
TOWARDS BETTER SYNERGY BETWEEN S&T AND DEVELOPMENT: PROPOSALS AND RECOMMENDATIONS

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EXECUTIVE SUMMARY

1. Under the umbrella of CAAST-Net, Work Package 2 (WP) is addressing the interface between, on the one hand, S&T cooperation under the EU Framework Programmes for Research and Technological Development, and, on the other, the broader development endeavours towards poverty reduction and food security, especially within the context of the European Development Fund (EDF) as the main instrument of development cooperation.

2. In a companion report ('Science and Technology for Development: The Institutional Landscape in Africa and Europe') WP2 has examined the existing landscape as far as S&T is concerned in relation to broader development efforts in Africa. The present report advances a series of recommendations as to how synergies could be improved between the EU's respective instruments for S&T and development cooperation with Africa.

3. The inter-relationship between science and technology, on the one hand, and innovation, outreach and application for development, food security and poverty reduction, on the other, is a very complex one. These divergent types of activity tend to be compartmentalised and to interact only rarely, or at best occasionally, because their evolution seems to move on separate tracks. Bridging the gap between these endeavours is therefore a challenging task.

4. The intervening factors between research and application are legion and may distort or 'contaminate' the dissemination and application processes. The most difficult distorting influence to tackle is political interference.

5. Ideally, policy-making should be evidence-based. But public policy-making is an inherently political matter, governed by priorities set by the predominant political constellation in a particular country. Consequently, policy-making involves striking a balance between technocratic assessments based on scientific evidence and priorities based on political considerations and interests.

6. Scientists and policy-makers/practitioners find it difficult to understand one another, in part because they rarely meet. They tend to speak different 'languages' with distinct idioms, often compounded by the technical jargon of specialised fields of science. Unfortunately, the appropriate fora for dialogue between the scientific community and the development community are often lacking.

7. The two discrete communities operate within different time horizons. Research and technological development is a long-term undertaking. By contrast, politicians and practitioners in the civil service, in the private sector and in civil society are impatient. They want to see instant application of research findings and insights. The mismatch of the time perspectives of the scientific and development communities, respectively, is a major impediment to finding a common platform for collaboration.

8. Beyond the *formulation* of policy, the *implementation* process is also inherently political in nature; the same political factors that influence the formulation of policy are also operative in the

implementation process.

9. The eligibility criteria for both the EDF and the FPs appear to restrict access by African institutions to resources for research purposes under these instruments. Largely due to weak institutional capacities, lack of and/or unreliable communication infrastructure and several other structural impediments, the involvement of African institutions in EU-funded research programmes has been dismal, although on the increase.

10. Notwithstanding fundamental differences between the objectives of the FPs and the EDF there is potential for convergence along certain dimensions. While the FPs see S&T as a major driving force of production and societal change, the EDF also acknowledges the importance of science and technology in the economic development process, societal transformation and the improvement of quality of life, albeit to a lesser degree. These common features provide a basis for the intensification of development interventions through harmonisation, co-financing, joint implementation, monitoring and review, as well as the consolidation and the scaling-up of successful interventions.

11. The existing AU–EU dialogue arenas require fora of African and European technocrats and S&T subject-matter specialists to refine and operationalise policy decisions, to assess the technical feasibility of various policy options, and to prepare actions plans, including the identification of resources for their implementation within Europe and Africa.

12. Mechanisms should be put in place to ensure harmonisation and synchronisation of interventions at various levels for greater development impact with more efficient use of resources.

13. There is an absence of provisions within the FPs for support to pre-proposal activities ('seed money') for potential applicants, as well as lacking mechanisms for cross-utilisation of EDF and FP funds. It is imperative, therefore, to operationalise the ACP S&T programme within the 10th EDF for support to STI institutional capacity building for SETIs within ACP countries.

14. A window could be introduced for support to pre-proposal or proposal preparation activities for all initial applicants to enable them to undertake preliminary research and to engage meaningfully in fully-fledged proposal development. Thus their transaction costs would be reduced and the threshold for participation lowered.

15. The EDF national and regional indicative programmes could be modified or redesigned to make an explicit provision for STI activities that the recipient countries and RECs would be expected to include in their national and regional programmes.

16. There is a case for the reconceptualisation of programmes, their consolidation or merger, their scaling-up ambitions, and the harmonised implementation of existing programmes at intra-regional, regional or continental levels in order to leverage more resources, harness the underlying synergies, ensure cost-effectiveness, and augment their development impact.

17. The establishment and operationalisation of the African Science and Innovation Fund (ASIF) for long-term financing is urgent. This facility could be capitalised by AU member state contributions and complemented by EDF and future FP funds channelled to Africa, and with contributions from the donor community.

18. There is a case for ensuring greater coherence in the preparation of the future 8th Framework Programme. Short of requiring each and every FP project to take on board the development implications, far greater emphasis should be placed on the application aspects of FP projects in order to enhance the take-up of research results in development programmes. However, a greater emphasis on application must be adapted flexibly, depending on the nature of the funded projects.

19. Acknowledging that there is a divide between S&T and development communities that needs to be bridged, it is imperative that steps be taken to bring them together in dialogue fora. The dialogue and interaction must move from the high level of officials and politician and be brought down to the scientists and practitioners who are closest to the problems at hand.

20. It is mandatory to build *operational* models for bridging the existing gap. While awareness-raising in the two communities involved is a necessary first step towards better S&T–development synergy, the heightened awareness must be translated into models of collaboration between scientists and practitioners with a view to achieving a greater take-up of research findings for development ends. But it would probably not be possible to arrive at a generic collaborative model that would fit all circumstances and sectors.

21. Possible ways in which African scientific Diasporas can be effectively utilised to synergise S&T and development must be explored. Creating short- or medium-term placements in African universities and research institutions for highly qualified Diaspora personnel seems an attractive avenue. Beyond their technical knowledge and skills, Diaspora scientists may contribute new understandings acquired in the host countries, cultural competence and tacit knowledge that span hybrid identities and transnational experience. Diaspora members can act as effective interlocutors between the technology and its originating context and the home country's recipients and culture.

22. There is a strong case for promoting better synergy between S&T and development in sub-Saharan Africa with regard to intellectual property legislation. The enactment of comprehensive legislation across the African continent is a matter of urgency and accords well with one of the AU lighthouse projects: setting up a Pan-African intellectual property organisation (PAIPO).

23. Ideas and recommendations will remain castles in the air if they are not accompanied by funding mechanisms. While governments will ultimately be the principal funding sources, the donor community will continue to play a supplementary role. It is recognised that the bulk of the funding for activities intended to bridge the S&T–development divide must come from the 10th EDF.

24. The operationalisation and implementation of the 8th partnership of the Joint Africa-Europe Strategy is still in its infancy, but once operational and funded, resources could be leveraged from this source.

25. There is a case for setting up an endowment fund which could serve as a supplementary basis for long-term financing of such activities. An endowment fund would have the advantage of insulating the S&T–development synergy-promoting activities from the unpredictability of governments and donors.

ACRONYMS AND ABBREVIATIONS

ACP	African, Caribbean and Pacific
ADP	Agricultural Development Programme
AfDB	African Development Bank
ANSTI	African Network of Science and Technology Institutions
ARDEP	Agricultural Research and Development Programme
ASIF	African Science and Innovation Fund
AU	African Union
AUC	African Union Commission
CAAST-Net	A Network for the Coordination and Advancement of Sub-Saharan Africa-EU Science and Technology Cooperation
CAP	Common Agricultural Policy
CBO	Community-Based Organisation
CODESRIA	Council for the Development of Social Science Research in Africa
CPA	Consolidated Plan of Action (AU/NEPAD)
EAC	East African Community
EDF	European Development Fund
EPA	Extension Planning Area
EU	European Union
EUR	Euro (currency)
FAO	Food and Agriculture Organisation (of the United Nations)
FP	Framework Programme
FP7	EU 7 th Framework Programme for Research and Technological Development (2007–2013)
GMO	Genetically Modified Organism
ICPC	International Cooperation Partner Countries
ICT	Information and Communication Technology
INCO-NET	International Cooperation in Science and Technology Network
IST	Innovation, Science and Technologies
M&E	Monitoring and Evaluation
MoAFS	Ministry of Agriculture and Food Security
NARS	National Agricultural Research System
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organisation
NRCM	National Research Council of Malawi
PAIPO	Pan-African Intellectual Property Organisation
PCO	Programmes Coordination Office
R&D	Research and Development
REC	Regional Economic Community
SETI	Science, Engineering and Technology Institution
SICA	Specific International Cooperation Action
S&T	Science and Technology
STD	Science and Technology for Development
STI	Science, Technology and Innovation
UNCST	Uganda National Council for Science and Technology
UNCTAD	United Nations Conference on Trade and Development
WP	Work Package

INTRODUCTION

The CAAST-Net project is designed to establish a platform for improving cooperation in science and technology (S&T) between Europe and sub-Saharan Africa.¹ Towards this end, CAAST-Net will offer critical analyses of the existing S&T cooperation landscape between Europe and Africa. Informed by such analyses, CAAST-Net will support Europe-Africa S&T policy dialogues to enhance cooperation and improve coordination of partnership initiatives.

CAAST-Net has been developed against the background of the emerging global consensus that S&T is essential not only to modern economic competitiveness, but also to sustainable development and poverty reduction. African governments are increasingly prioritising S&T as a key factor of their national and regional growth and development programmes. However, current S&T cooperation initiatives frequently lack coherence with policy objectives, and suffer from fragmentation. Under the umbrella of CAAST-Net, Work Package 2 (WP2) is addressing the interface between, on the one hand, S&T cooperation under the EU Framework Programmes for Research, and, on the other, the broader development endeavours towards poverty reduction and food security, especially within the context of the European Development Fund (EDF) as the main instrument of development cooperation.

In addition to the opportunities for African researchers to participate in its Framework Programmes (FP), the EU has long-standing development cooperation relationships with African governments as currently governed by the Cotonou Partnership Agreement, as well as through other instruments.² The development cooperation instruments could offer support for R&D activities, focused, for example, on African priorities such as poverty reduction and food security, which the present FP modalities are ill suited to support.

Under the Cotonou Partnership Agreement, the EU's chief instrument for development cooperation with Africa is the EDF. This facility provides development cooperation funding to African governments through national programmes, and to Africa's regional economic communities (RECs) through regional programmes. Over the years there has not been consistent alignment and indeed very little synergy between the objectives of EDF programmes for Africa, on the one hand, and the opportunities for African participation in successive Framework Programmes, on the other. Consequently, very few EDF-funded activities—either nationally or regionally—have a specific science and technology capacity-building component. Similarly, S&T has not been optimally integrated within the broader thematic development cooperation activities.

In a companion report ('Science and Technology for Development: The Institutional Landscape in Africa and Europe') WP2 has examined the existing landscape as far as S&T is concerned in relation to broader development efforts in Africa. Taking its cues from this report, the present report sets out to advance a series of recommendations as to how synergies could be improved between the EU's respective instruments for S&T and development cooperation with Africa. The goal is partly to promote a higher priority of science and technology capacity-building activities in African countries' EDF National Indicative Programmes, and partly to support their science and technology capacity-

building programmes, as well as the Regional Indicative Programmes of the RECs within a wider regional context.

Following the analysis, WP2 will, through the convening of an appropriate forum, seek to strengthen and inform the dialogue between stakeholders from the African S&T community and European and African policy-makers responsible for EDF programming i.e. the identification of EDF spending priorities. The analytical work and awareness-raising efforts of WP2 could serve as a platform for a possible greater take-up of S&T priorities in the EDF, in both national and regional programmes, to achieve greater synergy and to strengthen innovation capabilities.

In summary, the objectives of WP2 are:

- i. To promote greater take-up of development-orientated FP research in order to facilitate innovation;
- ii. To promote better synergies between EDF development goals and FP7 S&T cooperation with Africa;
- iii. To develop means and mechanisms to strengthen regional indicative programmes;
- iv. To identify regional S&T bodies in Africa (for example, NEPAD, CODESRIA, and ANSTI) which might undertake further actions/activities related to enhanced African participation in FP7.

1. BRIDGING S&T AND DEVELOPMENT

The inter-relationship between science and technology, on the one hand, and innovation, outreach and application for development, food security and poverty reduction, on the other, is a very complex one.³ These divergent types of activity tend to be compartmentalised and to interact only rarely, or at best occasionally, because their evolution seems to move on separate tracks. Bridging the gap between these endeavours is therefore a challenging task. The road from the researchers' world of S&T to innovation and the application of findings and insights, to the daunting development challenges facing African countries is indeed long and convoluted. The intervening factors are legion and may distort or 'contaminate' the dissemination and application processes. These factors may be technical, beyond the control of scientists and practitioners alike, or natural phenomena such as weather conditions and other calamities. Arguably, the most difficult distorting influence to tackle is political interference, which may take many forms, for example budgetary misallocation of funds; corruption; or the misuse of research findings for cheap populist purposes by self-serving politicians.

Ideally, policy-making should be evidence-based and informed by findings from research. But public policy-making is an inherently political matter—as it should be—governed by priorities set by the predominant political constellation in a particular country. Consequently, policy-making involves striking a balance between technocratic assessments based on scientific evidence and priorities based on political considerations and interests. However, when political interest takes precedence in disregard of technocratic and scientific evidence, it could lead to policy failure.

Apart from the unpredictability of political interference in the formulation of policy, translating knowledge and insights from research into operational policy requires close dialogue and consultation between scientists and policy-makers, and practitioners. Apparently living in their separate worlds, scientists and policy-makers/practitioners find it difficult to understand one another, in part because they rarely meet. They tend to speak different 'languages' with distinct idioms, often compounded by the technical jargon of specialised fields of science. Unfortunately, the appropriate fora for dialogue between the scientific community and the development community are often lacking.

It should also be noted that the two discrete communities operate within different time horizons. By its very nature, research and technological development is a long-term undertaking. Meticulous research, taking account of a host of variables, is time-consuming. Research methodologies require careful documentation of details so as to enable review by peers. As a result, scientists tend to take the time they deem necessary. The time pressure on their rate of progress stems primarily from career considerations in terms of the publication of findings in peer-reviewed journals, and from accountability obligations to the agencies that provide research funding. The dissemination and application of findings are not primary concerns of scientists. By contrast, politicians and practitioners in the civil service, in the private sector and in civil society are impatient. They want to see instant application of findings and insights, if that were possible. The respective constituencies of these categories of practitioners have in common that they expect speedy benefits from investment in S&T activities.

First, the politicians want to be able to tell their voters that tangible benefits from research were brought to their constituencies during their term of office. In their re-election campaigns politicians would like to capitalise on the perceived benefits deriving from S&T. They are disinclined to wait for results to materialise further down the line because it might be too late when considered within their rather short time perspective: by then they might simply not have been re-elected. The upshot is that they tend to be very impatient and to push scientists towards premature application of findings, which, in turn, could be counter-productive. Second, civil servants are similarly judged by their performance in this era of accountability (physical, technical and financial), even though they do not have to face the challenge of election. Third, the same basic logic applies to civil society which is under pressure from their constituencies and donors who demand results. The mismatch of the time perspectives of the scientific and development communities, respectively, is a major impediment to finding a common platform of collaboration.

Beyond the *formulation* of policy, the *implementation* process is also inherently political in nature, although this is often not appreciated or acknowledged. Policy formulation and implementation are not – as is often assumed – discrete, successive phases whereby implementation simply follows the precepts laid down in the preceding formulation. The same political factors that influence the formulation of policy are also operative in the implementation process. Therefore, the potential distortion effects of political interference may lead to outcomes at variance with the results the formulated policy was intended to achieve.

Apart from the ‘contamination’ effects stemming from political interference, the implementation process requires continuous dialogue and liaison at all levels between the stakeholders involved to be successful. There might be a problem, though, that stakeholders pull in different directions according to their narrow interests and sometimes in defiance of evidence.

Notwithstanding these caveats and risks, it is imperative that—in the interest of development—a meeting of minds is found between the two respective communities of scientists and practitioners. Against the backdrop of the policy environment and the institutional landscape described in the companion report (‘Science and Technology for Development’), this report will endeavour to make some suggestions that may promote that ambition.

2. AFRICA–EU S&T COOPERATION INSTRUMENTS

The companion report ('Science and Technology for Development') to this one indicates several gaps that need to be addressed on either side of the divide in order to foster meaningful development cooperation between Africa and Europe, not only in science and technology but across the entire spectrum of development cooperation.

More specifically, the various instruments of cooperation, i.e. the EDF and the Framework Programmes could adopt harmonised technical design and funding approaches to provide a common platform for synergistic undertakings and to ensure adherence to the provisions of the Paris Declaration with regard to cost-effectiveness and significant development impact across Africa and Europe. The funding priorities under both instruments, though largely EU-driven, could be amended or reformulated in order to reflect a consensus on Africa–EU priorities on S&T and development. The Cape Town Consensus, the AU/NEPAD CPA and the Lighthouse Project concepts spell out several of Africa's STI and development priorities that could be considered for future inclusion within the 10th EDF and the 8th Framework Programme.

The eligibility criteria for both the EDF and the FPs appear to restrict significantly access by African institutions to resources for research purposes under these instruments. In the case of the Framework Programmes, even though third party countries may not be in a position to initiate and coordinate grant proposals in lead functions, strategic partnerships could be enhanced to ensure early and significant inclusion of third party countries and researchers in EU-led research and development programmes. The profile, responsibilities and compensation of African institutions and researchers could be matched with their actual and relative contribution towards achieving the desired results.

Largely due to weak institutional capacities, lack of and/or unreliable communication infrastructure and several other structural impediments, the involvement of African institutions in EU-funded research programmes has been dismal (see 'Science and Technology for Development'). They are concentrated in a few centres of scientific excellence leaving the rest of the African continent unaware of, or not significantly involved in such activities. Consequently, this renders the greater part of the African continent oblivious of cutting-edge developments in various fields of science and technology, and therefore, unable to engage in mutually beneficial cooperation undertakings with their EU counterparts. To ameliorate that situation, EDF and FP resources could be leveraged to synergistically and mutually reinforce each other in strengthening the capacity of African institutions and researchers to become effective and genuine partners with their EU counterparts in building up robust science and technology systems across Africa, and in the EU. Initial emphasis could be placed on creating incentives and building adequate network infrastructure and human resource capacities that are required for effective participation in international cooperation activities. Expanding capacities will not by itself produce the desired effect. Complementary policies to retain human resources are necessary—for example, better working conditions and higher remuneration—

so as not to accelerate the brain drain. Below are some suggestions and options on areas of potential synergy between the EDF and the FP in fostering the EU's S&T cooperation with Africa.

3. SYNERGY OPTIONS

The Framework Programmes and the EDF differ fundamentally in many respects (see companion report for details). The overriding objective of the FPs is to enhance the competitiveness of the EU in the world economy. However, by inviting African partners into EU-led research consortia with FP funding African countries may also—as a bi-product—stand to enjoy benefits in terms of knowledge creation. By contrast, the principal objective of the EDF is to promote tangible development in the ACP countries (including Africa), which are typically short-term undertakings. Notwithstanding these fundamental differences, the FPs and the EDF have the potential of converging along certain dimensions. While the FPs see S&T as a major driving force of production and societal change, the EDF also acknowledges the importance of science and technology in the economic development process, societal transformation and the improvement of quality of life, albeit to a lesser degree. These common features provide a basis for the intensification of development interventions through harmonisation, co-financing, joint Implementation, monitoring and review, as well as consolidation and the scaling-up of successful interventions.

On the basis of the foregoing discussion, the options for better EDF-FP synergy fall under five rubrics: 3.1 policy considerations; 3.2 new programmes/windows of support; 3.3 programme modification or (re)design to explicitly include S&T activities; 3.4 programme consolidation; and 3.5 STI financing.

3.1 Policy considerations

An overarching policy issue regards the perceived role and contribution of Africa in promoting the development policy objectives of the EU. This forms the basis of the EU–Africa S&T cooperation that is effected through the EDF, the FPs and other multilateral and bilateral cooperation instruments. Since the EU–Africa Strategy recognises Africa as strategic partner, a permanent forum for EU–Africa dialogue at both political and technical levels is required to ensure political commitment and technical follow-up on the implementation of the strategy and the achievement of its common objectives. This appears to be emerging from the Joint Expert Group on the 8th Partnership (JEG8).

The existing AU–EU dialogue arenas—for example, the recently adopted commission-to-commission platform—require complementary fora of African and European technocrats and S&T subject-matter specialists (in agriculture, industry, health, environment, water and sanitation, energy, education, ICT, and the like) to elaborate, refine and operationalise policy decisions, to assess the technical feasibility of various policy options, and to prepare actions plans, including the identification of resources for their implementation within Europe and Africa.

These technical fora will provide the much needed follow-up and operationalisation of the policy aspirations of the continental authorities and provide an arena for professional interaction among policy-makers, technocrats and development practitioners across Africa and Europe as an essential first step towards the sharing of experiences, approaches, harmonisation, ownership, and commitment to the implementation of international cooperation activities.

Another important policy consideration relates to the relative importance and priority—in terms of resource envelopes—accorded to research as distinct from development activities. While debate is rife between proponents and sympathisers of both aspects, where performance records are the key determinant of resource allocation, it should be noted that the road from research to products on the market shelf is not as linear and straightforward as it may seem in the case of development interventions—designed by means of the widely used logical framework toolbox—that almost certainly will produce some results within a given time horizon, notwithstanding unexpected outcomes in some cases. Taking this into consideration, a greater appreciation of the uncertainties of research endeavours is required when balancing the funding priorities between research and development interventions. Sustainable and adequate funding mechanisms could be explored within the EDF, the FPs or other instruments with assurance for higher returns from investments in research and innovation in the longer-term perspective.

A final policy consideration relates to the appropriate modality of development financing for various EU and African STI initiatives. Current practice involves a mixture of modalities at multiple levels, where there is direct funding of national activities alongside funding through the RECs as well as through continental bodies. In this way, funding is provided to projects which ensure closer donor control of budgets and cost-effectiveness, but often at the expense of coordination, synergy, harmonisation and alignment. This incoherent arrangement and management practice have obvious disadvantages, especially in respect of the multiplicity of related interventions it generates; the scattering of resources; the high likelihood of overlaps; complications in the measurement of development results; and resultant diminished impact on the ground. Therefore, mechanisms should be put in place to ensure harmonisation of synchronised development interventions at various levels for greater development impact with more efficient use of resources. Specific project support measures for short-term research and/or development activities in the mutual EU–Africa development priorities (reflecting the consensus derived from the EDF, the FPs, the AU/NEPAD CPA, regional and bilateral country-specific development strategies) could be put in place. Longer-term and sustainable funding arrangements could be established through, for example, regional financial institutions such as the African Development Bank (AfDB) for the regional and continent-wide STI initiatives, complemented by funding sources at the national level. Proposals towards that end have been mooted in several fora, and need to be reinforced and made operational.

3.2 New programmes and windows

An apparent lack of specific STI focus was noted within the 9th EDF. Similarly, there is an absence of provisions within the FPs for support to pre-proposal activities ('seed money') for potential applicants (particularly relevant to under-resourced African research institutions), as well as lacking mechanisms for cross-utilisation of EDF and FP funds. These shortcomings in terms of S&T–development synergies suggest that it is imperative at this point to operationalise the ACP S&T programme within the 10th EDF for support to STI institutional capacity building (research infrastructure and human resources) for SETIs within ACP countries. This could serve as an STI cooperation and capacity enhancement programme/facility for African countries. Part of the funds within such a programme/facility could go towards supporting participation in EU and FP activities

such as organising EU–Africa technical fora, preparing FP applications and participation in other EU–Africa activities.

Also within the FP application procedures, a window could be introduced for support to pre-proposal or proposal preparation activities for all initial applicants—especially in less developed economies—to enable them to undertake preliminary research and to engage meaningfully in fully-fledged proposal development. Thus their transaction costs would be reduced and the threshold for participation lowered. The long-term effect of such a facility would probably be enhanced STI capability in African countries. To the extent possible the national governments might include such facilities in their national indicative programmes.

3.3 Programme modification or redesign

A review of the portfolio under the 9th EDF indicates a limited focus on STI-specific activities, especially in Africa. Funding under the EDF tends to be allocated to the traditional sectors of the economy, leaving out science, technology and innovation systems which in most cases are either implicitly subsumed under other sectors or completely left out of national priorities as reflected in national development plans or country assistance strategies by donors. The apparent absence of STI programmes from important funding instruments such as the EDF blocks the opportunity for conscious STI planning and prioritisation within national and donor-assisted development strategies. Therefore, the EDF national and regional indicative programmes could be modified or redesigned to make an explicit provision for STI activities that the recipient countries and RECs would be expected to include in their national and regional programmes.

The FPs also appear to address STI issues only at the level of policy and knowledge generation, leaving the nitty-gritty and intricate STI issues of a technical nature to the national economies or regional bodies that are ill equipped to meaningfully implement STI policy recommendations and outputs arising from FP activities. In order to ensure full implementation of FP recommendations and the application of research results, future FPs could be redesigned to cater for the entire project cycle in a multi-phased manner, covering not only the research project implementation but also policy research, application of findings in pilot activities, performance review and feedback. In this redesigned manner, the FPs would not stop short at policy advice but also provide practical field-tested solutions to STI challenges across Africa and Europe.

3.4 Programme consolidation

An examination of FP and EDF project portfolios across Africa, side by side with the AU/NEPAD CPA ongoing projects and proposals, the AU Lighthouse Projects (or concept notes as yet) and various proposals by the RECs points to commonalities by theme, sector of intervention (in most cases as consensual priorities among these institutions), implementation systems and structures, and expected results across countries or regions. This provides an opportunity for considering the reconceptualisation of programmes, their consolidation or merger, their scaling-up ambitions, and the harmonised implementation of existing programmes at intra-regional, regional or continental

levels in order to leverage more resources (financial, logistical and human), harness the underlying synergies, ensure cost effectiveness, and augment their development impact. Discussions around these possibilities could be considered among the various champions within the AU, NEPAD, the EU, the EDF, the ACP and the donor community. A similar approach could be undertaken at national and regional level institutions within Africa.

3.5 STI financing

Adequate, consistent and sustainable financing remains a daunting challenge for Africa's science, technology and innovation systems (see companion deliverable report 2.1). Therefore, the available resources under the EDF and other funding arrangements need to be consolidated, augmented and complemented by new and significant funding over the long term. Efforts by the East African Community to establish and locally capitalise a regional science and innovation fund are commendable and ought to be emulated at the continental level through the establishment and operationalisation of the African Science and Innovation Fund (ASIF)—first proposed by AMCOST in 2005—for long-term financing. A similar facility is the Digital Solidarity Fund. The ASIF facility could be capitalised by AU member state contributions and complemented by EDF and future FP funds channelled to Africa, and with contributions from the donor community. The fund could complement the EDF and the FP by financing Africa's participation in EU–Africa activities as well as the Africa-specific STI activities such as institutional development and capacity strengthening in non-EU priority areas.

Against the backdrop of Africa's protracted struggles for partnership and equal say in global STI and development policy, and for weaning itself from aid dependence, it is imperative for the continent to evolve home-grown solutions to STI and other development challenges. This includes formulating its own policies, designing its development interventions and financing mechanisms which would be complemented to an increasingly lesser degree by grants from development partners including the European Union. Only then will Africa be in position to take full control of its STI development destiny.

4. RECOMMENDATIONS

Flowing from the above considerations of options a number of specific recommendations emerge with regard to synergising S&T and development endeavours. At the outset it should be recognised that in order to arrive at a meeting of minds of the two distinct communities, accommodating efforts will have to be made on either side of the divide in terms of concessions, attitudes and good will. This appears particularly important in view of the legacy and persistence of poor communication between scientists and practitioners.

4.1 Applying FP results for development purposes

The objectives and procedures of FP7 are already firmly established. It will not be feasible, therefore, to recommend any amendments to its current make-up for the 2007–2013 period. Even so, recommendations can be made for amendments to the rules and regulations for the next period from 2014 onwards.

It may be far-fetched to require each and every project to suggest ways and means of applying the emerging results in the interest of development in Africa or elsewhere in the developing world. After all, it is acknowledged that the Framework Programmes are designed primarily to generate knowledge for the benefit of the EU and its member states with a view to promoting their global competitiveness. It will not be more than a coincidental effect of the Framework Programmes to contribute to development in the interest of poverty reduction or food security in Africa. Inviting African research institutions into consortia with European counterparts does not alter the primary orientation of the Framework Programmes; African participation is considered desirable only in so far as it contributes to the overriding FP objective. Granted, however, African participation will no doubt contribute in some measure to increasing the pool of knowledge and expertise in Africa and, *ipso facto*, make an indirect contribution to Africa's development as a 'bi-product'.

A debate has been raging for some time within the EU regarding the coherence, or lack of such, between policies in different spheres of activity. The argument has been that one set of policy in one sphere should be consistent with that of others. Otherwise, policies might cancel out each other. Vocal claims have been made that the implementation of the EU's trade policies and the Common Agricultural Policy (CAP) are not coherent with its development policy and that the former, in fact, undermine the latter. Admittedly, the EU is making continuous efforts to ensure greater policy coherence across the board but much remains to be done.

The point to drive home in this report is that the policies underlying the Framework Programmes are not entirely coherent with those in the development sphere. There is a case, therefore, for ensuring greater coherence in the preparation of the 8th Framework Programme. Short of requiring each and every FP project to take on board the development implications, this report would recommend that far greater emphasis be placed on the application aspects of FP projects in order to enhance the take-up of research results in development programmes.

However, a greater emphasis on application must be adapted flexibly, depending on the nature of the funded projects. In the first instance, some projects are of a very basic nature in the sense that the specific application of their outputs may not be known at the time when the research is being undertaken. It will be unreasonable, therefore, to require such project proposals to state clearly what the anticipated applications might be, because they may become apparent only some years down the line. Second, many FP projects do have, on the other hand, several possible applications that can be envisaged *a priori*. They should be stated explicitly. Third, some projects may, indeed, have taken as their points of departure specific problems that cry out for a solution. In those cases the inclusion of an application section in the proposal may seem obvious. In many cases it will not be unreasonable to require the applicants to make a statement on the applicability of the envisaged results, and even to write a policy brief upon the completion of the project that indicates its implications for policy and practice.

4.2 Dialogue fora

Acknowledging that there is a divide between S&T and development communities that needs to be bridged, it is imperative that steps be taken to bring them together in dialogue fora. It is vital that mutual awareness be raised about the respective modes of thinking by the two communities. It is conceded that the understanding of the issues may be adequate in high-level circles of officials, perhaps even in some circles of politicians. Declarations and official documents are replete with statements that acknowledge the worlds apart of S&T and development, as well as half-hearted commitments to remedy the situation. Unfortunately, the rhetorical statements often remain mere lip service; significant corrective measures are only rarely taken.

The position taken in this report is a sincere plea for the operationalisation of lofty principles and ambitions. The dialogue and interaction must move from the high level of officials and politician and be brought down to the scientists and practitioners who are closest to the problems at hand.

4.3 Building models of S&T–development synergy

Beyond dialogue fora for raising mutual awareness about the interface between S&T and development efforts, it is mandatory to build *operational* models for bridging the existing gap. While awareness-raising in the two communities involved is a necessary first step towards better S&T–development synergy, the heightened awareness must be translated into models of collaboration between scientists and practitioners with a view to achieving a greater take-up of research findings for development ends. This is only possible if the models are workable, i.e. involving all the relevant stakeholders operating on a common understanding and within a policy environment conducive to such collaboration. It would probably not be possible to arrive at a generic collaborative model that would fit all circumstances and sectors. Conditions vary considerable from one country to another and across sectors. Even so, certain elements of a model may be robust and replicable in wider contexts. Other elements may be less robust. Hence, most models, while replicable in some respects will need to be ‘customised’ to the specific conditions at hand, be they institutional or otherwise.

A Malawian model to be emulated

In Malawi, a poor African country vulnerable to food insecurity, an interesting model has been elaborated for harnessing S&T in the agricultural sector. Previously, Bunda College of Agriculture as a key agricultural research institution tended to live in an academic cocoon devoid of any inclination for the application of the technologies it had developed and for outreach to smallholders as the ultimate beneficiaries. Promising technologies were effectively shelved. However, with the design of a new programme in 2006 – the Agricultural Research and Development Programme (ARDEP) – this apparent distain for application of research findings changed completely.

The novelty of ARDEP is its mode of operation. First, its defining characteristic is the involvement of multiple stakeholders across sectors – government (in particular the extension services), farmers' associations, NGOs and CBOs, poor smallholders, and research institutions – into a coherent system of implementation so as to ensure concerted action towards common goals. Second, a series of micro projects implemented in selected pilot sites throughout the country are based on demand-driven research from and outreach to the ultimate beneficiaries at the grassroots: the farmers themselves, in conjunction with and on the advice of the scientists. The micro projects cover several agricultural sub-sectors such as animal husbandry, crop cultivation, fish farming, and marketing. In such a bottom-up approach extensive sensitisation and mobilisation were necessary. Creating rapport and collaboration among stakeholders who used to be sceptical of each other was a time-consuming process. Third, the pilot micro projects are fully integrated into established government structures, especially those of the Ministry of Agriculture and Food Security (MoAFS). Moreover, ARDEP fits squarely into the overall government policy framework for the agricultural sector: the Agricultural Development Programme (ADP). It must be underscored that ARDEP is a national programme, although managed from Bunda College. This feature is especially important for its sustainability beyond the initial period with external donor funding.

Significantly, steps are being taken to include ARDEP as an item in the regular state budget which would also contribute to sustainability. Fourth, ARDEP is exploiting existing technologies previously developed at Bunda College and through the National Agricultural Research System (NARS) which falls under the MoAFS. In the past, these technologies tended to remain without wider application but through ARDEP the missing outreach element has been given prominent attention.

In addition, the ARDEP micro projects also incorporate concurrent research spurred by problems that have emerged in the course of implementation. The results thereof will be fed into and reinforce the ongoing development activities.

The model involves the provision of project inputs from external funds through ARDEP, i.e. improved production technologies, including seeds, fertilisers, and improved breeds of animals; initial capital, mainly for construction purposes; and advisory services from the scientists. For the purpose of documentation of activities and results, a system of monitoring and evaluation (M&E) was established, which is critical for deriving lessons learned when subsequent scaling up is put on the agenda.

The apex of ARDEP's governance structure is formed by the Programme Board responsible for policy. Below the Board is the Management Group consisting principally of technical people responsible for assessing project proposals stemming from the calls for proposals and providing technical advice in the implementation of the programme. The daily management of ARDEP is entrusted to the Programmes Coordination Office (PCO). The management of the micro projects is delegated to resident government officers at the district and Extension Planning Area (EPA) levels, and NGO personnel who liaise with and assist the farmers and their associations in the implementation of the projects. The local teams are intermittently visited by scientists from Bunda College or from the Chitedze National Research Station who offer guidance and advice. The bulk of the development work is carried out by the farmers themselves and their local associations.

Overall, what has emerged is a unified management and implementation structure comprising a wide range of relevant stakeholders whose collaborative relationships are cordial and function well. However, the demarcation between the roles of the scientists and development workers, including farmers in the management of the micro-projects at times becomes blurred when interacting. Although there are grey zones between research and development, the respective roles of the staff involved should be delineated clearly. While it is crucial that the scientists engage with the implementers and farmers so as to promote a proper understanding of the new technologies by the beneficiaries, once that understanding and knowledge has been imparted, the scientists should withdraw and leave the development work to the other implementers and the farmers.

The ARDEP concept and design are definitely sound and may serve as a model for synergising S&T and development elsewhere, not only within the agricultural sector but also in other sectors, provided necessary modifications are made to adapt to the circumstances at hand.

4.4 Tapping into the African Diaspora

Through migration, Africa has been losing large numbers of professionals and scientists in a wide variety of sectors. This migration, principally to Europe and North America, has no doubt had a debilitating effect on African public and private institutions. The estimated number of African immigrants in Europe and North America is in excess of 3 million. Although not all of them are professionals, a large proportion has higher education. Put differently, more than one-third of Africa's highly qualified human resources are at present in the Diaspora. The majority of them left voluntarily (or due to structural compulsion or an illiberal intellectual environment) in search of better remuneration and working conditions than their home base could offer since most African states are still unable to offer competitive salaries and working conditions in terms of research funding, laboratories, and the like.

Debate is rife on whether to consider these migrants as Africa's loss (brain drain), brain circulation (in the context of industrial training and global exposure) or labour export (in the context of remittances). The perception and treatment of these migrants in national demographics varies across the countries and is largely shaped by the factors underlying their decision to migrate, length of stay in the host countries, as well as their subsequent commitment to their home countries.

In the context of this report we explore the possible ways in which these Diasporas can be effectively utilised to synergise S&T and development on the African continent.

Much attention has been directed at the considerable amounts of remittances from Diaspora populations. A World Bank estimate in 2003 put the volume of remittances to sub-Saharan Africa at USD 4 billion. Beyond the remittances, however, Africa would be interested in the skills and human resources that the Diaspora represents. Short of luring Africans back to their countries of origin on a permanent basis, probably an unrealistic proposition save for professionals approaching retirement, there are other options worth considering.

First, *creating short- or medium-term placements in African universities and research institutions for highly qualified Diaspora personnel* seems an attractive avenue. There is evidence, manifested in the remittance flows, that the African Diaspora harbours commitments and loyalties to their home countries because of family ties, mortgages, career prospects, and the like. These could be tapped into through sabbaticals and other arrangements of leave of absence from tenured positions in the host countries.

With regard to the interface between S&T and development, Diaspora scientists and professionals are likely to possess certain advantages. Scientific migrants' work environment in the industrialised host countries tend to be far superior to that of their home countries in terms of funding, technical support, equipment and laboratories, scientific networks and experimental conditions. Being equipped with such scientific experiences coupled with experiences from their home countries would produce a competitive combination of skills. The process of knowledge creation, dissemination, transmission and application requires not only social and institutional insights. It also requires socio-cognitive insights which are rarely replicable or transferable because they build on local conditions and the tacit collective knowledge accumulated through daily group practice. For the application of research findings to be successful deep knowledge is necessary of the conditions into which research findings are to be introduced.

Thus, beyond their technical knowledge and skills Diaspora scientists, when well harnessed, may contribute new understandings acquired in the host countries, cultural competence and tacit knowledge that span hybrid identities and transnational experience. Diaspora members can act as effective interlocutors between the technology and its originating context and the home country's recipients and culture. Furthermore, scientific migrants in the Diaspora are likely to understand and be able to apply state-of-the-art approaches to problem-solving. While hailing from African countries they have been exposed to and socialised into the scientific culture of their host countries – being members of two worlds, so to speak. These scientists and professionals would thereby have the added capability of problems-solving and could act as communicators and bridge-builders in a dual sense: (a) between S&T and development in general; and (b) between sophisticated science and the conditions obtaining at the grassroots, including cultural dimensions.

The latter function would be particularly useful in spurring innovation adapted to local conditions and thus to synergising research and development.

Second, the 'virtual' return of the Diaspora by means of ICT could also be an option, although perhaps to a lesser degree than temporary placements. There is a potential for ICTs which are increasingly gaining ground in Africa to be exploited more systematically. However, the potential is for the time being constrained by the persistent digital divide, even if the constraints may dissipate in the not too distant future. The advantage of this option is that it is not limited to short- or medium-term physical placement of staff; it could operate on a year-round basis for knowledge sharing and virtual service delivery. A range of discussions ranging from policy consultations and student supervision to clinical diagnosis, etc. could be pursued through this mechanism. In which case the notion of 'brain drain' could be reconsidered as 'brain circulation' where one continues to contribute technically and economically to their home country while physically working and living in another country.

4.5 Intellectual Property legislation

A new facility within FP7 is Specific International Cooperation Actions (SICAs) geared towards third countries which are listed as International Cooperation Partner Countries (ICPCs). This list includes all sub-Saharan African countries. Some SICAs are dedicated to third countries with a view to reinforcing their research capacity. They may also be relevant when there is mutual interest between the EU and the ICPCs on the basis of both S&T and the developmental needs of the countries concerned. SICAs are also intended to encourage FP7 participation of countries which lack capacity to participate in other topics of FP7. The participation of at least two ICPCs and at least two EU states is compulsory for a consortium wanting to carry out a SICA.

Unfortunately, the SICA instrument may not be appropriate for addressing the challenges facing Africa with respect to intellectual property rights because the criteria would not be met. There is a strong case, however, for promoting intellectual property legislation in sub-Saharan Africa. An appropriate mechanism must be found toward that end. While some legislation with limited thematic or sectoral coverage exists, very few African countries have enacted comprehensive legislation to protect intellectual property and innovations generated by African research institutions. Furthermore, Africa's rich resources of biological material are currently being 'poached' by non-African interests for the purpose of genetic modification which is subsequently patented and controlled by commercial interests outside the African continent. The use of genetically modified organisms (GMOs) is a hugely controversial matter in Africa, not only on account of its commercial aspects but also the potential repercussions for the natural environment and biodiversity. On the other hand, GMOs are in many circles seen as part of the answer to the food security challenge facing Africa. The enactment of comprehensive legislation across the African continent is a matter of urgency. It also accords well with one of the AU lighthouse projects: setting up a Pan-African Intellectual Property Organisation (PAIPO). Important as the passing of legislation may be, the ability to litigate effectively is a concomitant necessity. Still, putting the legal framework in place is a good start.

5. FUNDING SOURCES AND ARRANGEMENTS

Ideas and recommendations will remain castles in the air if they are not accompanied by funding mechanisms. Appeals and exhortations directed at donors and national governments have not yielded much in terms of financial support. While governments will ultimately be the principal funding sources so as to ensure long-term sustainability in accordance with the Paris Declaration, the donor community will continue to play a supplementary role in the short and medium term. Efforts must be made to identify sources of funding that can be tapped into in the short and long run. The sections below contain some suggestions and recommendations regarding funding with a view to realising the long sought-after synergies between S&T and development. The synergistic potential is there for the taking provided that funding is secured.

5.1 Drawing on the EDF for synergising S&T and development

It is recognised that the bulk of the funding for activities intended to bridge the S&T–development divide must come from the 10th EDF. However, it is unclear how much of the EDF programmable resources have been set aside for S&T-related activities. It is particularly uncertain how much of the S&T-dedicated resources can be used for the purpose of synergising S&T and development. Still, to make any headway in the interface between S&T and development the provision of some intra-EDF resources will be critical.

5.2 The 8th partnership of the Joint Africa–EU Strategy

The comprehensive Joint Africa–EU Strategy adopted in 2007 subsumes the 8th Partnership on Science, Information Society and Space. To give substance to the partnership the African Union Commission and the European Commission have compiled a Book of Projects, also referred to as ‘Lighthouse Projects’. The Book of Projects comprises 12 projects with an estimated funding requirement of EUR 192.5 million over a five-year period. Some uncertainty still surrounds the funding of these projects. The EC is committed to them as a priority of attention under the 8th Partnership of the Joint Africa–EU Strategy umbrella, but not necessarily to their funding. It appears that the required money will be sourced in part from remaining funds under EDF9 and in part from the inter-regional component of EDF10. The operationalisation and implementation of the 8th partnership is still in its infancy and a number of uncertainties persists with regard to financing. It is likely, however, that once operational and funded, resources could be leveraged from this source.

5.3 An endowment fund for synergising S&T and development

While recognising that short- and medium-term funding for synergising S&T and development could be expected to come from African governments and to a lesser degree from donors in order to build sustainability, there is a case for setting up an endowment fund which could serve as a supplementary basis for long-term financing of such activities. An endowment fund is a pool of money or property donated to an institution, usually with the stipulation that it be invested, and with a proviso that the principal remain intact in perpetuity or for a specified period of time.

There might also be a built-in provision about enlargement or replenishment should the principal capital become depleted for one reason or another. The yields from investment would allow for the donation to have a much greater impact over a longer period of time than if the money were spent all at once, and thus contribute to long-term sustainability.

It is not for CAAST-Net to determine the volume of the proposed endowment but it would have to be of some magnitude to make a difference. To show their seriousness about synergising S&T and development both African national governments and donors should contribute to the capitalisation of the suggested endowment fund. In principle, however, contributions could come from any quarter within Africa and internationally and should be actively encouraged.

If well managed, such an endowment might yield a handsome and fairly predictable sum to sustain core functions towards facilitating S&T and development synergies. Possible activities eligible for support might include dialogue fora, training in policy research techniques as integral parts of university curricula, synergistic pilot projects in specific fields, attracting African Diaspora scientists to spend stints in their home institutions, and so on. Ongoing publicity activities could also be funded in order to raise awareness about S&T and development synergies within the scientific and development communities alike.

An endowment fund would have the advantage of insulating the S&T–development synergy-promoting activities from the unpredictability of governments and donors. However, there are very important *caveats* to be observed. An endowment fund needs to be well managed in order for it to yield the expected dividends. Such management requires a degree of sophistication and professionalism which universities and research institutions rarely possess. While there a strong case for setting up an endowment fund, great care should be taken to ensure that its design and management rules be worked out in great detail. Furthermore, its management should be independent of the day-to-day operations of the institutions it is meant to buttress. It is particularly important to ensure that risk be spread so as to avoid the adverse effects of volatile financial markets.

CONCLUSION

This report and its companion report ('Science and Technology for Development: The Institutional Landscape in Africa and Europe') should be read in conjunction. Whereas the latter maps the various cooperation instruments between the EU and sub-Saharan Africa in the fields of S&T and development, the former attempts to make some recommendations as to how these two spheres of activity can be brought closer so as to produce tangible benefits in terms of development, poverty reduction and food security for the majority of Africans.

Taking its cue from the CAAST-Net project document, this report discusses by way of introduction the troublesome and challenging relationship between S&T and development as two discrete endeavours, and points to the arduous route from research findings to their application. The divergent outlook and mode of thinking of scientist and development practitioners are highlighted.

It goes on to set out the existing Africa–EU cooperation instruments in respect to STI and discusses a number of general synergy options such as policy reconsiderations; new programmes and windows; programme modification or redesign; programme consolidation; and STI financing. Moving towards operational recommendations, the report advances five specific recommendations that need further specification and elaboration into concrete proposals before becoming implementable:

- i. Modification of FP8 by making explicit demands on FP grantees to consider the application of envisaged findings;
- ii. Creation of dialogue fora between scientists and practitioners;
- iii. Building models of STI–development synergy, with an operational example from Malawi;
- iv. Tapping into the African Diaspora;
- v. Addressing intellectual property rights.

The final section is devoted to funding sources and arrangements, without which the recommendations will be of no consequence. It is acknowledged that the bulk of the funding will have to come from the EDF and possibly the 8th partnership of the 2007 Joint Africa–EU Strategy. In order to provide sustainable funding a proposal is made to set up an endowment fund.

This report presents a number of mechanisms for bridging the S&T–development gap. Over time we may come to understand which ones will prove to be most effective towards that end. However, the two sets of policies underpinning the FPs and the EDF and their funding bases remain as wide as ever and will continue as such as long as they retain their essential characteristics. Therefore, unless the FPs and EDF are significantly changed in structure and purpose, all one can ever do is to suggest temporary mechanisms that address the gap, while never actually closing it.

END NOTES

1. See the CAAST-Net project document (Grant agreement no. 212625). Annex I – Description of Work. A version of this document can be found online. See the following URL: <http://www.caast-net.org/xwiki/bin/download/Main/Introduction+to+CAAST-Net/DOW-StakeholderCopy.pdf>.
2. The Cotonou Agreement covers not only African partners but also Caribbean and Pacific countries, under the ACP label. The African group makes up the majority of the ACP countries.
3. See Emma Crewe, Ingie Hovland and John Young, 'Context, Evidence, Links: A Conceptual Framework for Understanding Research–Policy Processes', in Julius Court, Ingie Hovland and John Young (eds.), *Bridging Research and Policy in Development: Evidence and the Change Process*, London: ITDG Publishing, 2005; and Melissa Leach, Andy Sumner and Linda Waldman, 'Discourses, Dynamics and Disquiet: Multiple Knowledges in Science, Society and Development', in *Journal of International Development*, Vol. 20, No. 6, 2008, pp.727–738.