

Prospective Position paper for University Support and National Research Development

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Abstract

This paper describes the Swedish experience of research cooperation with developing countries. Sweden has been one of few donor countries that have acknowledged the need to strengthen research capacity at an institutional level, rather than granting training of individuals and research project support. Recently major actors in the donor community have rediscovered the significant role of science and technology for development. From the Swedish experience Sida suggests three areas where universities and national knowledge systems need to be strengthened: Research Policy, Research Environments and Research Management. The first and the last require that donors cooperate to assist developing countries in their setting up of conducive mechanisms for research. External support for the strengthening of Research Environments should be aligned with National Policies and Research strategies both at national and University level. In Sida's experience cooperation between universities in developing countries and Sweden has proved to strengthen both local research environments and international scientific information exchange.

1. Introduction

The Millennium Goals and the quest to combat poverty before the year 2015 are among the greatest challenges that humans have tried to meet. Meeting these challenges requires mobilization of all possible resources, both in society and nature, in rich countries as well as in the poorest countries. Fundamental to efficient and sustainable utilization of these resources is good governance. One of the foundations for good governance is qualified knowledge about the limitations and possibilities that nature, politics and technology could offer. Such qualified knowledge is lacking in poor countries, both regarding indigenous knowledge production and the ability to assess and adapt external knowledge to local conditions. This lack severely hampers the informed decision-making required to make viable strategies to combat poverty.

The major explanation to this lack of qualified knowledge is the past inability to construct coherent education systems in poor countries. Urgent needs to expand basic education have disfavoured secondary, vocational, tertiary and academic education. There are many constraints to education systems in developing countries, but generally speaking, quality could have been improved with a more holistic approach to the different levels of education. Instead skewed education efforts have led into vicious circles: without Higher Education to train teachers, primary education get low quality and poor output, leading to weak entrance rates to secondary schools and vocational training, which again makes it difficult to recruit students to universities with sufficient basic knowledge. Previous politics for education has created a deficit of skilled human resources in developing countries.

From the lack of academically qualified human resources has followed severe incapacity to conduct locally based research and to adapt international scientific findings. A national research capacity is a good and necessity for the nation, but it also makes it possible for the country to share and contribute to the stock of global public goods. Scientific communication facilitates such sharing of own research results, and validation of these through multiple trials and experiments by researchers in many countries (both developed and developing). It also makes it possible to test research results from abroad in a local context. This communication process safeguards academic scrutiny and quality which in turn makes it possible for local researchers to give valid and credible advice to policy makers. With research capacity built up at least at one university in poorer countries the curriculum of higher education and at secondary schools could be adapted to the country's development strategies. Research based curriculum would at the same time bring in relevant international knowledge frontiers and to encompass local perspectives.

2. Experiences of Swedish Research Cooperation with Developing Countries

The arguments above were very much the motive to include knowledge as an essential part of development cooperation already when Sweden started Research Cooperation with Developing Countries in 1975. The two complementary objectives stated in the original policy for Research Cooperation are still valid:

- To facilitate research of relevance and utility for development
- To build capacity for research in developing countries

The modalities to work for these two goals has since then been to direct financial support to international research organisations, to regional research networks and to national research bodies, through bilateral research cooperation. The thought behind this division is that these three levels would reinforce each other through the international scientific communication processes pertinent to the academic system.

The Swedish engagement in bilateral research cooperation has been a learning process. The first 10 years could be characterized by support to

national research councils. An evaluation of this period showed that, in most cases, these bodies lacked the capability to make priorities of research based on scientific criteria. Decisions were merely political which did not safeguard the quality of the knowledge produced. A countermeasure during the next period was to strengthen research capacity through research training using the so-called sandwich mode, which is still in use. This modality differs from ordinary research scholarship systems that detach the student from the local context. In the sandwich mode students spend time at Swedish Universities for coursework, analysis and writing-up, while the empirical research is formulated with a local perspective and with data collected from the local context.

At first, research students were identified among staff in ministries, at research institutes and at university departments. Over time it became obvious that training of researchers had to be supplemented with investments in research infrastructures and scientific equipment. To cater for needs of scientific information support to libraries, and archives, was included in the approach. The sum of these should contribute to the establishment of research environments that would be attractive work places for the researchers trained in the bilateral programs. Through these additions the support gradually became more institutional than individual. As a result, choices had to be made regarding the selection of grantees. At the beginning of the 1990's a shift was made to favour more comprehensive support with the aim to inculcate research cultures at national public universities. The university as a researching institution was given priority before research institutes because of its connection to higher education. Supporting the university was regarded as more sustainable investments, with the possibility to engage in long-term processes that would lead to the establishment of local research training.

The decision to support national public universities was contemporary with a movement of university reforms. In most poor countries the 1980's had been disastrous to universities, in some cases through financial neglect, in others through political obstruction of the academic freedom. With democratization and liberalized economies came an increased demand from students and university teachers to improve the situation for higher education. The Swedish Research Cooperation was seen as a tool in this process and was aligned with the strategic plans that universities developed to guide their reforms.

The main provision for support was that research should be part of the strategic plan and that university teachers should be given the opportunity to engage in research or research training. Although this is part and parcel of most university reform documents, practice has proved that there are many barriers for the researching university to materialise. According to the Swedish experience the main responsibility to overcome these barriers could be attributed to the levels of governance and management.

The need for research must be recognised not only by the University management also by Government through appropriate ministries. The resources available for research must be governed through National

Research Strategies that align with strategies for Development and Poverty Reduction. Furthermore, National Research Strategies must not be shopping lists, but rather be elaborated to a level where they are fundable and assigning missions for the actors in the National Research System. The Swedish Bilateral Research Cooperation for some years, with some difficulty, has tried to engage at the level of National Research Policy. Recently a number of international initiatives have placed Science, Technology and Innovation on the agenda. Hopefully this will facilitate the dialogue with governments and harmonisation within the donor community to encourage the development of National Research Capacity based on plans and strategies for Science, Technology and Innovation.

The Swedish experience also has shown that a properly working Research Management is necessary at the level of research implementing organisations. This research management should safeguard that research conducted is in line with governmental and university strategies, promote that researchers generate own ideas of research topics, and assist researchers to attract funding from possible sources. The research management should also guarantee a properly working financial administration of internal and external research grants, and assist researchers to find proper channels for research outputs through scientific journals and to potential users in the public and private sectors. Sida has developed a number of instruments to establish and strengthen such units at universities, but this still remains a challenge to the Swedish Research Cooperation.

The following sections of this paper will describe how the new Swedish Policy on Global Development emphasises the experiences made by Research Cooperation and the need to further elaborate the instruments that has been developed through the 30 years of Swedish Research Cooperation with Developing Countries.

3. Research Cooperation within the New Aid Architecture

The Government Bill 2002/03:122 Shared responsibilities – Sweden's policy for global development passed the Parliament in December 2003. This Government Bill grasps the new opportunities provided by globalisation and strengthens Sweden's international efforts in support of the Millennium Development Goals. The Bill encompasses all areas of policy and proposes a common objective: to contribute to an equitable and sustainable global development.

A new focus within Swedish development cooperation is presented, placing a greater emphasis on developing countries' own responsibility for development. At the same time, the Bill underlines the responsibility of the richer countries to increase their transfer of resources and enhance the efficiency of cooperation activities. The proposed new objective for Swedish development cooperation is to help creating conditions that will enable the poor to improve their lives.

Two perspectives permeate all parts of the policy: a rights perspective based on international human rights conventions; and the perspectives of the poor.

The content of the policy is formulated with respect to eight central thematic areas and component elements. These elements are:

- Sustainable Development
- Peace and Conflict Resolution
- Economic Growth
- Social Development
- Democracy
- Human Rights
- Equity
- Global Public Goods

It is obvious that all of these areas involve topics for research. National universities could contribute with analytical tools to understand the situation as regards the elements. For Sustainable social and economic development universities could participate in developing innovations of importance to the implementation of national and local strategies. Furthermore, promotion of Universities as a foundation for the national knowledge system is one prerequisite to make endogenous knowledge production sustainable. Universities may also contribute to increased Democracy, Human Rights and Equity, and they have a key role as bridging points for Global Public Goods. Hence the Swedish support for research Cooperation with Universities in Developing countries is well in line with the intention of the Government Bill.

Sida has also developed an internal document "Perspectives on Poverty" that describes Poverty as being context dependent, with a multitude of causes, which calls for Poverty reduction strategies that arrange a number of specific interventions, of which research is one, into a holistic approach. In Sida's interpretation of the new policy, the two perspectives and the eight central component elements are dependent on the context in each collaborating country, and the balance between them must be set in accordance with national strategies for poverty reduction and development. The development of domestic research is seen as an important tool for poverty reduction.

In the Paris Declaration for Aid Effectiveness 2005, Sweden among other countries, has agreed to make Development cooperation more effective with an increased alignment of aid with partner countries' priorities, systems and procedures and helping to strengthen their capacities.

The emphasis on ownership and poverty reduction have always been a guideline for Swedish Research Cooperation, but the new Policy and the Perspectives on Poverty has called for a sharpening of the strategies for Research Cooperation and the tools used. The principle of aligning research cooperation with the university system in each country has been increasingly done since the 1990's. Recent shift of emphasis in the international approach towards science and technology as essential for development and poverty reduction has opened new possibilities to extend this approach into the entire national knowledge system. This shift of demand also provides new opportunities for Sida's old wish to harmonise with other research funding agencies.

The policies and agreements mentioned above, together with other efforts to construct a new architecture for aid could be summarised as follows:

- **Perspectives on Poverty and Rights** require that interventions are scrutinised in relation to their potential effects for poor people and for the spread of the UN conventions on Human Rights. The Swedish goal for development cooperation is to help creating conditions that will enable the poor to improve their lives. Research cooperation can only indirectly assist the poor themselves, it has only indirect connections to the UN conventions but it can directly assist a country to build up the foundations for knowledge that create the enabling conditions.
- Multidimensional explanation to causes of poverty requires **multidimensional and contextually defined approach**. In the Swedish Policy this is formulated in the eight central component elements. Research capacity building could be done in each of these areas, and gives access to some of the arenas where Global Public Goods are shared.
- Emphasising Ownership
- Alignment with national structures
- Joint Funding
- Harmonisation

4. Research Cooperation as part of Poverty Reduction and Development Cooperation: Demand for and Supply of Knowledge

The section below describes three aspects of the shift of demand for research in development cooperation, followed by a description of how Sida perceives that the domestic supply of research based knowledge could be strengthened.

4.1. Demands for Knowledge

Describing Knowledge for poverty reduction is connected to a great risk of reducing knowledge to instantly demanded needs for know-how. Research based academic knowledge has a far greater potential than so. One of the main features is that it should always be subjected to quality control through peer review. Through this peer review domestic research links up with the international academic knowledge base, part of the Global Public Goods. A foundation for this body of knowledge is that it originates in the curiosity of researchers. Principles for academic freedom have been set up to safeguard that this curiosity should be allowed to work regardless of political conditions. In reality governance of research always puts number of restrictions and guidelines, of which some are derived from the situation in which a country finds it self. The following three aspects try to summarise some generalities that pertains to knowledge for poverty reduction in developing countries.

Knowledge for Empowerment

The lack of a domestic research based knowledge means that developing countries are badly equipped in international negotiations, which maintains a situation of dependency. Agreements within international bodies may pass without the effects or preconditions for developing countries are analysed. Major investments that need foreign technology may be done without

sufficient knowledge to assess if the procured products meet the requirements. Domestic research has a potential for national empowerment in this respect. The development of domestic knowledge could also empower the poor through various mechanisms by the development of new procedures and products derived from research results. Also dissemination of research results through the educational system and other channels provide a general increase in knowledge that may benefit the poor.

A Sustainable Knowledge Economy

Globalisation has led to an increased emphasis on knowledge as one of the major factors in international economic competition. The previous neglect of domestic research from governments and the donor community has postponed the possibilities for developing countries to enter into such competition. Most developing countries have natural resources that could be refined to high-value products with knowledge and innovation, thereby contributing to economic growth. Unfortunately, most developing countries also has harder natural conditions than developed countries which means that knowledge is needed to safeguard that exploitation of the potential products is made environmentally sustainable.

Increased Demand for Higher Education

Population growth in developing countries has created an increased demand for higher education. Most countries show an increased number in the age cohorts that are potential university students. With economic liberalisation and increased democracy higher education has become seen as a lever for social mobility. This demand manifest itself in an increased number of students applying for university and the growing interest in establishing private universities to cater for this demand. Governments are now faced with the necessity to come up with regulatory mechanisms and innovative funding strategies. Research and research training at the public universities also get a new role as provider of academic staff, not only for their own faculty but also for the entire university system.

4.2. Supply of Knowledge

Each country has its own system for the supply of knowledge. These are products of different types of interventions throughout history and rarely a result of a comprehensive strategy. Reforms are often called for but diverging interests within the system and ignorance from external stakeholders contribute to a status quo. In this situation that has persisted for a number of years, Sida has assessed some interventions as crucial and to be of a kind that contributes regardless of future changes in the system. A focus on strengthening universities as the main bodies for research and research training provides a good foundation for the development of knowledge, human resources and experiences of knowledge strategies on a larger scale than a single research institute could provide.

At least one Research University in a country

The combination of research, research training and undergraduate education makes the university stronger and more sustainable than individual research institutes and researching NGOs. Supporting the university to strengthen good

research environments in many subject areas provides a foundation for future research and research training. Doing this within one university could facilitate multidisciplinary research as well as interdisciplinary. Dependent of the strength of the national university system, Sida choose different strategies to focus research funding. In a weak system funding would go to one university rather than diluting it to many weak universities. In countries with stronger systems, resources could be spent on the research environments with best potential. The idea is that each country should establish at least one researching university that could cater for the needs of the country and eventually become a resource for the creation of a more extended university system and for national innovation systems.

Links to the International Academic Community

No university is stronger than its links to the international academic community. Sida has chosen interventions that contribute to strengthen such links, both to international research institutes and through regional cooperation in networks and organisations. Research training could be conducted in collaboration with other universities, in the north or with more developed university departments in neighbouring countries. Collaborative projects between researchers interested in the same topic form another opportunity. Other interventions link up universities to the Internet for communication and access to international scientific journals and databases. Support that facilitates for researchers in developing countries to participate in international scientific conferences makes other links available. Also support to international and regional organisations that promote issues of higher education and research contributes to involve collaborating university in wider networks.

Curiosity driven and basic research as foundations for Innovation and Policy-formulation

Sida's opinion is that a researching university must have the ability to conduct curiosity driven, basic research to be able to respond to demands and strategies. Without this ability the university loose possibilities to act pro-actively and strategically. Instead it gets restrained to react to current funding opportunities which risk reducing the quality of research. Interest for research in the Development aid community is by tradition focused on demand-driven applied research of direct value for policy-making or project implementation. Recent trends focusing on innovation tend to emphasise the same end of the research spectrum, though with a more strategic and systemic approach. Sida's support combines support for basic research as well as applied, and has mechanisms to promote curiosity driven research as well as capacity to respond to demands.

5. Research Cooperation as Capacity Building

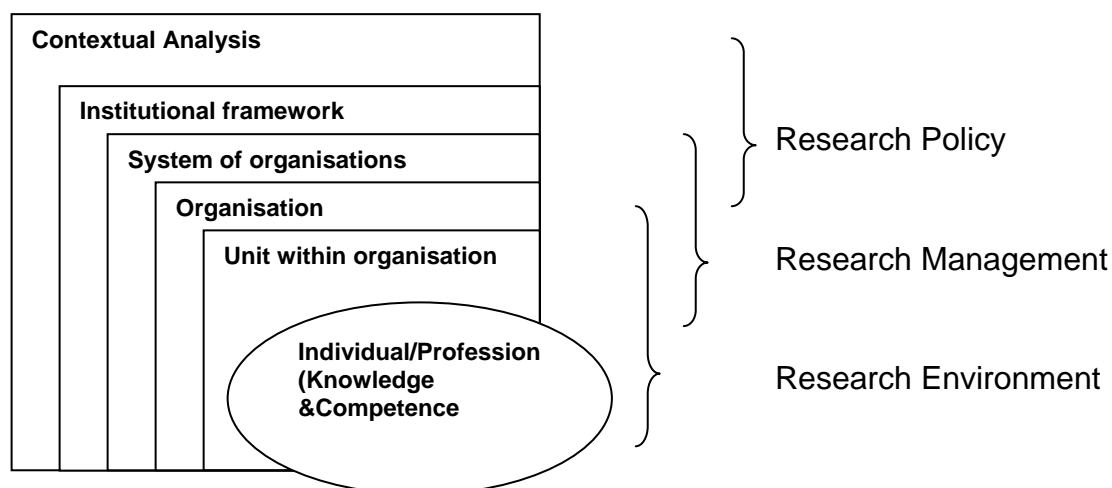
Sida's strategy to fund the basic prerequisites for research at universities has produced a number of research environments over the world that could contribute to development and poverty reduction. However, to realize this

potential much more need to be done by governments and the development aid community.

Sida is active in various types of capacity development, where research capacity building is one. To analyse and compare different types and modalities of capacity development Sida has established a policy including definitions and a common language. The diagram below shows to the left a summary of the thinking in Sida's policy for capacity development in respect of target levels. In a certain, given external environment there is capacity in the form of

- individuals/professions
- organisational units
- organisations
- systems of organisations, and
- institutional frameworks

Everything is related, but depending on the analysis of the problems and Sida's ambitions, Sida can choose to support capacity development at one or several of these levels. To the right of the diagram three modes of support for capacity building are shown, with brackets defining how they relate to the policy for capacity development.



When a national Research Policy is formulated it takes into consideration the contextual analysis, reviews the institutional framework, sets up the system of organisations and defines roles of each organisation and how they relate to the system, institutional framework and context. Sida is challenged to find ways of assisting national efforts to improve national policies and strategies for research, science, technology and innovation. Some areas of intervention are described below.

Research Management refers to how a Research policy is implemented, within the systems of organisations, and within the organisations and their units. As Sida prefers to work with universities for research capacity building this area of intervention refers to support for efforts to strengthen management and management tools at university associations, universities and faculties.

Building strong Research Environment has been at the core of the Swedish Research Cooperation. It includes of course the training of individual researchers,

research supervisors and research coordinators, but also investments in the facilities necessary for performing research. The concept of research environment, in the context of Sida's research capacity building scheme, refers to the levels of organisations, units of organisations and individuals.

The following parts aims at explaining how Sida could assist countries in setting up and strengthening National Research Policies, develop research management and further strengthen research environments.

6. Research Policy

National research policies exist in a number of developing countries. Often they depict a great variety of research areas that need to be explored, reflecting various sectoral policies and development plans. They are adhered to at certain levels of the research system, while other parts neglect to be governed by these strategies. To become a tool for development national policies and strategies for research need to be more strongly implemented, and they need to be reflected in national budgets. The donor community and other research funding bodies have a responsibility to harmonise their effort to also cover this level. However, the Swedish experience of research cooperation shows that without a critical mass of researchers, research policy tends to be political documents rather than strategies utilised for knowledge creation and dissemination. Any research policy must be created as a result of negotiation between the academic community and government. As a starting point for research policy formulation there must be a joint view between researchers, government and funding agencies on what the national research system looks like, where decisions are made, how it works and what could be done to strengthen it.

6.1. Mapping the research landscape

To grasp the research landscape a first distinction must be made between the policy making level, the policy advisory and governing level, and the bodies that implement research. Policy making is often divided between different sector ministries, while in some countries efforts have been made to create ministries for Science and Technology or vice-ministries within the Ministry for Education. Theoretically there is always an "owner" of a national research policy, but in practice decision making is spread and diluted.

At the advisory and supervisory level, Science and technology councils/commissions and even academies of science exist, but most often with an unclear mandate and funding opportunities. Again their role vis-à-vis other actors may be unclear, and not rarely, viewed upon with a certain scepticism. In some countries in Latin America where a high degree of academic freedom has been the guiding star, the political as well as the supervisory levels have been substituted for by autonomous universities or university associations.

In most developing countries Universities and research institutes have been built as a response to initiatives with different aims at different historical conjunctures. Some has managed to adapt and reform to fit new

circumstances, while others have become obsolete and outmoded. Institutes may be products of donor projects, and when research funds have been withdrawn governments still are responsible to keep up staff and facilities. At Universities several different systems may be super-positioned upon each other, so that a university with an original English disposition has been transformed during post-colonialism through cooperation with different countries. Often these different models create conflicts within the university.

Even though research systems in developing countries are comparatively small they may show a great level of complexity where the devil lie in the details. Any reform process must consider this complexity and deal with it through negotiations.

6.2. Forming and strengthening arenas for research policy debate

Besides the various elements governing, supervising and implementing research there are a number of other stakeholders, like governmental authorities, industry, agriculture, the health system etc. Before any formulation process begins it is important to decide on modalities for these stakeholder groups to participate in the process. It is also important to make decisions on what role each of the involved elements should play in the process. It may be necessary to change roles if, for instance the advisory bodies are too weak to conduct the policy formulation process. Most probably any system needs to be strengthened as regards the analytical capacity. All measures of this kind should be done with the vision to create a comprehensive national arena for analysis and debate before a policy is formulated. The degree to which external research funding bodies should participate has to be decided in each case.

6.3. Analysing research in policy and practice

In most countries it is possible to find various types of analysis of the systems for research and higher education. Sida has conducted such analysis before entering into collaboration with new countries. Evaluations of ongoing and finalised research cooperation have also been made. Other donors have made similar types of analysis. Together these documents may give a picture, but fragmented because of the different aims behind the analysis. More comprehensive studies are rare, but UNESCO has renewed efforts to make science policy studies.

Methodological work on how to conduct analysis of research systems in developing countries remains undone. The format used in OECD-countries, the Frascati Manual, suggests measures that are neither relevant nor available, like for instance quotation indexes or patents to measure productivity. Financial flows are also extremely difficult to measure as grants given from external donors rarely are accounted for in national budgets, and because of weak financial systems. Researchers may also resist exposing their funding for various reasons. Research on research systems in developing countries is a neglected area. Since 2002 Sida has started funding some initiatives that hopefully will lead to methodological developments and a greater understanding of the conditions for conducting research in developing countries.

6.4. (Re)Formulating research strategies with a systemic approach

A national research policy would ideally consist of a compilation of coherent research strategies at different levels of the system. There are different models of governance to achieve this, and the selected model must be appropriate to the system where it should function.

With knowledge about the research system, different types of research capacity may be discerned and also the level of capacity held by the organisations in the system. There are strategic priorities to be made, whether weak areas should be strengthened or if the country should rely on external knowledge resources in these fields. Such priorities must be made from perspectives on both immediate needs from stakeholder, and from possible long-term potential in a research field in relation to structural changes in the production system or other challenges. Formulating research policies involve great levels of risk and chance. To minimize risk, policies ought to be generically formulated, thus creating opportunities for emergent research fields rather than giving strict and exclusive guidelines. It is important that the policy strikes a balance between curiosity driven, demand driven and strategic research.

Because of the need to formulate generic research policies, it is more difficult to relate the national research policy directly to Poverty Reduction Strategies, PRS, and other short term development strategies. Poverty Reduction Strategy Papers are rarely explicit on the role of science and technology. Research Policy formulation based on PRS risk to be based on interpretations and connections become artificial rather than integrated. Formulation of a national research policy might have to come up with different types of mechanisms to promote research that in the long run contributes to poverty reduction and development.

To an increasing extent the donor community bases its funding decisions on the PRS. The difficulty to make research policies coherent with the PRS might thus be detrimental for funding possibilities for research. A big burden lies on the donor community to acknowledge that research need to be formulated differently from, and more open ended, than other policies.

6.5. Implementing policies and strategies

The main instrument to make National Research Policies and Strategies operational is to connect it to existing funding mechanisms, or to establish new types of grant schemes. Medium to long term funding of these schemes must be secured, or the policy will be an empty document. For sustainability the government must take a responsibility to include research in its budget, but this will not suffice, hence donors must to enter into long term commitments to such funds. When resources are tight a minimum requirement for implementation is that grant schemes could supply seed funding that would facilitate for researcher to apply for external grants.

External funding will always be a necessary to supplement national funding. A policy should also include the possibility to apply for external grants to strengthen selected areas, for research as well as research funding. However,

the policy also needs to have a certain degree of rigorous guiding so that external funding does not derail research resources to purposes that are out of scope for the policy. Again some of the responsibility lies upon the external funding agency to comply with the national policy.

The policy must also include mechanisms for development of regulations for harmonisation of research management. Without this, different funding agencies will apply different rules which confuse and fragment the system. Also if research implementing bodies apply different rules, this could skew competition on criteria that are not related to academic quality.

7. Research Management

It was an early experience in Sida's bilateral research cooperation that research requires management and that it needs to be aligned with the university managements endeavour for the entire university. In the early 1990s this fact was stressed in international conferences, where university reform and strategic planning was discussed. In the absence of a true governmental responsibility for the national research agenda, Sida decided to assist the elaboration of university strategic plans, if they also considered research capacity development. As a result of this endeavour the research cooperation between Sida and some universities could be channelled through the universities central directorates for research, and the selection process developed to involve university management structures.

University research management continues to be an issue for research cooperation and a central element in the Capacity Building approach presented in this position paper. Research Management corresponds to the intermediary level between the Research Policy and the Research Environments. It should be established and strengthened to provide services to the latter and, in the execution of research, safeguard the values of the former.

What governments and donors could expect is that university research management works to create Credibility, Accountability and Transparency, in academic as well as in administrative procedures. To some extent this can be met by internal audit mechanisms, sound financial administration, self evaluations and procedures in governing boards. However, involvement of peer review in academic matters and external audits in financial would make for a stronger case. Also universities need Good Governance, properly designed Management Structures, and processes for Strategic Planning, and many have come far in establishing such.

Below follows a description of what Sida and other donors of research could do to assist Universities and Research Institutes to improve Research Management.

7.1. Assisting the set-up of an institutional framework for Research Management

Ideally, research management is codified in a number of documents describing the practice of different aspects of the research process, and in the setup of a number of relevant units within the organisation. When a university strategic plan is applied and implemented, research should be a part of this plan. This plan should build on existing national research policy/ies, should consider the contextual analysis of research in the country, and involve basic academic values.

Sida has supported some universities to perform studies on various aspect of the usually makes an "Institutional Assessment" before entering into cooperation with new partners, and occasionally when there are changes. Findings in such reviews should be considered in the strategic plans, or in documents that makes the plan operational.

To manage research and research training a number of issues need to be regulated. Fundamental is that there is a Manual for the management and administration of research funds, covering external as well as internally generated funding. Such a document would assist administrators and research project coordinators to account and report properly. A manual could also become an important tool for harmonisation of donor requirements on reporting and auditing.

Another important type of document would be a strategy for research training, including regulation of registration, remuneration and examination, and other issues of importance to Ph.D.-students. It could also include frameworks for local research training courses. This type of document would be of great value in negotiations with donors on forms of support to research training.

A Manual for Research has been elaborated it some universities, governing modalities for applications to, and reporting of, local research grant schemes. They could also include regulations for remuneration, conditions for research leaves etc. Also the set up of seminars for application writing, report writing, publishing assistance etc. could be governed by such a document.

Some universities also work with negotiation processes with faculties to establish Research Agendas, some with the involvement of stakeholder from society. The idea has been to get better coordination of different research efforts, seek for complementarities and multidisciplinary cooperation, and to define joint strategic research fields. Again, this type of government would be important in negotiation with donors, and could assist donors to better align and harmonise support.

7.2. Assist the making of Links to Society

Universities also need policies that govern different types of Links to Society. Of particular importance are policies for links to industry and production, where Intellectual Property Rights matter. The ideal conditions for Innovation

Systems, with Patent laws and Bureaus of Standards are rarely in place in Developing Countries. Universities must therefore set up a preliminary praxis to deal with such issues. Donors could be of assistance in this respect, in various ways, from support to pilot project where ideas could be tried, to support of training for the parties that enter into such links.

Many donors already support policy-relevant research, an important but slightly difficult area. The main issue is on how such research enters into the policy-making process: as lobbying or as part of a parliamentary commission? As part of the strive to better align development cooperation with national structures, Donors could assist developing countries to establish better forms to include researchers in formal political processes. University research management may need assistance to find practical methods of participation, and ways of safeguarding academic freedom when taking on commissions from the political system.

In many donor funded research projects there are strong informal links to civil society. Research management could have a role in exploring models for such cooperation and encourage new forms or the spread of models to other research areas.

Research management would also be in charge of exploring links to funding agencies, both those that could provide support at an institutional level and those who provide scholarships for individuals. Research management could take on the role as a match-maker, for funding opportunities as well as possibilities for research training or research cooperation.

7.3. Dialogue regarding relations between Research Management and other Units at the University

Most universities have an organisational set-up that caters for many of the issues mentioned in relation to research management. The issue is not to duplicate this, but rather to get an overview how regulations and practice at different unit promotes or hamper research. Research management should get a mandate to find ways of facilitating research. Examples of units to cooperate with are: the University Library with a key role to provide scientific information to researchers; Directorates/Schools of post-graduate studies; Units for procurement of equipment and goods; Units for maintenance of scientific equipment; Offices responsible for staff; the Bursars office; etc.

For donors to know that their support is efficiently used for research, a streamlining of the different institutional frameworks governing the work of these units would be necessary. The best instrument to reach such a streamlining would be dialogue, possibly supplemented by the support to institutional assessments.

7.4. Assistance to common facilities and infrastructures for research

Sida has experience of supporting a number of different common facilities for research. A brief description of these types of facilities and infrastructures follows below:

7.4.1. ICT-infrastructures

ICT-infrastructures require rather large contributions. A prerequisite for Sida's engagement has been that Universities elaborate ICT-strategies and Master Plans for the investments and for maintenance. Other donors could easily align to these plans when supporting ICT. Major obstacles for the use of these infrastructures prevail in the high subscription rates for connectivity to the Internet, which means that donors will have to continue to contribute for this. However, ICT also provides opportunities for income generation.

Evaluations of the Sida supported ICT shows that these investments have produced change at many levels of the university and put the university into better communication with the surrounding world. Some changes have been unexpected and very beneficial. Yet, ICT as a tool for research, research training and research management is not fully explored. Donors could still expect proposals for various types of projects and for institutional support.

7.4.2. Support to libraries and digitalised scientific information

With the assistance of the International Network for the Availability of Scientific Publications, Universities in developing countries have been able to negotiate favourable prices for digitalised scientific information. Sida supports annual subscriptions in cooperating countries. This access to digital information requires that university libraries take on a new role, and INASP and other organisations provides training for this purpose. Access is given by publishers as national licenses. The full utilisation of this opportunity requires that libraries engage in outreach activities to provide services and training to both faculty members and organisations outside the universities. Donors could also encourage organisations supported within the different sectors to utilise these services.

7.4.3. Support to laboratories and scientific equipment

Support to laboratories could be given both to central laboratories that are resources for many research groups and to more specific equipment of use to only a few. There are a number of management issues involved in this, including procurement issues, both also the set up of regulations for use etc. If investment plans were made up, donors could more easily enter into joint financing. However, there must also be room for funding and quick procurement of equipment of immediate needs. However, procurement regulations are often an obstacle to smooth operations of research. Donors could assist with reviews of these regulations should be done in order to allow for some exceptions.

7.4.4. Support to local scholarship programmes

Sida has supported local scholarship programmes, mainly with the purposes of facilitating recruitment of university staff and research student. As Universities change through reform programmes and through capacity building, these objectives need to be reviewed. If research management produces strategies for research training it would be possible for Sida to consider new ways of support. For instance, with a larger proportion of Ph.D.-trained staff, there may be need for post-doc or research scholarships.

7.4.5. Support to Faculty research grant schemes

Sida has supported Faculty research grant schemes at a number of universities, with the purpose of giving university staff possibilities to perform research, even if they have not had the opportunity to receive external grants. Universities have set up peer-review mechanisms to scrutinise proposals, and sometimes they have institutionalised seminars for proposal writing, and for presentation of research results. In some cases publication series have been developed. The faculty grant schemes have contributed to inculcate a research culture at the universities.

Once the mechanisms are set up other funds could find their way through the same channel. However, this has to date not materialised. It remains as a challenge from Sida to the universities and other donors to negotiate around such possibilities for joint funding.

7.5. Other issues

In many countries the HIV/AIDS pandemic has moved this issue into completely new dimensions. Also university staff and students are vulnerable to infection, or their participation in teaching and research may be constricted by sick and deceased relatives. The university has unique possibilities in gathering knowledge about the HIV/AIDS situation, to develop measures for prevention and to disseminate these through the student population. What is required is that Universities engage in establishing their own HIV/Aids Strategies.

8. Strengthening Research Environments through Research Cooperation and Research Training

The bulk of the Swedish experience lies in strengthening of research environments through research cooperation. Here, experiences come from a variety of contexts. With a consistent guiding idea different varieties have developed. In some cases strengthening has resulted from a dialogue with the collaborating university round the universities strategic plan. In other cases a strengthened research environment has been conducive in promoting university reform. As well as research results these environments have also produced change agents. This part of the document tries to summarise the experiences as one multifaceted mode of operation.

8.1. What is a strong research environment?

Research environments grow stronger in an open-ended evolutionary process rather than as a result of strictly goal-oriented methods. It is difficult to define what characterises a strong research environment and it is difficult to assess whether a certain research group has the potential to become strong. Strength in research is also conjectural, depending external as well as external factors. However, from the Swedish experience of research cooperation it is possible to define some determining factors.

A strong research environment should:

- Engage a critical mass of researchers
- Be attractive for guest lecturers and post-docs
- Send away attractive post-docs and guest lecturers to other universities
- Manage to attract funds for research projects and research training from different sources
- Engage in training at different levels; Ph.D., Master, undergraduate and short training courses for externals
- Link up with stakeholders in society

To be able to do this a research environment needs:

- A supportive university management
- Good management skills among principal investigators and
- Adequate facilities and equipment
- Easy procurement of scientific consumables
- Access to training opportunities
- Access to international scientific information and the Internet
- Access to local research funding

Throughout its thirty years of existence Swedish Research Cooperation has provided support for these needs in different forms. Major lesson learned is that to get the full support of the university management all priorities must be set in accordance with the universities strategic planning. In this it is decided whether only strong environments should get support or if there are reasons to strengthen even the weaker ones for strategic reason. The university management must on their side show commitment to promote research activities, despite the need to use staff for a heavy teaching burden. Also they must have the courage to give some faculties and departments priority before others. Priorities are set through a pre-screening process at the university which select among the proposals before they are submitted to Sida. Sida in turn screen proposals with the assistance of external reviewers to find the environments that show the greatest potential to build a research capacity. This screening process is at the heart of the research cooperation modus operandi.

The main methods used by Sida to strengthen research environments have been through research training and support for infrastructures and equipment as described below.

8.2. Research training through the sandwich model

In emerging research environments where the major part of staffs are in their early stages of an academic career external research training is a must. Sweden has chosen to contribute through the mode of sandwich training, which has a better alignment with university strategies than ordinary scholarship programs that detaches the student from the home university. In sandwich training research students are recruited among the university staff and tested for admission to, mainly, Swedish Ph.D.-training programs. Research students keep up their position at the home university, define their research project in that context and spend periods in Sweden for coursework, analysis and write up. A Swedish supervisor collaborates with a co-supervisor from the home university. Groups of students may be admitted within the same program. Supervisors from both sides make exchange visits to follow the students closely.

A major prerequisite is that research students have an academic background that allow them to be admitted. Proficiency in English is a must. In some cases it is necessary to start a training program with additional academic and language training. Sida try to utilise facilities in the collaborating country or in neighbouring countries, for instance Masters Programs and language institutes for upgrading.

In cases where the applying faculty endeavours to train more students than those who could be admitted to Sweden, Sida has facilitated that Swedish supervisors assist to set up local research training courses that more students could benefit from. For crosscutting courses, like science theory senior staff from other faculties at the university could contribute.

8.3. Strengthening local research training

When entering into research cooperation with faculties with more senior staff that have possibilities to conduct local research training, Sida has found other models to strengthen. Cooperation is focused on supervision of supervisors. In comparison to the sandwich model it means that roles are reversed and the Swedish researcher becomes co-supervisor. Research courses are set up locally. Exchange visits are still made, but for specific project purposes and to expose the Ph.D.-students to other research environments. Some programs have facilitated a joint accreditation of courses so that Swedish Ph.D. students can participate in the same program.

As an intermediary step Swedish supervisors could assist newly graduated Ph.D.s to set up local masters training programs. Gradually these develop into Ph.D.-training programs.

These modalities are a fresh experience for Sweden. This modality will get increasingly useful as demand for higher education expands in the collaborating countries and more staff with research training is needed. The collaborating universities could then take on a role as post-graduate training centres.

8.4. Building laboratories and other research facilities

Sida has supported investments in scientific equipment both to facilitate implementation of projects but also as programs to build central laboratory facilities that could be shared by many departments. These have several advantages as they strengthen the universities strategies for research rather than individual researchers.

Sida could also support other types of research facilities like archives, documentation centres etc.

8.5. Seed money from local research grant schemes

A Local Grant Scheme is an important tool to inculcate a research culture that gets wider spread than among the beneficiaries of research cooperation. Providing an opportunity for university teachers to get small grants for minor research projects they could manage to keep abreast with research frontiers. Such funds could also be used as seed funding to get an empirical foundation before applying for external research funding.

Grant schemes can be used by the research environment to promote different strategic objectives. They could supplement other research project with multidisciplinary inputs; they could cater for involvement of younger scientists etc. As the research environment matures such funds could also be used in more innovative way to establish links with other universities, for instance for planning of joint major grant applications.

8.6. Connecting to the academic community

Research training abroad or locally in collaboration with external partners provides a good foundation for international academic cooperation. However, developing countries have been facing severe constraints when it comes to communication and information exchange. The advent of relatively cheap Information and Communication Technologies has counteracted these constraints to a certain degree.

Sida has supported major ICT investments at collaborating universities. Support has been used for construction of campus networks, for training of users and establishment of ICT service centres at the universities. The effects of these investments have been far greater than the objectives, many times totally unexpected things have happened. In some cases semi-national networks have been constructed, connecting a number of universities to each other. As side effects a number of issues have had to be harmonised, some as an effect of mere information exchange. Sida expects that a number of new initiatives will emerge as universities learn how to explore these new technologies, many of them worthwhile for the donor community to support. A major constraint continues to be high subscription fees for Internet services charged by communication satellite companies.

Since the mid 1980's, support has been given to subscriptions of scientific journals. The Internet has provided new opportunities to get electronic copies of scientific articles on demand. The International Network for Availability of

Scientific Publications, INASP, assists developing countries to negotiate favourable prices for subscriptions to such digital media. The current agreements include access to more than 7000 scientific journals and databases with national licenses, making it a resource not only for universities cooperating with Sida but also for other universities, research institutes and agencies in the country. Sida also support training activities for librarians to learn how to facilitate for researchers to access this treasure of information.

With the program above, ability to access information from abroad has increased. Possibilities to disseminate information from national universities to the international community are still limited. To get an article published in a well-known academic journal is almost unattainable for researchers from developing countries. It means a cumbersome process of rewriting that researchers rarely can afford to undertake with large teaching burdens. Universities in the North that frequently gets published often provide writing services to their researchers to polish manuscripts, something that is unheard of in developing countries. The alternative in this situation is to publish in regional or local journals with limited outreach. Sida supports INASP to make some of these journals available on-line to a wider public.

Besides the support to bilateral research cooperation Sida support international and regional research organisations. These provide opportunities for researchers to participate in comparative research programmes or to participate in conferences. This possibility could be much further exploited than it is today. The overlap between the regional entities where national researchers participate and those supported by Sida would never be total, but could be better aligned. The donor community could jointly make greater efforts to align support to existing regional organisations that mobilizes national researchers through open processes rather than as closed shops.