointed out that DFID and its predecessors had in the past made a major commitment to sustainable land-use assessments in many developing countries, and urged that this be restored as a significant component of its

programmes of AST and development. The issue of sustainability was raised by several other contributors in terms of the respective strengths and weaknesses of low external input agriculture (LEIA) and high external input agriculture (HEIA), and it was pointed out that both had costs associated with them. LEIA incurred costs through its requirements for greater land area and labour inputs, while HEIA was subject to the costs of external inputs such as fertilisers and pesticides.

11. The issue of land use in terms of conservation of biodiversity versus its use for food/cash crop production by the poor provoked strong comments from one contributor, who felt that the “North” had dominated the global agenda and driven it towards conservation rather than utilisation, and that there was no scientific evidence to indicate that the latter, including monoculture was unsustainable if this was linked to good practices.

12. The role of biotechnology in pro-poor AST was noted by several contributors, who felt that this had considerable potential, including for example the introduction into major food staples crops of traits such as drought tolerance, essential nutrients and disease/pest resistance. Some NGO contributors expressed their concerns about the use of GMOs with particular reference to the adverse impact on poor farmers of large corporations marketing these products. A number of participants, including those associated with DFID’s Renewable Natural Resources Research Strategy (RNRRS) programmes pointed out that most of the biotechnology research of relevance to the poor was being undertaken in public institutions and as such represented international public goods

13. It was emphasised by many contributors that almost all pro-poor AST is of necessity long-term, given the complexities of the poor referred to earlier. This means “long-haul” work rather than “quick fixes” through magic bullets, and this is an issue that is referred to again later in this summary.

How should DFID source its AST knowledge?

14. Contributors considered that DFID should derive its AST knowledge from a wide variety of sources, including public sector organisations in the UK and elsewhere in Europe, as well as other developed and developing countries, international organisations such as the CGIAR, FAO and IAEA, other donor agencies, NGOs involved with AST, and the private sector. It was pointed out that by some contributors that DFID already has access to much AST knowledge through its outsourced RNRRS programmes that have extensive networks with national, regional and international institutions and agencies. One contributor also noted that DFID could directly commission its RNRRS or other programmes to undertake activities that addressed specific issues.

Should DFID support the generation of new AST knowledge, and, if so, how?

15. A number of contributors expressed their concerns that donor agencies, including some parts of DFID, believed that it was not necessary to generate new AST as there was sufficient “on the shelf” to meet most foreseeable needs, and that the focus should therefore be on applying what was

already known. There was broad consensus that, given the many changing and emerging challenges facing the poor, there continued to be a compelling need to maintain programmes of strategic and applied AST. There were also concerns that DFID emphasised the need to achieve rapid impact through, for example, “magic bullet” projects, and therefore tended to support short-term rather than long-term programmes needed to effectively address the problems of the poor. The key question raised was what areas should DFID support and by what mechanisms?

16. Effective partnerships were seen as an essential ingredient of any mechanism, with complete equity between partners in terms of sharing research and other outcomes. In this regard, it was felt that the outsourced RNRRS programme model had significant strengths, but also some weaknesses, which included a lack of communication/collaboration between programmes – given the interdisciplinary nature of the problems faced by the poor. A number of contributors pointed out that there were also inadequate linkages between DFID and UK institutions supported by the Research Councils. It was recognised that the main emphasis of these institutions was on issues of benefit to the UK, but that they had also had much to offer the developing world

17. Contributors had mixed views on the significant increase in support for the CGIAR centres, pointing out that (a) they were dependent on partnerships with other institutions, (b) many were experiencing problems in leadership and broader governance issues, (c) they were costly in terms of overheads, and (d) that their mandates were restricted to food crops rather than cash commodities. While valuable work was being undertaken at centres, it was felt that allocation of funding to the CGIAR should be based on rigorous prior evaluation of the programmes being supported. One contributor pointed out the importance of coordination and collaboration with other European institutions engaged in generating new AST, and the significant scope for DFID to engage with the EC and member state donor agencies to support large activities through co-funding.

18. Another contributor raised the possibility of soliciting new AST innovations through the award of prizes from any individual, groups or agencies, public or private, in developing or developed nations. This “pull” mechanism for acquiring new AST could complement other approaches already in use.

How can DFID best use AST in its development programmes and does it need in-house capacity to do this?

19. There was a wide consensus among contributors that research on AST should be fully integrated from the outset with mainstream development programmes, if the outcomes are to reach the poor. This was described as the research-development-application continuum. Most donor agencies had failed to achieve effective integration, and there was an opportunity for DFID to provide leadership by introducing such systems into central and in-country programmes. A number of contributors noted that some RNRRS programmes had, in the absence of a formal mechanism, set up their own systems for further development and application of research outcomes. These were inevitably short-term and thus not always sustainable after projects terminated, with frequent losses of key staff in partner countries, the UK and elsewhere.

20. At least one contributor pointed out that this was always likely to be a problem of a project-based approach to development in the absence of a longer-term strategy. Having said this, several other contributors believed that DFID's RNRRS programmes with a life of 10 years did have a coherent long-term strategy, and that this model should, as noted earlier, receive serious consideration by DFID in establishing its new strategy for AST. In doing so, one contributor emphasised the need to assess the impact of the programmes and thereby gain from lessons learned. This meant placing as much, if not more emphasis on failed projects than on successful ones.

21. Several contributors believed that it was important for DFID to have in-house capacity to address technical issues in its central and in-country offices, and highlighted the adverse effects of erosion of such capacity over recent years – particular at the senior levels. One contributor felt that, whilst in-house capacity was desirable, this was not essential and could be outsourced.

22. Issues of storing and accessing AST information as well as the dissemination of research outcomes are addressed in a later section of the summary.

What role should DFID play in capacity building and institutional strengthening?

23. There was broad consensus among contributors on the crucial importance of both capacity building and institutional strengthening as an integral part of AST, and the need for DFID to develop a strategy for supporting this effectively. Without this, there was little or no likelihood of AST being sustained after donor-supported partnerships came to an end. A number of examples were provided from RNRRS programmes where effective partnerships had led to national institutions forming their own networks and other alliances. The particular problems of weak African national research and extension systems were flagged by many contributors. It was recognised that very significant multi-donor funding was needed to address these problems, combined with the necessary political will of the national governments. This should however not deter DFID from continuing to support and indeed enhancing its commitment to capacity building and institutional strengthening.

24. Participatory research initiatives involving all key stakeholders, farmers, NGOs, extension agencies and social and life scientists, were highlighted by many contributors as being of special significance in terms of capacity building, and worthy of support from DFID. The need for capacity building for local agricultural innovation systems was stressed by one contributor and supported by others. These encourage active participation of all stakeholders through knowledge sharing and learning, and could provide opportunities for DFID to fund in-country AST initiatives that address priority needs in mainstream rural development activities. It is suggested that sources of AST for such activities should include the UK science base.

25. A number of participants expressed their concerns about the continuing decline in funding for training young scientists from developing countries, noting the success of earlier schemes and the legacy that still remained from these. These concerns were not confined to the developing world, but also to the UK. There had been very significant losses of scientists with specific experience of

pro-poor development in recent years, and thus little or no incentives for younger scientists to seek career opportunities in this field. It was considered that further attrition would seriously impact on the ability of the UK to retain its position as an internationally-recognised leader in AST for international development. The contributors urged DFID to establish schemes to help recruit young scientists into the development field as has been done by several other donor agencies.

What are the implications for AST of DFID's move towards direct budget support (DBS)?

26. Only one contribution referring to DBS was received in the S&T theme, but the topic was discussed extensively in a number of other themes. The contributor to S&T cited one example in Ghana where effective local capacity building led to those trained in AST to successfully lobby for AST to be built into the poverty reduction strategy paper (PRSP), and subsequently receive support for several specific activities.

B. Agricultural science and technology: Dissemination of AST knowledge and uptake

Access to AST knowledge

27. In a series of contributions on “mediated communication”, one participant highlighted the crucial importance of advances in information technology (IT) for archiving and accessing AST knowledge – a view supported by a number of other contributors. The intended audience here is national research and extension organisations, NGOs and other “intermediate” stakeholders, rather than poor farmers, but one contributor pointed out that the establishment of village information centres in some areas are enabling rural communities to access such information directly. The previous contributor noted that a range of IT methods can be used to provide wider access to publications, reports and leaflets produced by research institutions, extension services and donor agencies, where hard copy distribution would inevitably reach a far more limited proportion of the intended audience.

28. Most international research organisations have websites, but CD-ROM digital libraries can provide a vast amount of information in situations where there is no Internet access but a computer is available. The CGIAR is providing a considerable amount of AST knowledge in this way, and a number of DFID's RNRRS programmes are making project information available through CD-ROMs. suggested that DFID should require all of its projects and programmes on AST and extension information to archive their material electronically.

29. The same contributor also highlights the need for the outcomes of AST research to be popularised so that they can be accessed and understood by farmers, and others in the rural communities including school children. Few national research and extension organisations in the developing world provide incentives for scientists or others to take on this task. DFID should

develop a formal communications strategy that includes AST. Such a strategy should include capacity building in communication channels such as the mass media.

30. A number of contributors representing organisations that use electronic communication channels for sharing information between stakeholders also pointed that these channels are augmented by hard copy newsletters for those unable to access computers. DFID has funded a number of activities in this area. A plea was made by several contributors for DFID to provide assistance to libraries in the developing world, many of which are in a woeful state.

Extension services

31. Contributions on extension services have appeared in several themes in this E-forum, and this summary is based on those that were forwarded to the S&T theme.

32. The main message emerging on this topic was a need for extension agents to be able to advise on a wide range of challenges that faced poor producers, going beyond production through the entire value chain. These included information on new technologies for intensification and diversification of production, prospects for on-farm value adding, prices, markets and so on. Gaining experience in these areas would enhance the value that farmers place on their extension agents, and thus motivate the latter. It was claimed that most currently lack motivation. The extended mandate of extension agents would also provide opportunities for participatory planning for small farmers, addressing, for example, key issues in the annual cycle of farm activities and how these relate to off-farm employment opportunities. In developing such plans, extension agents could work with district teams comprising farmer associations, NGOs, private sector representatives and other stakeholders. It was recommended that DFID support a number of pilot schemes to evaluate these programmes.

33. Several contributors considered that some aspects of the extension service function could be contracted out to the private sector where this was considered appropriate. This was already happening in the case of crops such as cotton, which are linked to specific market demands. Contract farming that involved small farmers was cited as a further means of building up the know-how and skills of farmers in applying new technologies.

Concluding summary of points raised in the AST summary for consideration by DFID

- (i) Need to ensure that AST is developed within a developmental context
- (ii) Issues that need highlighting as priorities include: *(Note** very few contributions were received on forestry or fisheries, so these priorities are not representative of the whole RNR sector)*
 - The potential world food crisis
 - The linking of agriculture and health
 - Water resources management
 - Sustainable land use
 - Livestock, including pastoralism

- Piloting of programmes to increase competitiveness of tropical crops internationally
 - Consideration of entire value chain in smallholder agriculture for food and cash crops;
 - Ensure balance in AST investment for smallholder and commercial scale agriculture
 - Tackle long-term challenges faced by the poor, and not only those addressed through short-term rapid impact projects (e.g. “magic bullets”)
- (iii) Need to support the generation of new AST to address emerging problems of the poor, as can not rely on what is “on the shelf”
 - (iv) In developing new research strategy, review strengths and weaknesses of different models including the RNRRS
 - (v) Develop more effective linkages with the UK science base, and greater linkages with other donors and institutions in Europe
 - (vi) With increased support for CGIAR, ensure that there is rigorous evaluation of programmes and impact, as for RNRRS and bilateral activities, before allocating funding. Ensure that increased funding not at expense of bilateral programmes
 - (vii) Ensure that reviews of impact of RNRRS and other programmes to learn lessons, include failures as well as successes
 - (viii) Consider “pull” mechanisms, including prizes, for encouraging innovation in pro-poor innovation for AST
 - (ix) Need to integrate research and development so as to create a research-development-application continuum both centrally and in country programmes
 - (x) Get adequate in-house capacity for AST
 - (xi) Need to develop a strategy for effectively supporting capacity building and institutional strengthening for AST
 - (xii) Continue to support strengthening of national research and extension systems (NARES) through co-funding
 - (xiii) Support local innovation systems to feed into in-country programmes and address high priority needs in mainstream development
 - (xiv) Help ensure that there is no further erosion in numbers of development scientists in developing countries and the UK, through appropriate fellowships and other training schemes
 - (xv) Develop a communications strategy that includes AST, and, under this, support capacity building in communications in NARES, and also the production of CD-ROM digital libraries and similar electronic sources of information
 - (xvi) Ensure that all DFID programme and project outcomes on AST are electronically archived in readily accessible form.
 - (xvii) Support innovative approaches to enhancing extension services, including training to broaden the skills of extension workers.