



# Swedish International Development Cooperation Agency

## Report on the Evaluation of the International Science Programme

30 September 2011



# Table of Contents

Abbreviations and Acronyms .....	i
Executive Summary .....	v
1. Introduction .....	1
2. Purpose and Scope of the Evaluation .....	3
2.1 Objectives of the Evaluation.....	3
3. The International Science Programme.....	5
3.1 The Role of Science in Contributing to Development and Poverty Alleviation.....	5
3.2 ISP Objectives.....	7
3.3 Governance Structure of ISP .....	7
3.4 ISP's Scope.....	9
3.5 Mode of Operation.....	10
3.6 ISP Core Programme Description.....	14
3.7 ISP Funding .....	16
3.8 ISP Systems and Procedures .....	19
3.9 Monitoring and Evaluation of ISP Activities .....	20
3.10 Programme Ownership.....	21
3.11 ISP's Relationship with Sida .....	21
4. Evaluation Findings .....	25
4.1 Relevance .....	25
4.2 Effectiveness and Impact.....	32
4.3 Efficiency.....	42
4.4 Sustainability.....	44
5. Recommendations .....	49

# Table Index

Table 1 ISP Expenditure and Outputs 2003 – 2010 .....	16
Table 2 ISP Funds Sources and Uses 2003 to 2011 .....	18
Table 3 Private returns to primary and tertiary education .....	34
Table 4 List of Recommendations from Evaluation Text.....	49

# Annexes

Annex A Terms of Reference (ToR)	
Annex B Persons Met	
Annex C Role of Science in Contributing to Development	
Annex D Alignment of ISP Activities with Sida Focus Countries	
Annex E Kenya Case Study	
Annex F Ethiopia Case Study	
Annex G Draft Logical Framework	
Annex H Graduated Research Groups and Networks	
Annex I Examples of Anecdotal Evidence Demonstrating Outcomes	
Annex J List of References	

# Abbreviations and Acronyms

AAU	Addis Ababa University
AIDS	Acquired Immune Disease Syndrome
ANCAP	African Network for Chemical Analysis of Pesticides
AU	African Union
AusAID	Australian International Development Assistance Agency
CPA	Comprehensive Programme of Action under the New Partnership For Africa's Development
EAUMP	East African Universities Mathematics Programme – a network
ESDP IV	Education Sector Development Programme IV in Ethiopia
ESARSWG	East and South Africa Regional Seismological Working Group – a network
ETH	Ethiopia
GDP	Gross Domestic Production
GHD	GHD Pty Ltd., the company contracted to undertake the Evaluation
IMF	International Monetary Fund
IPICS	International Programme for Chemical Sciences
IPMS	International Programme for Mathematical Sciences
IPPS	International Programme for Physical Sciences
ISP	International Science Programme
KEN	Kenya
Ksh	Kenyan shillings
MDGs	Millennium Development Goals
MSc	Master of Science
MSSEESA	Material Science for Solar Energy Network for Eastern and Southern Africa
NAPRECA	Natural Products Research Network for Eastern and Central Africa – a network
NEPAD	New Partnership For Africa's Development
OECD/DAC	Development Assistance Committee of the Organisation for Economic Cooperation and Development
PACM	Pan-African Centre for Mathematics
PhD	Doctor of Philosophy
QA	Quality Assurance
R&D	Research and development
S&T	Science and technology
SAREC	Swedish Agency for Research Cooperation with Developing Countries - now succeeded by the Research Cooperation Unit in Sida.
SEK	Swedish Krona
Sida	Swedish International Development Cooperation Agency

SLU	Swedish University of Agricultural Sciences
SR	Summary recommendation
STI	Science technology and innovation
SU	Stockholm University
TL	Team Leader
ToR	Terms of Reference
UK	United Kingdom
UNEP	United Nations Environment Programme
UoN	University of Nairobi
US	United States (of America)
UU	Uppsala University

# Preface

The goal of the Swedish International Development Cooperation Agency (Sida) is to contribute to enabling poor people to improve their living conditions. Sida's support to research in partner countries is handled by the Secretariat for Research Cooperation (FORSKSEK). Support is provided to research councils, universities and research institutions, regional research networks, and international research programmes. The Secretariat also supports Swedish research activities relevant to developing countries.

The Secretariat has a wide mandate in research support and capacity building, encompassing natural sciences and technology, social science and humanities, natural resources and environment, and health care.

Since 1975, Sweden's International Science Programme (ISP), located at Uppsala University, has assisted selected countries in Africa, Asia, and Latin America with strengthening their domestic research capacity in the chemical, physical, and mathematical sciences.

In 2011, via an international competitive bidding process, Sida awarded a contract to GHD to undertake an evaluation of ISP. The purpose of the review is to provide Sida, ISP, and Uppsala University with input to upcoming discussions concerning preparation of the next phase of the science programme. Furthermore, it is to help Sida obtain a deeper understanding of the programme in order to facilitate its decision-making. The scope of the review includes assessment of the relevance, efficiency, effectiveness, sustainability, and impact of ISP for the period 2003-2011 in relation to its objective, and to provide recommendations which will assist in future programme directions.

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# Executive Summary

This Report is the output of an evaluation of the International Science Programme (ISP). The purpose of the evaluation is:

*“to provide Sida, ISP and Uppsala University with input to the upcoming discussions concerning the preparation of the next phase of the programme. Furthermore it is to help Sida obtain a deeper understanding of the programme in order to facilitate its decision-making.”*

A small evaluation team comprising an evaluation specialist, a physical sciences and academic expert and an expert in development assistance undertook the study. The method involved literature and documentation reviews; structured questionnaires of key informants and stakeholders; discussions and interviews with staff of Sida, the ISP and Uppsala University (UU); and a field visit to Kenya and Ethiopia, identified by Sida as case study countries.

The scope of the evaluation included:

- a. Descriptions of the organisational, relationships and cooperation matters which exist within ISP;
- b. Assessment of the relevance, efficiency, effectiveness, sustainability and impact of ISP; and
- c. Provision of recommendations to Sida, ISP and Uppsala University, on the future directions of ISP.

As requested by Sida, the evaluation period was 2003 to 2010.

## Findings of the Evaluation

This report begins (section 3.1) with the **broad strategic context** of the role of science in development. Seven specific reasons are cited why capacity for science is needed and relevant to the development efforts of developing countries, especially those in Africa. The issues are expanded in Annex C.

The report then assesses **ISP’s objectives** (section 3.2). The evaluation finds, amongst other things, that ISP had a well-articulated objective for the 2003 to 2007 period *“to support long-term collaboration in research mainly between leading Swedish institutions and institutions in developing countries, as well as regional collaboration amongst developing countries and to build the capacity within developing country institutions to undertake research”*. There was no further programme logic developed to support this objective, nor has there been since that period.

These objectives align well with those of the Research for Development Policy of Sida and UU. The objectives also align well with the policies and development plans of Kenya and Ethiopia, the case studies used for this evaluation. In addition, there is a wealth of current analysis from development partners such as the World Bank that indicates the significant need for improvement in the capacity of the higher education sector throughout Africa to provide graduates in the fields of science and technology. This is an evolution in World Bank thinking, as they previously favoured investment in primary level education, especially in Sub-Saharan Africa. However, as explained in their recent study of education in Sub-

Saharan Africa, the World Bank finds that constraints and bottlenecks at the tertiary level are now constraining growth in much of that region<sup>1</sup>.

The evaluation shows (section 3.3) that ISP has a strong **governance structure** as well as systems and procedures. These are necessarily derived from those of the UU. At the top of the governance structure, the Board is strongly aligned to UU and the scientific fields covered by ISP. ISP's activities are approximately 85% funded by the combination of an annual grant from Sida and Sida bilateral programme coordination. Although ISP is very dependent upon Sida, over the last three years there have been indications of an increasing diversity of funding sources, though only with minor total impact on funds.

The **scope of ISP** activities has to date been restricted to the sciences of chemistry, physics and mathematics. Section 3.4 of the evaluation shows these are "enabling sciences" on which many other development related sciences can then potentially build, including environmental science, engineering, biology, agriculture and health. ISP has the potential to expand into other related fields of science. Such expansion will depend upon numerous factors to be considered within ISP/UU and with the major funding source, Sida.

The evaluation finds (section 3.5) that ISP's **mode of operations** for scientific collaboration has evolved over the years. ISP has evolved from an activity that essentially focussed on individual fellowships to one that is generally more strategic, focusing on building broader institutional capacity in partner universities to manage their own research and teaching. ISP's own skills in teaching and research aspects of science has, over the long time that it has been involved, helped to build capacity in its partner universities in developing countries. However ISP has not kept up with contemporary approaches to development cooperation, particularly with respect to systematically demonstrating relevance, efficiency, effectiveness, impact and sustainability of Sida funding.

There will be various potential models for the way in which ISP might engage with Sida's bilateral programme, depending firstly upon the specific modality that Sida might first plan any one activity.

Section 3.6 provides a **description of ISP core programme**, including the main coordination activities for Sida bilateral programmes for research development support, and the nature and role of programme reference groups, research groups, collaborators and networks.

Analysis of **ISP funding** (section 3.7) indicates that the costs of managing the programme amount to between 15% and 23% of total annual expenditures. This includes scientific coordination costs. Such a range is within acceptable levels of overhead expenditure profiles of other programmes experienced by the evaluators, although it should be noted that ISP would need to invest more in monitoring and evaluation if it is to meet Sida's requirements for "results based management". That would then drive up overall management and overhead costs.

Analysis finds that **ISP Systems and Procedures** are generally satisfactory. However there is a case for now using more objective selection criteria, and even competitive tendering, for more mature and capable research groups in the partner universities (Section 3.8).

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<sup>1</sup> World Bank 2009: *Accelerating Catch Up*

**Monitoring and evaluation** has not kept pace with current international developments, and lacks an explicit and logical framework that links inputs to outputs, outputs to outcomes, and outcomes to impacts. (Section 3.9 and also section 5 of this report). It will be important to strengthen this aspect of ISP work if activities are to meet Sida's requirements for a more results based management programme overall.

The analysis finds that **programme ownership** and commitment is strong, both within ISP managers and within the partner Universities. (Section 3.10)

The analysis finds that **relations with Sida** are generally good, but somewhat complex, as would be expected from a fifty year relationship and the changes in recent years with Sida/SAREC. There is an understandable tension between (a) the "freedom" suggested by the long-term intent of historical Sida direct support (amplified by the discretionary character of the funding provided over many years by Uppsala University) and (b) the constraining policy settings of the government. This tension has been intensified by unforeseen changes to the duration and amount of Sida's direct support since 2006.

It is also noteworthy that while Sida has been funding ISP's activities for many years, and has on occasion single-sourced ISP as a coordinator for a number of bilateral activities, there has been no apparent decision to demonstrate efficiency or value for money by "testing the market" through a competitive tendering process.

Sida's purposeful movement to a more bilateralised programme, concentrated on twelve focus countries, provides opportunities for a more cohesive, complementary, predictable and stable relationship between Sida and ISP. There are benefits/synergies to be gained by ISP Core Programme activities being undertaken in countries in which Sida also has an agreement covering research and higher education. Opportunities in this regard need further investigation and assessment. However any developments in this direction will require active management and good communication from both sides. (Section 3.11).

Section 4 of the evaluation report finds that, in terms of relevance, there is already close alignment between the goals of ISP and Uppsala University. There is also close alignment between ISP and Sida's specific policies and strategies for research cooperation. There is a mixed degree of alignment between ISP and Sweden's broader five key areas for development: strong alignment in focus areas such as environment and climate change, and less direct alignment with focus areas such as democracy and human rights.

In the case study countries studied (Kenya and Ethiopia), ISP activities are highly aligned with the priorities of the national governments. An analysis by the World Bank indicates that other countries in Sub-Saharan Africa will have similar needs for capacity building in the sciences for higher education. Quality of the scientific programmes supported by ISP is variable from country to country. However evidence is provided to show that at least the quality of planning and research activity proposals increases with ISP support and that the outputs (published papers) reveal high to satisfactory levels of research work with a level of citations which is above world benchmarks.

**Effectiveness and impact of ISP.** Section 5 shows that, despite some methodological limitations, there are some broad in-principle reasons to believe support to tertiary level sciences in Africa has good development effectiveness and impact. There is also good specific evidence confirming most of ISP's expected results have been achieved, particularly in terms of expanding student numbers

and activities. There is evidence that capacity to plan and manage research activities is improving, although better capturing of trends would make that finding more robust. Identifying the extent of “leakage” of ISP graduates subsequently emigrating to OECD countries is also essential to assessing effectiveness, efficiency, impact and sustainability of ISP’s programmes and goals. There is some good anecdotal evidence that ISP programmes are contributing to socio economic development and poverty reduction – but the rich case studies that demonstrate this are not being systematically collected. Effectiveness and impact would also be strengthened if ISP had more explicit and coherent links to Sida’s bilateral programmes at the country level. These could be at both the “upstream” level (for example, linking up with strengthened secondary school maths and science programmes that Sida might support) and “downstream” (for example links to specific bilateral projects in sectors such as agricultural productivity or clean energy).

Moving to a stronger monitoring and evaluation system, and one which is more results based, is a necessary and valuable investment. Specific recommendations are therefore made with respect to four key areas: finances; alumni; systematic collection of case studies; and better upstream and downstream linkages to Sida’s own bilateral development programmes.

The movement to a more targeted, country focused, and results-based management programme for research cooperation also provides opportunities for Sida and ISP to demonstrate effectiveness and impact more clearly and explicitly, although there are also risks that need to be managed. Specific recommendations are made to achieve this.

**ISP’s efficiency** is evaluated in section 5.1. ISP efficiently delivers capacity building activities in recipient universities, including training, equipment and materials support, research collaboration and the development of networks. ISP’s overall management costs as a percentage of the total of ISP expenditure averages at 18.6% over the period 2003 to 2010. This is considered to be quite efficient delivery from the experience of the evaluation team. The sandwich course approach to training results in PhDs and Masters degrees being awarded at a lower overall cost than the alternative fellowship approach under bilateral programme activities. In addition, there are indications that there is a lower risk of students remaining or moving overseas and being lost from the host university while they are still studying under the sandwich course approach. However, no detailed records have been kept to allow detailed analysis of this aspect. Loss of students *after* they graduate – for example if they emigrate to the United States – is a substantial risk to the short to medium term efficiency and cost-effectiveness of the programme.

**Sustainability** of ISP is evaluated in section 5.2. Two aspects of sustainability are considered:

- (1) ISP is heavily dependent upon Sida funding, with 85% of its total funds being sourced from Sida. While this is reducing slightly in the recent three years, this is a major risk for ISP as an entity; and
- (2) The sustainability of the capacity built within recipient universities will be largely dependent upon external factors including the financial and resources support within their own university’s administration, and the priorities and strategies of the national government, as well as the risk that alumni emigrate.

## Recommendations

Section 5 of the report provides a list of recommendations made throughout the text. In this Executive Summary the recommendations have been summarised, divided into those that are the responsibility of either Sida or ISP/UU and prioritised:

### Summary Recommendations (SR) to Sida:

- SR.1 Sida **should require that an acceptable logical framework and M&E framework** be developed prior to further ISP Core funding approvals. (Results of Recommendations 4, 8, 17, 18, 20, Pages 14, 21, 35, 35, and 38)
- SR.2 **Formal agreements between Sida and ISP** should explicitly reflect new strategic directions and intended outcomes, including greater clarity of deliverables and a timeframe. (Recommendations 3 and 14, Pages 13 and 30)
- SR.3 Sida should **consider a master plan** in relation to the type of research development cooperation engagement with the various focus countries, recognising that shifts and adjustments in Swedish development priorities are bound to continue. This will allow for the longer term planning required for research programmes and post-graduate training. It will also allow for the negotiation of an overarching Agreement with ISP that sets out mutual expectations and understandings over a reasonable period, and especially in relation to the transition to a more bilateralised programme. (Recommendation 9, Page 22)
- SR.4 Sida should reassess the prohibition of core ISP programme activities in focus countries that also have bilateral research/higher education agreements. (Recommendation 10, Page 23)
- SR.5 While ISP is well placed, given its experience and established networks, to coordinate Sida's bilateral programmes, Sida should **consider testing the market and demonstrating value for money** by having some form of competitive tendering. For selected bilateral research activities, Sida should therefore consider tendering the coordination and management role of research support in selected countries. Having some form of competitive process should, however, be carefully managed and done in a phased manner over time so as not to be unduly disruptive to current programmes and students. Sida should consider a pilot research grant programme in a selected Focus country university with appropriate management and administrative capacity. This pilot scheme would require careful design, including an M&E framework to ensure appropriate feedback of learnings. (Recommendations 11 and 12, Pages 23 and 24)
- SR.6 Sida should **discuss with ISP the advantages and disadvantages of expanding beyond mathematics, physics and chemistry**. ISP has a structure, the systems and the experience to enable the broadening of scientific fields in which it supports recipient universities. If other fields are to be included, then: (a) any impact on the existing activities must be

taken into account (including financial resources); and (b) a robust monitoring and evaluation framework must be introduced prior to commencement.

(Recommendation 16, Page 32)

- SR.7 Sida should continue to **keep ISP activity and administration costs and benefits under review** and should encourage regular Performance Audits, and not just Compliance Audits.  
(Recommendation 21, Page 44)

## **Summary Recommendations (SR) to International Science Programme and Uppsala University:**

- SR.8 ISP should **further develop the programme logic** in the form of a logical framework, representing ISP overall and explicitly articulating the intended goal of the activities; as well as the expected relationship between inputs to outputs, outputs to outcomes and outputs to impact. This will: (a) assist in compliance with Sida's Results Based Management system; as well as (b) provide the necessary basis upon which models and model options for ISP's future operations can be developed.  
(Recommendations 4 and 8, Pages 14 and 21)
- SR.9 Furthermore, ISP should have a **more systematic, and results and outcomes focussed, means of monitoring and evaluation**. ISP should use the logframe developed to capture the relationship between inputs to outputs, outputs to outcomes, and outcomes to impact. ISP should also have a more systematic way of capturing "impact" stories. In addition, detailed financial data should be collected in accordance with requirements identified through the logframe (in addition to normal financial management requirements).  
(Recommendation 8, 17, 18 and 20, Pages 21, 35, 35 and 38)
- SR.10 ISP should **strengthen its capacity for impact assessment and results based management** by developing and implementing appropriate systems and procedures and working with Sida to build relevant linkages.  
(Recommendation 20, Page 38)
- SR.11 ISP should work with the universities it supports to **more systematically monitor the geographical location, and recent professional accomplishments of their alumni** with the aim of measuring their contribution to development and degree of leakage of alumni to OECD countries as this is a significant threat to the short to medium term effectiveness, efficiency and sustainability of the ISP programme.  
(Recommendation 19, Page 37)
- SR.12 ISP and Uppsala University should **engage vigorously with the public and government processes that establish Sweden's development policies**, providing advice based on their extensive experience. Support for enabling science should remain a focus for ISP, in the context of Swedish development policy settings. ISP should position itself to respond to other opportunities (in Sweden and elsewhere) to support development research cooperation. In addition ISP should promote the

“good news stories” showing the benefits of their work.  
(Recommendation 1, Page 7)

- SR.13 The **invitation and selection of Research Groups** should be made in a more objective, explicit and transparent manner. Those groups that have attained a certain level of self-sufficient capacity, or are part of strong universities, should be encouraged to apply for support on a transparent, competitive, basis, while groups with limited capacity might be fostered and supported to a greater level for their initial period.  
(Recommendation 5, Page 19)
- SR.14 Uppsala University should **consider the benefits of broadening the skill set of the ISP board** to include members with experience in development cooperation and in the politics and bureaucracy of the focus countries.  
(Recommendation 2, Page 9)
- SR.15 ISP and Uppsala University should **review membership, selection and performance management of the Reference Groups**, especially considering the emphasis on Focus countries and further integration with the bilateral programmes of Sida.  
(Recommendation 7, Page 20)
- SR.16 ISP and Uppsala University can **improve the effectiveness and efficiency of delivery by adjusting the roles of Reference Groups**. More use of peer review to evaluate progress reports and outcomes, might strengthen ISP core activities.  
(Recommendation 6, Page 19)
- SR.17 ISP needs to **actively consider diversification of revenues** beyond the support provided by Sida and Uppsala University. This would not only assist ISP’s opportunity for sustainability, but could allow new development partners to capitalise on ISP’s capabilities in efficient and effective ways.  
(Recommendation 13, Page 24)
- SR.18 ISP has a structure, the systems and the experience to enable the **broadening of scientific fields** in which it supports recipient universities. This should be discussed again with Sida and if other fields are to be included, then: (a) any impact on the existing activities be taken into account (including financial resources); and (b) a robust monitoring and evaluation framework be introduced prior to commencement.  
(Recommendation 16, Page 32)
- SR.19 **Planning for PhD students’ studies overseas** should be more detailed in terms of expectations of achievements and the timeframe so as to reduce the potential for extensions and delays. In addition there should be careful monitoring and reporting on progress against expectations.  
(Recommendation 22, Page 44)
- SR.20 ISP should **develop and implement a defined exit strategy** when it is to leave a country, as part of the road map to sustainability. Sida should provide adequate time for ISP to implement an agreed exit strategy from a country.  
(Recommendation 24, Page 46)





# 1. Introduction

The International Science Programme (ISP), at Uppsala University (UU) aims at assisting low income countries to strengthen their domestic research capacity within the basic sciences of chemistry, physics and mathematics.

The term “basic science” is often used to describe these and similar disciplines (biology for example). This evaluation adopts the descriptor “enabling sciences” to send a clear reminder of the role of these disciplines, and also to avoid potential confusion arising from the basic/applied dichotomy. Inspection of publications produced with ISP reveals that much of the supported research in the enabling disciplines has an applied character and liaison with ISP staff indicates that they are very aware of and sensitive to this terminology. The use of “enabling” in this report is not necessarily a recommendation for a change.

ISP was established by UU after holding an international seminar on research and education in physics in 1961 and celebrates its 50<sup>th</sup> year in 2011. ISP has evolved a great deal over its 50 years. Amongst other things, it has shifted its focus from fellowship programmes centred on individuals, to a programme that builds broader institutional capacity at Universities in developing countries to plan and manage their own research and teaching. The following paragraphs give details of the changes and evolution that have occurred in more recent years, including those years covered by this evaluation.

The Swedish International Development Cooperation Agency (Sida), and previously the Swedish Agency for Research Cooperation with Developing Countries (SAREC) has supported ISP with substantial grant funds since 1975 with the purpose to strengthen enabling sciences.

Since 2006 a series of interim funding arrangements agreed between Sida and ISP were adopted while consideration was being given to a new model of engagement. Influencing this approach were a number of factors:

- Prior to the agreement period 2003 – 2005, ISP was asked to focus on low income countries in their capacity building efforts and to increase the number of female participants in the programmes. ISP was also requested to ensure that the programmes were well known at the universities and to develop forms of cooperation which contributed to institutional capacity building;
- In June 2004 the conference "Capacity Building in Developing Countries with Focus on Basic Sciences" was held in Stockholm with four organisations invited to discuss their efforts in this direction. An important conclusion was the need not merely to focus on individual scientists, but to support the development of sciences in line with national and institutional strategies. It was agreed that there was a need for an in-depth dialogue between Sida and ISP on direction, modalities and level of future support;
- During the Interim support for 2006 and 2007, a series of meetings were held with the purpose to develop a new model for engaging ISP within Sida's bilateral research cooperation and in support of Science faculties. Funding was then further extended in order to provide time to develop the forms of cooperation both in relation to Sida supported bilateral university programmes and to research groups, networks and resource centres; and

- During this period, Sida also intended to conduct an independent evaluation of ISP. This evaluation was delayed until 2011 and is now the subject of this report. This Evaluation Report sets out the findings of a small team contracted by Sida to independently:
  - (a) Confirm a description of ISP, its organisational, relationships and cooperation matters;
  - (b) Assess the relevance, efficiency, effectiveness, sustainability and impact of ISP; and
  - (c) Provide recommendations to Sida, ISP and Uppsala University on the future directions of ISP.

## 2. Purpose and Scope of the Evaluation

### 2.1 Objectives of the Evaluation

The Terms of Reference (ToR) is provided as Annex A and states:

**“The purpose of the review is to provide Sida, ISP and Uppsala University with input to the upcoming discussions concerning the preparation of the next phase of the programme. Furthermore it is to help Sida obtain a deeper understanding of the programme in order to facilitate its decision-making.”**

It is clear from this statement and the initial briefing<sup>2</sup>, that this is largely an evaluation for internal stakeholders: (a) to ensure clarity about the nature of ISP, how it operates in practice, and how it uses its Sida funding to contribute to the development cooperation objectives of Sida; as well as (b) to be utilised as a learning process to inform these key stakeholders for the future design of a potential ongoing ISP. As such, it is understandable and consistent with Sida terminology, that the term “review” has been used in various places within the ToR. However, in other references the ToR has used the term and titled the mission as an “evaluation”. In this document we use the term “evaluation”.

While this evaluation focuses on the ISP activities that are directly funded by the Sida block grant/core support to ISP, the implementation of bilateral coordination is both a challenge and an opportunity for ISP and cannot be totally divorced from the former. Bilateral coordination activities are incorporated in the evaluation where relevant.

#### 2.1.1 Scope and relevance to ISP

The ToR establishes the scope of the evaluation as being:

- a) Description of ISP and its operations;
- b) Assessment of the relevance, efficiency, effectiveness, sustainability and impact of ISP in relation to its programme objectives; and
- c) Provision of recommendations to Sida, ISP and Uppsala University respectively, on the future directions of ISP.

It is understood that an evaluation of ISP was undertaken in 2002. However, the report from that evaluation was apparently not acceptable to Sida and has not been made available to the current Evaluation Team.

The time frame to be covered is from 2003 to the present time. This would appear appropriate as, although ISP has been implemented for over 40 years, it has evolved considerably over that period, moving from a focus on individual scholarships to a greater focus on capacity building of science and mathematics faculties in developing country universities. In recent years ISP has been implemented through different modalities and with within the Sida-funded activities there is increasing pressure for ISP to become more integrated into Sida’s bilateral programme.

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<sup>2</sup> Phone briefing of 4 April 2011

As with other donor agencies around the world, Sida is increasingly required to demonstrate to stakeholders the contribution its various development assistance programmes make to development, and especially to poverty reduction. In addition, there is increasing need to demonstrate that it is achieving good value for money in its policy and programming choices. Sida is therefore moving towards a results based management approach. Sida is complying with a Swedish government decision to reduce its country programmes to the 12 “Focus” countries with which Sweden has “long term cooperation”. These are mainly African countries, including Burkina Faso, Ethiopia, Kenya, Mali, Mozambique, Rwanda, Tanzania, Uganda and Zambia, but also Cambodia, Bangladesh and Bolivia.

Specified in the ToR, the Evaluation Team was required to use Kenya and Ethiopia as case studies. Both are Focus countries and provide slightly different contexts within which ISP is operating.

This Evaluation is an important step, not only in Sida, ISP (including UU), and developing country universities learning and being able to plan for the future, but also in providing valuable and independent advice on the performance and worth of ISP as a programme funded by the Swedish Government.

# 3. The International Science Programme

## 3.1 The Role of Science in Contributing to Development and Poverty Alleviation

This section attempts to put into context the relevance of the enabling sciences to economic development and poverty alleviation.

The Evaluation finds there are **seven reasons why aid money should be used to support enabling science:**

1. Most of the flagship breakthroughs in development that disproportionately benefit the poor have science at their core, including well known examples such as the Green Revolution in Asia, the eradication of smallpox, control of river blindness in West Africa<sup>3</sup>, and provision of modern, safe, effective methods of family planning;
2. Research in the enabling sciences is a “public good”, and often a global public good;
3. Expenditure on Research and Development, including the enabling sciences is low, both by developing country governments and their development partners. Indeed, the World Bank finds that the gap between Research and Development spending between rich and poor countries is much larger than the income gap between those countries. OECD countries have historically spent around \$218 per million population, whereas low income countries excluding China have spent just \$1 per million.<sup>4</sup> This is especially so in Africa where investment in and capacity for research has been particularly low: Sub-Saharan Africa has an average of 25 researchers per million population compared to 48 per million in North Africa; 459 per million in China and 4103 in the United States.<sup>5</sup> Bilateral development partners - if they support science research at all - focus heavily on short term, applied science (Thulstrup, 1998). World Bank analysis (World Bank 2010) finds that international aid in support of higher education tends to be relatively small in both absolute (US\$ 600 million annually) and relative terms (only one quarter of all international aid to the education sector in Sub Saharan Africa). Furthermore, of the relatively small amount that goes to higher education, only 26 per cent goes directly to African Universities and research centres to build local teaching and research capacity. The balance goes to support for scholarships. (World Bank 2010);
4. Market forces are such that OECD research institutes, and companies, rarely invest in research of direct interest to developing countries;<sup>6</sup>

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<sup>3</sup> Control of Onchocerciasis (OCP) produced an impressive change in health between 1974 and 2002: Transmission of the disease-causing parasite was halted in 11 west African countries, 600,000 cases of blindness were prevented, and 22 million children born in the OCP area are now free from the risk of contracting river blindness. About 25 million hectares of arable land—enough to feed an additional 17 million people per annum—is now safe for resettlement. Further details available in Levine and Kinder (2004) *Millions Saved: Proven Successes in Global Health*. Center for Global Development

<sup>4</sup> World Bank (1998) *World Development Report Knowledge for Development*

<sup>5</sup> World Bank (2009) *Accelerating Catch Up: Tertiary Education for Growth in Sub-Saharan Africa*

<sup>6</sup> As just one example, the World Health Organisation estimates one billion lives are blighted – mainly in Africa – by “neglected tropical diseases” [http://www.who.int/neglected\\_diseases/en/](http://www.who.int/neglected_diseases/en/)

5. Enabling science underpins productivity and international competitiveness: key drivers of sustainable economic growth in a globalised world. Enabling science is a necessary (although not sufficient) condition for technological improvement and productivity increases in agriculture (crops and livestock) manufacturing (power generation and telecommunications) and the service industries (health sciences). “The future will be like the schools are today”<sup>7</sup> applies equally well to universities;
6. Enabling science provides the evidence base for responding to many of the most basic challenges facing developing countries, be they low-income or middle-income. These challenges include responding to climate change (including water stress, desertification, and pest control) and public health (including multidrug resistant tuberculosis); and
7. Research and training needs long term investments. None of the breakthrough discoveries have been achieved without long term, predictable, sustained financing.

Each of these issues is elaborated in Annex C.

However, this Evaluation believes several factors can undermine the full potential benefit of support for enabling science in the universities of least-developed countries. For example, well trained scientists can leave developing countries to work in the USA or other countries on projects that are not related to development needs. Second, when scientists stay in the developing country, they may not be able to generate good science. This can be due to many well-known factors: lack of financing for basic equipment and consumables or consumables such as electricity; professional isolation; lack of access to international journals etc. Third, even when they produce good basic research, there may be barriers to application in development and poverty reduction because institutional arrangements and reward systems are misaligned. Fourth, even where research results are available and relevant to development and poverty alleviation, political considerations and poorly formed public policy can fail to capture the opportunities afforded by good science. Finally, even where scientific evidence is adopted as part of the policy **response to a development problem, many other socio-economic factors are** required to align if development is to proceed, be equitable, and reduce poverty. These issues are also elaborated in Annex C.

**Good enabling science is a necessary condition for development and poverty alleviation.** Other factors not within the domain of good science must also be in place for the optimal benefit to be captured. The modalities and priorities for investment in enabling science should take into account the strengths and weaknesses of the entire system of innovation and development to help ensure those in poverty or vulnerable to poverty can access such benefits. Embedding ISP activities in the broad framework of Sida’s bilateral strategies may appear sometimes counter-productive from the viewpoint of the long-standing ISP programme, but without respecting the broader context of Swedish and other countries development investment, valuable Sida development resources may be applied in applications with lower development returns.

The Evaluation considers that ISP does not promote its successes and its contribution to economic development and poverty alleviation. Perhaps as a result of the long-standing support from Sida, this has not been necessary to date.

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<sup>7</sup> Albert Szent-Gyorgyi, Hungarian Biochemist and Nobel Prize Winner.

However, in the current environment of development cooperation, justification of the use of aid funds and promotion of success stories is imperative.

**Recommendation 1:** ISP and Uppsala University should engage vigorously with the public and government processes that establish Sweden's development policies, providing advice based on their extensive experience. Support for enabling science should remain a focus for ISP, in the context of Swedish development policy settings. ISP should position itself to respond to other opportunities (in Sweden and elsewhere) to support development research cooperation. In addition ISP should promote the "good news stories" showing the benefits of their work.

### 3.2 ISP Objectives

ISP was initiated in 1961 by the Uppsala University, in Sweden in the form of an international seminar for research and education in physics. It has developed significantly since then. Its objective as understood from the various documents is to support long-term collaboration in research mainly between Swedish institutions conducting research in physics, chemistry and/or mathematics and institutions in low income developing countries, to build the capacity within the relevant institutions in those countries to undertake research, and to promote regional collaboration amongst research organisations in those low income countries<sup>8</sup>.

This is actually several objectives or components of an overarching goal. Furthermore, they are pitched at different levels of logic. Clarifying this should be a major focus in: (a) preparing the design of the proposed next phase of funding; and (b) developing a comprehensive M&E framework.

### 3.3 Governance Structure of ISP

A formal regulation of ISP was established by the Swedish government in 1988 (UHÄ-FS 1988:18; SFS 1992:815), through the then Office of Universities and Higher Education (Universitets- och högskoleämbetet; UHÄ). ISP is formally a part of the Uppsala University (UU), and therefore the governance arrangements are determined by the Board and the Vice-Chancellor of the Uppsala University. Currently, ISP is operated as a Common Unit within the Disciplinary Domain of Science and Technology of UU. As a Common Unit, ISP does not itself undertake direct education and research activities or supervise degrees.

ISP is governed by a **Board**, the Membership of which is determined by Uppsala University after consultation with Sida. The membership comprises:

- Vice-Chancellor of Uppsala University or a person appointed by the Vice-Chancellor of Uppsala University (Chairperson);
- Permanent Secretary or other person from Uppsala University administration;
- A member of an international organisation working in one of the ISP areas of science;
- Three members who are researchers at Uppsala University, at least two being in fields of direct relevance to the programme;
- Three members from other universities in disciplines relevant to the ISP programme;

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<sup>8</sup> Wording prepared from Annual Reports

- A representative for developing countries nominated by the Board of ISP;
- A student at graduate level nominated by the Uppsala student union; and
- Three deputies representing different disciplines within the ISP nominated by the Technical Faculty of Science.

The ISP Board meets at least once per year and is responsible for:

- Establishing the strategic directions of ISP;
- Selecting of developing countries and organisations with which ISP cooperates;
- Approving and arranging for the monitoring all ISP activities;
- Approving policies and procedures relating to ISP operations and activities;
- Approving, monitoring and auditing of the ISP budget;
- Appointing the programme Reference Groups; and
- Appointing the Executive Committee of the Board.

The **ISP Executive Committee** of the Board has the following membership:

- Chairperson who is a Professor with scientific expertise in any of the sub-programme fields;
- An experienced university administrator;
- The Director and Programme Directors; and
- Other Members with expertise in fields of direct relevance to the ISP sub-programmes.

The Executive Committee meets at least 4 times per year and has the following responsibilities:

- Reviewing ISP financial performance on a quarterly basis;
- Receiving the Director's report on operational matters;
- Actively participating in planning of programme development including assessments of balance between research groups, resource groups and networks, and development of existing and new activities;
- Recommending to the ISP Board the appropriation request and the annual report;
- Oversee the cohesion of ISP activity and operations; and
- Establishing delegations and responsibilities in ISP.

The **Director of ISP** is appointed by the Vice-President of the Disciplinary Domain of Science and Technology after consultation with the ISP Board, and has the following responsibilities:

- Leading and developing the business of ISP;
- Encouraging interest and participation by academic staff in the activities of ISP;
- Creating new business for ISP;
- Preparing appropriation requests; and
- Briefing and supporting the ISP Board.

ISP is bound by the policies and procedures of Uppsala University. Its accountabilities in respect of financial, human resources and facilities administration lead to significant operational efficiencies and risk reduction in



comparison with an independent organisation. Despite being so closely linked with (and in reality, owned by) UU, ISP claims that it treads a careful path of selecting the best experts or universities for each specific situation.

The ISP team comprises the Director of ISP, Directors of each field of science and a five person team focussing on administration, logistics, IT and finances. Within this support team, there are individuals who concentrate on supporting one field of science (either Chemistry, Physics or Mathematics). Currently the Director of ISP is also the Director for Chemistry and there is a deputy Director supporting him in this field.

Uppsala University has research cooperation agreements covering many different fields of research with more than 1000 universities all over the world. The University's Internationalisation Plan commits to solidarity and sustainable development throughout the world. According to the plan, internationalisation efforts are the responsibility, in the first instance, of active researchers, teachers and students, while university-wide support functions serves to facilitate, coordinate, supplement and improve the visibility of the University's internationalisation efforts. While ISP is not a university-wide unit, it fulfils these support functions well and may be underutilised by Uppsala University as a campus-wide resource.

The governance and management arrangements for ISP provide clear lines of responsibility and accountability, There is little if any evidence of inefficient duplication or risky omissions in the hierarchy. For a university-run programme ISP has an unusually strong external orientation, and a strong reliance on relationships with Swedish government agencies, In these circumstances, both the University and Sida may find it beneficial to broaden the membership base of the ISP Board in order to foster improved awareness of the external environment in which ISP operates. Appointing members who are, for example, retired politicians and senior officials with experience in and commitment to research cooperation development would help ensure that the Board is aware of emerging pressures and challenges.

**Recommendation 2:** Uppsala University should consider the benefits of broadening the skill set of the ISP board to include members with experience in development cooperation and in the politics and bureaucracy of the focus countries.

### 3.4 ISP's Scope

ISP focuses its efforts through building capacity in the enabling sciences of physics, chemistry and mathematics. As such, it has evolved with three programmes: International Programme in the Physical Sciences (IPPS), International Programme in the Chemical Sciences (IPICS) and International Programme in the Mathematical Sciences (IPMS). Each programme is required to have a Director appointed by the Vice-President of the Disciplinary Domain of Science and Technology after consultation with the Director. Programme Directors advise the ISP Board directly on the design, content, scope, administration and finances of the ISP activities in their programme.

As would be expected, ISP's focus on the enabling sciences nevertheless supports more-or-less directly a wide profile of applied physical, chemical and mathematical research focussing on important development issues for each country<sup>9</sup>.

### 3.5 Mode of Operation

The evaluation identifies two main modes of operation by ISP, linked directly to the two kinds of funding provided by Sida: ISP Core Programme, and coordination of Sida Bilateral activities. Other, and often new, funding sources (see 3.5.3 below), are valuable extensions of the sort of activities that ISP undertakes, earning needed income for ISP.

These are described below, followed by a background and discussion on the "model" for ISP.

#### 3.5.1 ISP Core Programme

The Programme mode is based upon funds provided largely by the combination of Uppsala University and a direct grant from Sida.

Uppsala University funds are reported to cover the majority of the administration and management costs of ISP, while Sida core support funds cover the shortfall and are mainly allocated to support research groups, resource centres and networks within research fields proposed by the institutions and groups in supported countries.

While revenue from Uppsala University and Sida core support is provided with clear accountabilities, the ISP Board has considerable flexibility in its selection of activities to support with this funding. Swedish Universities supervising post-graduate students provide substantial assistance in kind, including such items as office space, access to computer facilities, libraries and equipment. The agreement with universities provides them with fees of SEK 4,000 per month (will increase to SEK 5,000 in 2012), but this is considered to lie far below the real cost. ISP considers, and the Evaluation Team agree, that the supervising university is effectively co-financing the particular research activity.

Students supported under ISP claim they receive detailed attention to their establishment and wellbeing. In addition, support may (in special circumstances and after approval of their home institution's research group or network) include allowances to partly provide for their spouse and children to accompany them on overseas training periods. This difference in treatment between ISP supported students and students supported under the bilateral programme can create disharmony within the student groups and complaints to those organising the individual's training. There is no information available to assess whether this situation has impacted upon academic performance of students who feel they have received lower benefits.

#### 3.5.2 Bilateral Activities

In this report, we use the term "Bilateral" in the broader sense of the Swedish development cooperation relationship with another country. On occasion, ISP undertakes assignments to coordinate regional and multilateral programmes and such programmes have not been separated out due to their small size relative to

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<sup>9</sup> As an example, one ISP-supported mathematics student interviewed at Uppsala advised that he will be using the mathematics methodologies to assist in modelling the spread of contagious diseases.

the overall programme. The presence, structure and geographical coverage of ISP place it in a strong position to provide services to Sida in coordination of training for Sida's bilateral programme within a number of countries. In addition, ISP's existing structure, systems and procedures for supporting training activities make it a logical candidate for the role of coordinating new training activities that arise under the bilateral programme. The opportunity has been taken up by Sida in the bilateral programme for a number of countries to request support from ISP. Separate agreements between ISP and Sida for the supply of services are signed on each new occasion.

As a result, ISP is currently coordinating the implementation of Bilateral Programme training activities as follows:

Ethiopia	Pharmacology
Mozambique	Chemistry, Mathematics and Physics
Tanzania	Geoscience and Food Security
Uganda	Information Technology, Library, Mathematics, Chemistry and Biology

ISP's role in these Bilateral Programme training activities is as the coordinator and other Swedish universities provide the training for post-graduate degrees. In effect, the logistical implementation processes are not dissimilar to those under ISP core programme activities. However in this role ISP has no control over the design of the activity (and therefore the achievements against expectations) nor does it always have direct control over, or impact on, the quality of training. Further description on the relationships between ISP and other universities is provided in the following sections.

There is a particular risk here for Sida's operations and good governance principles in that, by offering the coordination role to ISP, it may be perceived to be favouring ISP, rather than "testing the marketplace" and offering the opportunity to any interested organisation through a competitive tender process.

Furthermore, the very reason that ISP is able to provide these services to Sida also presents a risk to the bilateral activity in the following ways:

- 1) Systems, procedures and approaches are likely to be applied to the bilateral programme in the same way or similar to those provided under ISP core activities. This is not always appropriate and may lead to misunderstandings and inefficiencies and place pressure on relationships. An example of this is provided recently in Uganda, and what appears to be different goals of the recipient university versus the focus they perceive is being provided by ISP<sup>10</sup>;
- 2) Projects previously designed by others and offered by Sida to ISP to deliver already have pre-set targets and expectations, some of which ISP may feel are unrealistic. With ISP understandably willing to accept new Projects, the full repercussions of this design issue may not be identified for some time, potentially causing additional difficulties when it is finally raised as an issue. The process of tendering such an opportunity will

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<sup>10</sup> Phone discussions with Prof at Makerere University

provide immediate feedback on the design and allow early adjustments;  
and

- 3) Students from both bilateral programmes and ISP core activities often share living conditions together at their host university and indications are that some confusion and potentially resentment exists between students when they do not understand the details of each other's allowance packages or similar other personal benefit (refer to 3.5.2).

### 3.5.2 Other

This category covers funds from other sources, often for specific uses, but not always. Over the years 2008 to 2010 this category represented between 3% and 8% of total ISP funds.

Examples include:

#### **Agreement with Stockholm University (SU)**

An agreement with SU between 2011 and 2016 includes a commitment by SU to paying SEK 1 million per year to ISP. These funds are being used for:

Pan-African Centre for Mathematics (PACM), located in University of Dar Es Salaam. A total of SEK 500,000 is provided per year by SU and held by SU and dispersed upon request on agreed activities of the PACM. PACM is effectively a network, acting in the same way as any other network supported under ISP.

Other funding to ISP for activities in support of SU: A total of SEK 500,000 is provided to ISP to support SU activities "to further develop academic relations in the collaboration with third parties in developing countries in the fields of science that are of common interest".

#### **Service Agreement with Al Baha University (Kingdom of Saudi Arabia)**

An agreement with Al Baha University provides funds to cover the costs of ISP supporting students attending university in Sweden (any university). The actual costs of bench fees, travel, allowances etc are covered in addition to this agreement and paid directly to the host university. The agreement for the initial term of cooperation in 2011 comprises funding of about SEK 1million for ISP to develop the collaboration, which catered also for preparatory actions in 2010. Additional, specific activities will be subject to separate contracts in each case.

#### **Agreement between ISP, Luleaa Technical University (Luleaa) and National Mathematical Centre, Abuja, Nigeria**

This agreement provides commissioned education in Sweden, paid for by the Government of Nigeria. All costs are paid directly to Luleaa including a lump sum fee SEK 25,000 being charged by ISP for services and costs in supporting the placement of each student. There is currently 1 PhD student going to Luleaa.

#### **Letter of Intent for MoU with University of Ottawa**

The intent is to develop collaboration where students at University of Ottawa will be offered opportunity to make use of ISP networks and research groups for thesis work, gaining experience in working in a maybe challenging environment and contributing to on-going research. ISP was approached by the University of Ottawa to develop this opportunity.

### 3.5.3 The “Model”

In planning for ongoing support in 2007, and following an assessment of the ISP proposal for further funding, Sida/SAREC wrote<sup>11</sup> “A model shall be developed for engaging ISP in support of science faculties within Sida’s bilateral research cooperation.

The new “model” concept had been raised and referred to on a number of occasions. For example in the assessment of continued support to ISP for 1 July 2008 to 30 June 2010<sup>12</sup> and referring to dialogue in 2006 and 2007, “It was also discussed if and how ISP could be responsible for faculty development, how the ISP experience could be used within the bilateral programmes and how to avoid duplication within Sida partner countries”.

However, through document reviews and discussions with ISP and Sida personnel, the Evaluation Team has found no evidence of any further real development of the concept nor any understanding of what was really meant. In particular, although the desire to develop (or perhaps enunciate) the model was covered in early discussions and then in assessments, no contractual obligation to fulfil this desire was ever provided, nor distinct practical actions taken to bring it about.

**Recommendation 3:** Formal agreements between Sida and ISP should explicitly reflect new strategic directions and intended outcomes, including clarity of deliverables and a timeframe.

It should also be noted here, as pointed out in a number of sections in this report, that no programme logic had been established in the form of a logical framework or similar. The Evaluation Team believes this is a pre-requisite to and will assist in consideration of the new model or new model options.

In summary, the “model” has not been developed and the basis as to what this “model” might be is not understood by relevant stakeholders because:

1. There would appear to have been no clarity as to what was meant in the request to develop a model;
2. There was no clear responsibility allocated to develop the model; and
3. There is no base programme logic upon which the model can be based (though this is now being developed and the Evaluation has been a catalyst for such development – see Annex G).

Development of a programme logic allows the ‘theory’ behind the investment to be tested as part of a learning process. A good M&E system can be then developed to drive the learning process. This should help ISP to improve its targeting during operations. Done well, a programme logic should articulate some short and medium term results along the road to the long-term objectives. ISP can then use results at these short-term and medium-term levels to help demonstrate that it is on track to achieving the overall goals.

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<sup>11</sup> Sida/SAREC Promemoria 6 December 2006, Reference No. 2005-004055

<sup>12</sup> Sida/SAREC Assessment Memo 28 May 2008, Reference No. 2008-000791

**Recommendation 4:** ISP should further develop the programme logic in the form of a logical framework, representing ISP overall and clearly setting out the goal, relationships between outcomes and outputs, inputs and where the sources of funding contribute, This will: (a) assist in compliance with Sida's Results Based Management system; as well as (b) provide the necessary basis upon which models and model options for ISP's future operations can be developed.

The evaluation Team have not specified a model for ISP's involvement in the bilateral programme, as there are a number of options that could be tried each depending upon the modality of Sida's activity (which needs to be specified). For example a model for ISP to link with activities that derive from a Block Grant into a university may well be very different to ISP coordinating training activities for Sida (or other project implementers) in a project-based activity.

The current situation in Ethiopia could provide the basis upon which to quickly build experience and the basis for one model of operation (based on the block grant mechanism). At the higher level, Sida is providing a block grant to the Addis Ababa University to support the institutional development of AAU in various ways. After being given approval, ISP has recommenced supporting research groups in Mathematics, Physics and Chemistry. At this stage there appears no or very little dialogue to identify how each might benefit the other. Notwithstanding the fact that an agreement is already in place with the AAU and their priorities established (it is likely too late to make changes in this funding period), areas that could be considered include:

- Infrastructure and facilities development that will assist mathematics and the various sciences, and including physics and chemistry (but not only);
- Specific capacity building programmes for administrators within the various departments (including mathematics, physics and chemistry); and
- Establishing and building the capacity of a grants management team (if not already in existence) that can work across departments, that learns from and builds upon the experiences and systems established through ISP.

Models based upon ISP coordinating training for a bilateral project could be a simple contractor model – where relationships can be clearly spelt out.

A Model in which ISP undertakes or provides capacity building in grants management on the other hand will be more complex, and ISP could be seen to be a contractor implementing a Facility.

### 3.6 ISP Core Programme Description

ISP's Core Programme has evolved over 50 years and although the countries and groups being supported have changed over that time, the focus on building capacity in the enabling sciences has not changed.

To provide appropriate academic and scientific robustness to ISP's activities, ISP appoints a **Programme Reference Group** to each of its scientific programmes. The chemistry and physics programme Reference Groups nominally have six members each, consisting of well-reputed professors, three from Nordic countries (often just referred to as "North") and three from Southern countries (similarly referred to as "South"), representing different fields in each scientific discipline. The mathematics programme has three members, two of which are from the North and one of which is from the South. The Reference Groups assess funding applications, provide strategic advice to the ISP Programme Director and assist in identifying appropriate scientific experts and networks.

ISP supports research groups in countries and scientific networks between countries.

A **Research Group** is at least one senior scientist leading a research activity and one post-graduate student (MSc or PhD) in one of the fields of Physics, Mathematics or Chemistry. ISP provides direct support to a research group where the group has been invited to and has submitted an application for funding, thorough discussions have been held with the group's Department/Faculty, information on University management has been assessed, the application has been assessed by the ISP Programme Reference Group, and an allocation of funds has been proposed to and approved by the ISP Board. Support is normally for three year periods. However, if further development of a proposal is necessary before the Reference Group provides a positive recommendation for funding, then a one year interim activity may be approved, after which an upgraded proposal is to be submitted to ISP.

A Research Group will partner with a **Collaborator** who supports the research activity with scientific expertise and supervises the post-graduate training. The Collaborator is usually based in a scientifically more developed and resourceful institution in a Northern country (usually Sweden) or in the Region. In many cases the Collaborator is the leader of scientific activities including postgraduate education in a research group, a so called **Host Group or Partner Organisation**, at the collaborating institution. Collaborators are normally identified and recruited by ISP Programme Directors with advice from the Programme Reference Group and the supported Research Group. Some groups may have initiated collaboration themselves, e.g. with former supervisors of returning graduates, and this collaboration can potentially continue with ISP funding.

A Collaborator and the Host Group hosts scientific visits by researchers, students and/or technicians from the supported Research Group or Scientific Network (see description below). The Collaborator is often the supervisor of a "sandwich" student, and is responsible for the student's training and education while the student is with the Host Group. Individual researchers involved in the supervision of one research student are called Collaborating Supervisors.

A Collaborator or Collaborating Supervisor may receive ISP payments from the allocation to the Research Group, on request by the group. Payments include bench fees for training Research Group members, costs of intensive courses, and costs of travel to supported Groups.

A **Scientific Network** is a group of scientists in a number of developing countries affiliated to institutions interested in developing research and postgraduate education together, as well as exchange of ideas, sharing of resources, arranging courses and meetings, and exchange and training of researchers, students and technical staff, in a certain scientific field. A Scientific Network has a senior scientist as coordinator, being accountable to ISP, and a number of collaborating scientists in different functions. Each group of scientists constitutes a **node**. A Scientific Network directly supported by ISP has been invited to apply for funding, after thorough discussions, the application has been received and assessed by an ISP Reference Group, and an allocation of funds has been proposed to and approved by ISP Board.

A Resource Center is a defined resource (sometimes, but not always within a Scientific Network) which supplies academic or technical services to a number of nodes. It may be an existing or graduated Research Group with very good

resources and equipment. These services are of varying character and may for example, include access to scientific equipment.

Table 1 sets out a summary of the expenditure and of the outputs measured on ISP for the period 2003 to 2010.

**Table 1 ISP Expenditure and Outputs 2003 – 2010**

Expenditure/Output	2003	2004	2005	2006	2007	2008	2009	2010	TOTAL
<b>Expenditure (SEK '000, Research groups and Networks)</b>	<b>18,774</b>	<b>21,840</b>	<b>26,640</b>	<b>16,951</b>	<b>20,229</b>	<b>18,584</b>	<b>19,365</b>	<b>14,730</b>	<b>157,113</b>
No. Research Groups support Commenced	5	1	7	2	2	2	0	2	21
No. Research Groups support Completed	4	7	4	4	5	14	3	9	50
No. Research Groups supported	50	47	47	45	43	43	29	28	-
No. Networks support Commenced	2	1	1	0	0	1	1	1	7
No. Networks support Completed	0	0	0	1	3	1	2	2	9
No. Networks supported	19	20	21	21	20	18	18	13	-
No. total activities support Commenced	7	2	8	2	2	3	1	3	28
No. total activities support Completed	4	7	4	5	8	15	5	11	59
No. total activities supported	69	67	68	66	63	61	47	42	-
Number of Master students	273	300	366	340	342	320	364	232	-
Master degrees awarded	74	55	104	129	141	97	105	80	785
Number of PhD students	179	184	175	215	181	169	162	117	-
PhDs awarded	25	28	18	20	12	35	33	24	195
No. published papers	198	182	214	237	196	192	210	110	1539

## 3.7 ISP Funding

### 3.7.1 Funds Sources and Use

The sources of ISP funds currently (2011) are 70% from the Sida grant, 14% from the Sida bilateral programmes, 7% from UU, 3% from Stockholm University and 6% from other sources. Thus total funding from Sida in 2011 is 84% of total incoming funds to ISP. Over the years 2003 to 2008 Sida funds as a percentage of total incoming funds into ISP have been greater than 90% and the decrease over the last three years have been the result of an increasing diversification of funds sources. Table 2 provides a breakdown of funds sources as well as use of funds for the period from 2003 to 2011.

Analysis of funds use indicates that the costs of managing the programme amounts to between 15% and 23% of total annual expenditures. This includes scientific coordination costs. Such a range is within acceptable levels of overhead expenditure profiles of other programmes experienced by the evaluators, although it should be noted that ISP would need to invest more in monitoring and evaluation if it is to meet Sida's recent requirements for "results based management". That would then drive up overall management and overhead costs.

### 3.7.2 ISP Core Programme Funds

The budget applied for each activity, whether it be a research group or contribution to a scientific network, is developed and approved by the respective department/university. Following support from the university/department, it will be submitted for evaluation and approval (or rejection) by ISP.

ISP support is tailored to each activity, and may include:

- Support with equipment, spare parts, consumables, etc;



- Support with scientific literature and periodicals;
- Fellowships to scientists, students and technicians for research work and training. The fellowship period is in most cases 3-10 months, and only in exceptional cases will a fellowship period exceed one year at a time;
- MSc and PhD programmes of sandwich type, with the degrees given by the parent university whenever possible. Participation by young students and with a gender balance is encouraged;
- Support to participate in and/or organise conferences and workshops;
- Support to visits by co-operating scientists from developed countries; and
- Support to regional co-operation and exchange of scientists and technicians.

Once an annual budget for an activity has been approved by the ISP Board, an agreement has been signed, and any other conditions have been met, an activity leader can request funds disbursement from ISP. Money can be requested to be transferred to a local account for local use, to a company or organisation as payment of items or services, to a student to allow for subsistence while on training with a Collaborator in another country, to a Collaborator for “bench fee” or for travel costs. Money to be spent in Sweden is generally held for transfer directly by ISP.

Research Groups and Networks provide annual reports on progress. Any activity requesting more than SEK 200,000 for local use in a given year is subject to an annual audit by an external auditor. ISP provides Terms of Reference for such an audit.

Table 2 ISP Funds Sources and Uses 2003 to 2011

## ISP Funds Sources and Use

Source and Use	2003	2004	2005	2006	2007	2008	2009	2010	2011
									Estimates
<b>FUNDS SOURCE</b>									
Sida Grant	24,500	26,000	26,000	27,000	27,000	24,000	20,000	17,000	25,000
Network Conference Addis Ababa							1,667		
UU Grant	1,296	1,415	1,393	1,589	1,635	1,650	2,542	2,509	2,641
Stockholm Univ Grant									1000
Bilateral Funds	8,156	4,596	8,789	7,554	8,152	9,212	14,984	5,932	5000
Other sources	823	2,240	2,048	456	672	1,178	1,273	2,145	2000
<b>Total Incoming Funds</b>	<b>34,775</b>	<b>34,251</b>	<b>38,230</b>	<b>36,599</b>	<b>37,459</b>	<b>36,040</b>	<b>40,466</b>	<b>27,586</b>	<b>35,641</b>
Funds brought forward from previous year									
Grant funds brought forward from previous year	4,492	5,722	5,927	-13	5,543	6,840	7,952	4,331	
Bilateral funds brought forward from previous year	8,519	5,963	3,281	4,659	7,868	8,078	8,578	10,723	
Balance of Other funds	2,728	2,750	2,452	1,410	1,425	830	653	1,016	
<b>Nett Balance of Funds</b>	<b>15,739</b>	<b>14,435</b>	<b>11,660</b>	<b>6,056</b>	<b>14,836</b>	<b>15,748</b>	<b>17,183</b>	<b>16,070</b>	
<b>TOTAL FUNDS AVAILABLE</b>	<b>50,514</b>	<b>48,686</b>	<b>49,890</b>	<b>42,655</b>	<b>52,295</b>	<b>51,788</b>	<b>57,649</b>	<b>43,656</b>	
<b>FUNDS USE</b>									
Expenditure by Research Groups	14,915	17,099	20,146	12,911	14,601	14,568	12,717	8,672	
Expenditure by Networks	3,859	4,741	6,494	4,040	5,628	4,016	6,648	6,058	
Network Conference Addis Ababa							1,663		
Expenditure on Bilateral Projects/Activities	10,018	8,307	9,377	3,611	7,074	6,823	11,717	11,249	
Expenditure on Other activities (bilat sc and adm coord)	1,496	951	1,294	868	1,386	1,632	1,764	2,128	
<b>SUM of funds use for research gr+networks</b>	<b>30,288</b>	<b>31,098</b>	<b>37,311</b>	<b>21,430</b>	<b>28,689</b>	<b>27,039</b>	<b>34,509</b>	<b>28,107</b>	
<b>Other costs</b>									
Direct support/ scientific coord'n	3716	3295	4141	3763	4819	5249	3365	3260	
Direct support/ admin coord'n	1754	2253	1960	2591	2557	1910	3434	3352	
Ref Groups + Board meetings	321	381	422	184	476	405	280	697	
<b>Other costs (total)</b>	<b>5,791</b>	<b>5,929</b>	<b>6,523</b>	<b>6,538</b>	<b>7,852</b>	<b>7,564</b>	<b>7,079</b>	<b>7,309</b>	
<b>Balance carried forward</b>	<b>14,435</b>	<b>11,660</b>	<b>6,055</b>	<b>14,836</b>	<b>15,749</b>	<b>17,183</b>	<b>16,070</b>	<b>8,240</b>	

### 3.8 ISP Systems and Procedures

**ISP's internal systems and procedures** have been developed over a long period and appear to serve the Programme well. They are driven by five administrative staff within the ISP offices and overseen by the Director of ISP.

**Financial systems** are integrated with those of UU and finances are audited annually as a requirement of Sida.

**Procedures for selection of research groups and networks** have also been developed over time and are set out clearly in guidelines issued each year. Invitations to submit proposals, complete with these guidelines on preparation of proposals are sent out around June of each year for the funding cycle to commence in the next calendar year. These invitations are sent out to already known and prospective groups. There is no public advertising nor open system to allow prospective new proponents to participate. On the positive side, this "picking winners" and mentoring approach could be seen to be an efficient mechanism. Submissions are received and the Reference Group meets around November to assess the submissions and receive presentations from proponents.

**Recommendation 5:** The selection of Research Groups should be made in a more objective and transparent manner. Those groups which have attained a certain level of self-sufficient capacity, or are part of strong universities, should be encouraged to apply for support on a transparent, competitive, basis, while groups with limited capacity might be fostered and supported to a greater level for their initial period.

A survey of the Reference Groups indicates that expert review of applications by experienced peer reviewers forms a large part of the selection process. Respondents to the survey observe that existing groups are favoured by having had previous access to the ISP Directors of the various fields. Reference groups do not review annual progress reports, but they do review progress when an extension of ISP support for the activity is requested (normally every 3 years). It is reported that consideration as to whether a research group has developed their skills adequately to be able to graduate from ISP support is based on a subjective assessment by the Reference Group.

**Recommendation 6:** ISP and Uppsala University can improve the effectiveness and efficiency of delivery by adjusting the roles of Reference Groups. More use of peer review to evaluate progress reports and outcomes, might strengthen ISP core activities.

**Procedures for selection and managing the performance of Reference Group members** are unclear and a review of Annual Reports indicates there are only rare changes to the membership. There are benefits in having long term ISP experience on the Reference Groups. However, there are also benefits from having new ideas and broadening the outlook. With the emphasis on Focus countries, the particular representatives from less developed countries may be less relevant in some circumstances and may need to change. These points are made with the recognition that Reference Group members are willing to provide their time on a voluntary basis.

**Recommendation 7:** ISP and Uppsala University should review membership, selection and performance management of the Reference Groups, especially considering the emphasis on Focus countries and further integration with the bilateral programmes of Sida.

**Procedures for selection of collaborating universities** do not include open and transparent procedures. They are based on knowledge within ISP of the capabilities of Swedish universities and individuals within those universities (and sometimes universities or individuals outside Sweden). Within the academic field and concentrating on “basic” science, this can be seen to be a defensible approach. However, in each case the rationale should be recorded clearly for future reference.

### 3.9 Monitoring and Evaluation of ISP Activities

ISP reports that it continuously monitors the performance of activities through:

- On-site visits by ISP staff, reference group members and cooperating scientists;
- Frequent contact by email or telephone;
- Annual activity reports; and
- ISP reference group meetings considering applications and re-applications.

ISP measures outputs in the form of MSc and PhD theses and graduates, publications in research journals, and participation in conferences and workshops. It is acknowledged that there is a need to develop additional indicators to measure the development of a group in broader terms, its contribution to the quality of the higher education at the institution and its contribution to development of the society at large and to poverty reduction.

The Evaluation believes there is little if any structured monitoring and evaluation of ISP programmes in terms of the methods and expectations appropriate for a suite of development cooperation activities. While the situation is understandable as a result of the governance and history of ISP, it is unsatisfactory from the viewpoint of Sida and jeopardises the ISP Core Programme.

ISP needs a soundly structured programme logic and M&E framework. This point continually arises during the assessment and within this report and emphasises its importance. With consideration of another phase of funding ISP, there is the opportunity to achieve this necessary structure, to prepare a practical and defensible design, to provide information as a learning and continuous improvement basis, and to provide the basis for future evaluations and consideration of any ongoing funding.

In response to discussions with Sida on the need to develop Results Based Management systems:

1. ISP attempted to develop a “logical framework” or “logframe” (ie one of many development tools that link inputs to outputs, outputs to outcomes, and outcomes to impacts) in early 2010. However, the result was a mechanistic approach, neither targeted at the higher level objectives of ISP, nor owned or fully understood by the implementation team; and

2. The current (2011) guidelines for submitting proposals to ISP require a logical framework and are said to provide a template. It remains to be seen if those submitting proposals will be able to produce submissions of the quality necessary to make informed and good choices.

During the evaluation period, a brief workshop was held with ISP and a Sida representative to undertake a fresh look at an appropriate logframe. Further liaison followed during the evaluation period and while there is still substantial workshopping to be undertaken to complete the process, the latest version of the logframe prepared by ISP is provided in Annex G.

**Recommendation 8:** ISP should have a more systematic, and results and outcomes focussed, means of monitoring and evaluation. ISP should use a systematic tool, such as a logical framework (“logframe”) or similar to capture the relationship between inputs to outputs, outputs to outcomes, and outcomes to impact. ISP should also have a more systematic way of capturing “impact” stories. The draft logframe developed by ISP should be further developed in facilitated workshops.

### 3.10 Programme Ownership

ISP is established as a special unit within the Faculty of Science and Technology at UU. Although it receives over 80% of its funds from Sida, ISP remains relatively independent in its operations from the usual operational requirements of Sida. However, increasing pressures on the justification of the use of development assistance funds is resulting in increasing requirements of ISP to respond in a similar manner to many other programmes being implemented by Sida.

Despite these changes, ownership continues to remain strong at various levels of ISP operations, including:

1. A strong sense of ownership and commitment within the ISP team based in UU; and
2. Within each Research Group and Network, ISP has been careful to ensure that each entity is driving their proposal being put forward and also the implementation of any research and training activity.

### 3.11 ISP’s Relationship with Sida

Swedish Government policy establishes priorities for Swedish Government development support for specific countries and specific objectives. Sida officials are obliged to correspondingly channel Sida funding for research development cooperation according to these priorities. The Policy for Research in Swedish Development Cooperation 2010-2014 and the Strategy for Sida’s Support for Development Research Cooperation 2010-2014, provide the framework for this process. In practice, Swedish Government priorities require Sida to impose conditions on its direct funding to ISP. Within these conditions, Sida direct funding can be allocated to activities by ISP Board or their delegates.

In 2007, the Swedish Government determined that development assistance would focus more strongly on combating poverty in Africa. Twelve countries (the “Focus countries”) were identified for long-term, deepening development cooperation. Despite the stated focus on Africa, two of the Focus countries are in Asia and one is in South America. Bilateral programmes including elements of research development cooperation are in place seven of the twelve Focus countries,

including Ethiopia, Uganda, Rwanda, Tanzania, Mozambique, Burkina Faso and Bolivia. Five Focus countries do not yet have bilateral research development cooperation agreements: Bangladesh, Cambodia, Kenya, Mali and Zambia.

ISP has been requested by Sida not to undertake further core programme activities where there is a country bilateral programme which includes research cooperation (this includes seven of the Focus countries as above).

ISP has responded to Sida imperatives by systematically winding down activities that are not consistent with Swedish government priorities. Where this is required, ISP takes care to try to ensure that the benefits of its – and, of course, ultimately Sweden’s - earlier support are not lost, for example by welcoming research groups into research networks. Specifically, ISP has systematically started to curtail activities that are not within the “Focus countries”. Nevertheless, it is likely that the abrupt winding down of some ISP activities has exposed researchers in some developing countries to additional hardship, and reduced the potential value of earlier Swedish investments.

There is an understandable tension between (a) the “freedom” suggested by the long-term intent of historical Sida direct support (amplified by the discretionary character of the funding provided over many years by Uppsala University) and (b) the constraining policy settings of the government. This tension has been intensified by unforeseen changes to the duration and amount of Sida’s direct support since 2006.

It is understood that before 2006, ISP sometimes supported research groups at universities which were also receiving Sida bilateral programme assistance and that neither Sida nor the university management were aware that a group may have Sida funds through different channels. On the surface the issue may appear to revolve around communication between all parties, or the lack thereof. However, this may be a symptom rather than the cause. Design of both the Sida and the ISP activities in each country should have been cognisant of the other and integrated to ensure appropriate organisational/functional structures and communications. With a clear design, and implemented well, ISP’s operations can contribute to development impact and thus to Sida’s overall objectives.

**Recommendation 9:** Recognising that shifts and adjustments in Swedish development priorities are bound to continue, Sida should consider a master plan in relation to the type of engagement with the various Focus countries. This will allow for the longer term planning required for research programmes and post-graduate training programmes. It will also allow for the negotiation of an overarching Agreement with ISP that sets out mutual expectations and understandings over a reasonable period, and especially in relation to the transition phase to a more bilateralised programme.

The Evaluation Team believes there are good benefits/synergies to be gained by the ISP core programme also being provided in those countries in which Sida is providing support to research and higher education. An effective approach might involve the continuation and perhaps modest expansion (in terms of disciplinary coverage) of the ISP core programme, alongside bilateral research development cooperation funding delivered in other ways. This co-operation in any one country will require careful planning and good communications.

**Recommendation 10:** It is recommended that Sida reassess the prohibition of ISP core programme activities in focus countries that have bilateral research cooperation funding. If it is agreed to re-commence activities in those instances, then close cooperation between Sida and ISP is necessary to plan and review progress of all activities.

Moreover there is a synergy to be potentially gained in any country, if ISP and Sida activities effectively link together. For example, it is quite conceivable to envisage a situation where ISP, with Sida support, provides medium to long term (eg 10 to 15 years) support to build capacity in science and mathematics. Having a stable long term programme would enable ISP and partner universities to plan accordingly and appoint longer term staff positions, and make strategic – rather than year by year reactive decisions. With the longer term financing secured, ISP could also then take longer term M&E action such as more proactively monitoring the “leakage” of post graduate students.

To further enhance the development impact of Sida’s engagement at the country level, Sida could consider more direct “upstream and downstream” linkages to the ISP programmes. Examples of upstream linkages could include a bilateral Sida programme to increase the number and / or quality of upper secondary school mathematics and science teachers, especially female teachers. This would be a good bilateral programme objective in its own right for Sida, and the country. But it also has the added advantage of providing a larger, upstream, feeder pool of potential science and mathematics students entering ISP supported Universities. An example of a “downstream” linkage might be for Sida to build into an energy efficiency programme, or an environmental protection programme, applied research components that were to be undertaken by PhD and Masters students under the ISP programme. Again, these research programmes would likely be valuable in their own right, but have the added “downstream” benefit of utilising and making use of ISP supported faculties, increasing their profile and exposure to real world policy challenges.

A constraining feature to effective linkages of ISP activities and bilateral activities in a country is the variation in recipient organisation objectives and priorities for the utilisation of donor funds. The Addis Ababa University provides an example of this. When a block grant was provided through the appropriate channels of university administration, none of the funds were allocated to the departments of chemistry, physics and mathematics to support their ongoing needs initiated using Sida funds (through ISP). So such linkages and benefits can only be expected with careful planning and agreement on funds allocations by all relevant parties.

The continuing provision of annual grant funds to ISP is understandably being questioned along with the need to justify allocation of all of Sweden’s development cooperation funding. Increased pressures on justifying the allocation of aid funds is a world-wide reality. At the same time, the modalities through which these funds are used are also in question and the need to justify selection of those modalities is increasingly apparent.

**Recommendation 11:** While ISP is well placed, given its experience and established networks, to support Sida’s bilateral programmes, Sida has an obligation to its constituents to test the market and ensure value for money is achieved. For selected bilateral research activities Sida should consider tendering the coordination and management role and closely monitoring the performance of implementation.

ISP promotes ownership of activities by local research groups and networks in a number of ways, consistent with Sida's overall aims. However, much of the management and administration of grant funds to groups and networks is still undertaken by ISP, as it has formal obligations to Sida to ensure good governance in the use of Sida funds.

**Recommendation 12:** Consideration be given by Sida to a pilot research grant programme in a selected Focus country university with appropriate management and administrative capacity. This pilot scheme would require careful design, including an M&E framework to ensure appropriate feedback of learnings.

It is clear that ISP's dependency upon funding from Sida is a major risk for ISP as an organisation. Funds from Sida, both from the core programme grant and the bilateral activities, provides approximately 85% of ISP's total annual funding.

The phased withdrawal of ISP from non-focus countries (at the end of each agreement period) and the increase in number of countries with bilateral agreements in research (which will likely happen slowly – say one per year) will result in a forced decrease in ISP activities and a loss of capacity. This would be a great loss in many respects, including to Sida's niche role in supporting the enabling sciences. Options for ISP for the future:

- ISP changes to diversify its services and its revenue sources. This is occurring only very slowly at present and is a great risk for ISP;
- ISP be allowed to undertake core programme activities in non-focus countries;
- Policy be changed and ISP be allowed to undertake agreed activities (core programme or similar) in Focus countries that also have Sida bilateral research agreements; or
- Two or all three of the above

**Recommendation 13:** Diversification of revenues beyond the support provided by Sida and Uppsala University requires earliest attention by ISP. This would not only assist ISP's opportunity for sustainability, but could allow new development partners to capitalise on ISP's capabilities in efficient and effective ways.

In this context, the proposal to exploit ISP's experience in the establishment of the Pan-African Centre for Mathematics (a Collaborative Project between Stockholm University and Dar-es-Salaam University) provides an opportunity for ISP to expand its horizons.

The relationship between Sida and ISP is very close and Sida could be open to criticism or at least questioning unless the relationship is demonstrably delivering clear and explicit development impact and is providing value for money. The single select process sometimes undertaken to contract ISP to coordinate training on some bilateral activities increases the potential for criticism. Even where clear development impact and value for money can be demonstrated, Sida may well be asked why it is not at least "testing the market" by encouraging some degree of competitive tendering that would allow testing of the value for money concept and allow others to bring in fresh ideas. Hence this Evaluation's recommendation (recommendation 11) to tender selected activities.



## 4. Evaluation Findings

### 4.1 Relevance

#### 4.1.1 Is the programme consistent with the needs and priorities of the cooperating partner countries?

The evaluation finds that ISP is broadly consistent with the needs and priorities of cooperating partner countries for three reasons.

First, [there is clearly a need for scientific input to help inform policy and programmes as part of the overall development process](#), especially in Africa. As explained in Annex C, science makes a unique and essential contribution to the development process, yet is underfunded and underutilised in Africa. Amongst other things science provides the technical and evidence base on which to then make good public policy choices when responding to the wide range of the challenges facing Africa: climate change and environmental degradation; energy efficiency; biodiversity; water stress; HIV and AIDS; agricultural productivity; and so on. The World Bank finds in a study of 55 developing countries that there is a significant and positive association between the prevalence of science, maths, and engineering graduates and per capita GNI, although, interestingly, this relationship does not hold for pre law students. (World Bank, 1998). The Africa Union Commission's *Consolidated Plan of Action for Africa's Science and Technology* acknowledges the importance of addressing these issues so that Africa can harness and apply science, and contribute to the global pool of knowledge. As noted in Annex C, Africa is, however, under-investing in science and has a disproportionately low number of scientific publications and patents. It clearly has a need for more scientific input into decision making and scientific outputs. ISP has been able to expand the output of graduates, and scientific papers helping to meet that need.

Second, there is not just a need to “use” science directly now: [there is also a need to build the upstream capacity for science for the longer term in developing countries](#). A University cannot build teaching and research capacity in a vacuum, particularly in a low income African country. It needs access to international journals; international researchers; scientific equipment; and modern teaching methods. It needs to give its students exposure to international research methods and standards. It needs financial and mentoring support to build capacity and networks. There has therefore been a need to build capacity over the longer term. ISP has demonstrably evolved from a programme that focused on individual fellowships to a programme that explicitly aims to build overall capacity to initiate and manage science teaching and research.

These two needs – the need for science to inform policy and programmes now, and the need for longer term capacity building – are then [explicitly reflected in the priorities of most countries](#). As the World Bank notes in its comprehensive study of tertiary education in Africa:

**“Since their founding, African universities and, to a lesser extent, other tertiary institutions, have been guided by the threefold mandate to teach, do research, and serve the community. With only minor variations, these remained the principal missions of tertiary institutions as they entered the twenty-first century.”**

(World Bank, *Accelerating Catch-Up: Tertiary Education for Growth in Sub Saharan Africa*, 2009) page 50.

This threefold mandate aligns very well with the goals and purposes of ISP.

There is also ample evidence to show that domestic capacity for science and technology is an explicit priority for virtually all developing countries. Strengthening the capacity for science, as a contribution to economic development, is also an explicit part of the New Partnership For Africa's Development (NEPAD), arguably the largest single initiative for development in Africa in a decade. This is clear from the specific science related work programme agreed under NEPAD.<sup>13</sup> More broadly, the NEPAD Comprehensive Programme of Action (CPA) confirms that:

The vision of the CPA is that of an Africa that is well integrated into the global economy and free of poverty. The overall goals of this consolidated plan are:

- To enable Africa harness and apply science, technology and related innovations in order to eradicate poverty and achieve sustainable development; and
- To ensure that Africa contributes to the global pool of scientific knowledge and technological innovations.<sup>14</sup>

ISP aligns well with these stated priorities, given its focus on not just producing scientific graduates and publications, but building domestic capacity for scientific research and teaching.

#### 4.1.2 How does the ISP relate to the policies and strategies of Uppsala University and Sida?

This section of the report assesses the relevance of ISP to the policies and strategic goals of Uppsala University and Sida. It finds that there is close alignment between the goals of ISP and Uppsala University. There is also close alignment between ISP and Sida's policies and strategies for development research cooperation. There is a mixed degree of alignment between ISP and Sida's approach to bilateral development support in Swedish focus countries.

##### *ISP and the policies and strategies of Uppsala University.*

There is evidence to show that the ISP reflects, and is consistent with, the strategic goals of Uppsala University.

First, [the stated policies and strategies of Uppsala University and ISP align very closely](#). More specifically, the stated goals and strategies of the University are prominently stated<sup>15</sup> to be:

- Pursue research and education of the highest quality;
- Play an active role in global society, promoting development and innovation;

<sup>13</sup> Available at <http://www.nepad.org/humancapitaldevelopment/science-and-technology>

<sup>14</sup> <http://www.nepad.org/humancapitaldevelopment/news/1581/advancing-science-and-technology-africa> downloaded 20 June 2011.

<sup>15</sup> <http://www.uu.se/en/node1346> downloaded 11 June 2011

- Be far-sighted and open to change in all facets of its work; and
- Contribute to making our world a better place.

ISP is very consistent with those overarching goals and strategies (although it could be argued that that is simply because the goals and strategies themselves are so broad).

The ISP is also well aligned to the Uppsala University vision of international collaboration. More specifically, Uppsala University prominently states<sup>16</sup> that it seeks:

**“International relationships characterised by quality, long-term perspective and reciprocity are a priority, as is the development of well-grounded strategic collaborations with selected universities/ regions. An international orientation is crucial to the University as a whole. Accordingly, international perspectives must be integrated into all study and research programmes and administrative support processes.”**

Again, ISP with its long term perspective, strategic focus on certain disciplines in selected countries and regions is consistent with this vision.

The second source of evidence that ISP relates closely to the policies and strategies of Uppsala University is the [fifty year commitment of University resources to ISP](#). ISP has been supported by Uppsala University since 1961. A fifty year commitment is strong prima facie evidence that ISP has been relevant and useful to Uppsala University, given inevitable funding pressures and other priorities that University managers face. Looking to the future, the *Action Plan For Internationalisation at Uppsala University* has fifteen specific action points, each with a designated area for follow up responsibility, designed to increase the breadth and depth of internationalisation at the University. ISP, while not specifically mentioned in the *Action Plan*, is consistent with the forward-looking vision for internationalisation envisaged by the University.

*ISP and Sida’s Research Cooperation Programme.*

ISP relates very closely to the policies and strategies of Sida’s research cooperation programme. The evidence for that is as follows.

Sida has a very clear statement about the goals and strategies of its overall research cooperation programme. As stated on the Sida website<sup>17</sup> :

<sup>16</sup> <http://www.uu.se/en/node1346> downloaded 11 June 2011

<sup>17</sup> <http://www.sida.se/English/Partners/Universities-and-research/From-funding-research-to-fighting-poverty/> Downloaded 11 June 2011.

**“The goal is the same in all research cooperation: to help create knowledge that will enable poor people to improve the quality of their lives. Sida has three main research-related approaches for reaching this goal.**

- **We provide support to improve the ability of developing countries to run research programmes of their own, helping them help themselves.**
- **We provide support to research that can contribute to the solution of important development problems.**
- **We support Swedish research programmes that focus on issues related to development and development cooperation.**

**By helping developing countries build up their own research capabilities, Sida indirectly enhances their ability to negotiate, choose technologies, make use of natural resources and develop the social sector. It puts them on a more equal footing with the developed world.**

**And strengthening the research capabilities of developing countries’ institutions means that local knowledge is more relevant and readily available to policymakers, industrialists, civil society and to people striving to get out of poverty.”**

The Government of Sweden also has an explicit and well thought through vision of research capacity operating at different levels, starting at the individual researcher level and then building up through a hierarchy to ultimately contribute to research capacity at the regional and international level. More specifically, the Government of Sweden’s policy and strategy for development related research states (Government Offices of Sweden, 2009) that:

**“Research capacity is to be viewed as the overall impact of development at various levels in a research system. The principal levels are:**

- **Individual research capacity, reflected in the ability to identify, conduct and present research**
- **Institutional capacity (universities and research institutes), reflected in the ability to mobilise and allocate resources, assess research, recruit and train researchers and supply laboratories, libraries, Internet services and other important infrastructure.**
- **National capacity, reflected in a country’s respect for the right to freely publish and disseminate research and the ability to develop overall policies and strategies both for research and for the coordination and administration of national resources for research.**
- **Regional and international capacity, reflected in resources for cooperation, financing and the dissemination of knowledge.”**

This is a new Government of Sweden policy, applying from 2010 onwards. ISP’s historical goals and mode of operation align closely with this new strategy, including the linkages from individual students up through to regional and international capacity.

ISP goals and operations are also aligned well to other important parts of the Government of Sweden’s Research for Development Strategy. For example, Area

Objective 2.2.1 which deals with research capacity building in developing countries and regions, states that the key objective is for “partner countries and regional research actors are better able to plan, produce and use research in the fight against poverty”. The strategy then goes on to say that:

**“This objective is based on a system-oriented approach to higher education, research and innovation. Through long-term, predictable research cooperation, institutions and structures of particular relevance and strategic importance are to be strengthened.”**

(Government Office of Sweden 2009 page 23).

Again, ISP’s programme is already very relevant to this vision, particularly given its long-term, hitherto predictable, research cooperation and focus on capacity building. ISP also demonstrably “provides support to research that can contribute to the solution of important development problems”. However, it must be said that the emphasis here is on the words “*can* contribute”. If this was worded “research that *does* contribute” then ISP would have good anecdotal, but not systematically collected, evidence to show.

*ISP and Sweden’s broader development goals.*

The overall goal of Swedish development cooperation “is to contribute to making it possible for poor people to improve their living conditions.”<sup>18</sup> To give focus to this broad goal, the Government of Sweden has then identified five key areas for development:

- Democracy, Human Rights and Gender Equality;
- Economic Opportunities;
- Knowledge, Health and Social Development;
- Environmentally Sustainable Development;
- Peace and Security; and

While ISP activities would be expected to contribute to these five key areas through the operational plans of the Research Cooperation Unit<sup>19</sup> (formerly SAREC) within Sida, it is an important and legitimate question to ask for evidence of direct contributions to, and efforts to align with, these goals.

ISP clearly contributes to “environmentally sustainable development”. Interviews undertaken as part of this evaluation, and the ISP Annual Report confirm that research topics have, for example, included several activities related to solar energy; traffic emissions in Nairobi (page 29); water quality in Burkina Faso (page 19) and Malawi (page 45). In Kenya, “natural resources and environment” is one of three areas of sectoral focus for Sweden, and Sweden’s strategy confirms that “Climate change will continue to occupy a prominent place on the dialogue agenda.”<sup>20</sup>

ISP has the potential to contribute to the two goals of “economic opportunities” and “knowledge, health and social development”. ISP has a demonstrably strong track

<sup>18</sup> Swedish Development Cooperation: *This Is How It Works*. Page 1

<sup>19</sup> <sup>19</sup> *Research for Development, Policy for Research in Swedish Development Cooperation 2010-2014 and Strategy for Sida’s Support for Research Cooperation 2010-2014.*

<sup>20</sup> Government of Sweden *Strategy for Development Cooperation with Kenya January 2009-December 2013*. Page 8

record in supporting enabling science that has, in turn, directly contributed to research affecting agricultural productivity and economic opportunity. In the last year alone ISP has supported applied research on pesticides and pollutants in crops and fishing in Kenya, Bangladesh and Laos (ISP Annual Report page 13 and 37); underutilised food plants in Kenya (page 29); tropical root and tuber crops in Malawi (page 43) and nutritional biochemistry in Sri Lanka (page 58). ISP also has the potential to contribute to “knowledge, health and social development”. Good science can, for example, help to eliminate misconceptions in parts of Africa about how HIV and AIDS is spread, the purpose and public benefits of vaccines, and other related issues.

There are more tenuous links between ISP’s work and Sweden’s goal of contributing to “democracy, human rights, and gender equality” and / or “peace and security”. There are, of course, some links. Well trained scientists can contribute to public awareness about environmental sustainability, the causes of HIV and AIDS, agricultural productivity and other issues, thereby contributing to more evidenced based policy debates. It is, however, unrealistic to expect ISP to contribute directly to these goals. If the Government of Sweden wanted to use Universities and research to more directly support democracy, human rights and peace and security, it would be necessary to extend University to University programmes (such as ISP in the enabling sciences) to social sciences such as economics, public finance, politics, and journalism.

**Recommendation 14:** The existing high degree of alignment between ISP and Sida’s overall research priorities could be usefully reflected in an overarching Agreement between the two organisations including the need to reflect Government of Sweden’s recent strategy for research cooperation 2010 – 2014.

**Recommendation 15:** ISP should annually assess and report on the development context within which they implement their activities, including recipient government, university and Sida priorities and plans and the socio-economic conditions within the countries in which they work. This will link to the assumptions in the programme logic and the “theory of change” presented within the logframe.

#### 4.1.3 Scientific Quality of the Programme

The main indicators of successful conduct of research in Physics, Chemistry and Mathematics in a country’s leading universities relate to participation by researchers and research students (Master and Doctoral students) in the respective international research communities. In this way, the large volume of research undertaken internationally can be absorbed and adapted for priorities of the country in question, while the contribution of the researchers and their students are evaluated and acknowledged by the community of international peers.

ISP targets a range of appropriate measures of international participation in its assessments. These include publication of research findings in national and international outlets, participation in and organisation of conferences with national, regional and international participation, application for grants that are assessed by international peer review, and measures of the scholarly esteem of research leaders.

In relation to publication numbers, ISP reports an average of 192 published research papers per year over the period 2003 to 2010, from an average of

approximately 42 research groups. Given that a research group generally comprises only 1-2 leading researchers together with their research students, this quantity of output per person is satisfactory.

Scientific quality is best measured by the quality of the best research work that is produced, rather than the volume or measures of the average quality. Inspection of citation rates for a sample of publications supported by ISP reveals much high-satisfactory research work. For example, the ISI/Thompson Web of Science provides citation counts for selected recent papers published by ISP-supported researchers at the University of Addis Ababa and the University of Nairobi. The Addis Ababa paper “A New Donor–Acceptor–Donor Polyfluorene Copolymer with Balanced Electron and Hole Mobility” published in *Advanced Functional Materials* Volume 17, pages 3836–3842 has been cited almost 100 times since publication in December 2007, and the Nairobi paper “Electron transport and recombination in dye sensitized solar cells fabricated from obliquely sputter deposited and thermally annealed TiO<sub>2</sub> films” published in the *Journal of Electro-analytical Chemistry* Volume 605, pages 151-156 has received over 10 citations since publication in 2007. The rates of citation to these and several other ISP-supported papers that were identified in the ISI database are above world benchmarks. It is interesting to note that several papers acknowledge ISP/Sida/SAREC support for the African authors, as well as support for collaborating authors from granting bodies of their own national governments, such as the US, UK and Germany. Co-publication with grant-supported researchers in developed world universities is a strong measure of research quality.

Other indicators of satisfactory international connections relate to the overall research track of ISP-supported research leaders. For example, Professor Midiwo, research group leader and node group leader in natural products chemistry at the University of Nairobi has a publication profile over his research career that compares favourably with many professorial researchers in western universities. ISP-supported mathematicians who have moved into positions that could advance the development outcomes of their countries include Professor Niane, now rector of the University Gaston Berger, Professor Isselkou, Chef du Cabinet of Mauritania, and Professor Toure, Director of the African Virtual Learning Centre.

A number of ISP-supported research students and their supervisors were interviewed at Uppsala University. The students reported good progress on their research projects and an interest in pursuing academic careers in their home countries. Their projects often addressed important development problems, such as hydrologic models of civil works projects in major river systems, epidemiological studies of significant diseases, and investigations of natural products with a focus on exploitation through in-country mechanisms. The students' academic supervisors in Sweden spoke well of the level of academic preparation of the students. A frequently mentioned problem concerned time-management of research projects for students who hold teaching positions in their home universities.

The quality of ISP-supported research and research students points to successful capacity-building activity by ISP. A strong component of the ISP approach is the reliance on Reference Groups to assess applications for ISP support. Reference Groups comprise small teams of researchers with experience in both the disciplinary fields and in the challenges of undertaking research in developing countries. Members assess written applications, and recommend ISP support only if the application reaches the expected level of quality against ISP criteria. Where

applications do not meet the criteria, the Reference Groups provide feedback which contributes significantly to capacity building.

The specific elements of ISP support are well targeted to capacity building in the supported fields of research. Assistance with procuring and operating equipment, spare parts, consumables and technician training can be essential in experimental research in adverse climate and institutional conditions. Support for access to library and other research collections is particularly important for research students - ISP supports well-regarded training on open-access research publications, an increasingly important means of communication in international research. Support for fieldwork travel, fellowships and short exchange visits for research work and training, including PhD and MSc sandwich programmes allow continuing engagement with the relevant international research community. ISP also enables organisation of and participation in conferences and workshops that provide international exposure for research and students.

**Recommendation 16:** ISP has a structure, the systems and the experience to enable the broadening of scientific fields in which it supports recipient universities. This should be discussed again with Sida and if other fields are to be included, then (a) any impact on the existing activities be taken into account (including financial resources); and (b) a robust monitoring and evaluation framework be introduced prior to commencement.

## Conclusion

There is close alignment between the goals of ISP and Uppsala University. There is also close alignment between ISP and Sida's specific policies and strategies for research cooperation. Not surprisingly, ISP activities align with some but not all of Sweden's five key areas for development. In the case study countries studied (Kenya and Ethiopia), ISP activities are highly aligned with the priorities of the national governments and an analysis by the World Bank indicates that other countries in Sub-Saharan Africa will have similar needs for capacity building in the sciences for higher education. Quality of the scientific programmes supported by ISP is variable from country to country, however evidence is provided to show that at least the quality of planning and research activity proposals increases with ISP support and that the outputs (published papers) reveal high to satisfactory levels of research work with a level of citations which is above world benchmarks.

## 4.2 Effectiveness and Impact

### 4.2.1 Introduction

This section of the report assesses the effectiveness and impact of ISP. There are some methodological limitations in assessing the effectiveness and impact of ISP. However there are also some broad in-principle reasons to believe support to tertiary level sciences in Africa has good development effectiveness and impact. There is also good specific evidence confirming most of ISP's expected results have been achieved, particularly in terms of expanding student numbers and activities. There is evidence that capacity to plan and manage research activities is improving, although better capturing of trends would make that finding more robust. Identifying the extent of "leakage" of ISP graduates subsequently emigrating to OECD countries is also essential to assessing effectiveness and impact of ISP. There is anecdotal evidence that ISP programmes are contributing to socio economic development and poverty reduction, but the rich case studies that



demonstrate this are not being systematically collected. Effectiveness and impact would also be improved if upstream and downstream development linkages were strengthened, including to Sida's other bilateral programmes.

Moving to a stronger monitoring and evaluation system, and one which is more results based, is a necessary and valuable investment. Specific recommendations are therefore made with respect to four key areas:

- finances;
- alumni;
- systematic collection of case studies; and
- better upstream and downstream linkages to development programmes.

The movement to a more targeted, country focused, and results-based management programme for research cooperation also provides opportunities for Sida and ISP to demonstrate effectiveness and impact more clearly and explicitly, although there are also risks that need to be managed. Specific recommendations are made to achieve this.

#### 4.2.2 Methodological Limitations

There are some important methodological limitations in measuring the actual effectiveness of ISP and attributing impact. To begin with, ISP operates in a wide range of environments. Mali, for example has only one public University, whereas Bangladesh has 82 Universities, 31 of which are public. Such differences make cross-country comparisons problematic and reduce the ability to make specific conclusions about ISP. It is also difficult to know with certainty what the counter-factual is: what would have happened in the absence of ISP support? There is no obvious comparator either: no other development partner has provided 50 years support to targeted Universities in a programmatic way. The ability to make robust findings about the effectiveness and impact of ISP is also compromised by the fact that it does not have an explicit statement that links inputs to outputs, outputs to outcomes, and outcomes to impact. There is no clear baseline, eventual target to be achieved, or indicators to track overall trends and progress in reaching higher level targets.

#### 4.2.3 In-principle Reasons Suggesting Effectiveness and Impact

Nevertheless, there are some *prima facie* and in-principle reasons for believing long term support to tertiary level mathematics and science, as ISP does, constitutes good development effectiveness and impact.

Recent World Bank analysis finds that there are high private – and even social - returns to tertiary level education in developing countries, particularly for science based courses. As the table below shows, private returns<sup>21</sup> to tertiary education are higher in developing countries, including Africa, than the global average.

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<sup>21</sup> A concept that measures the additional net financial returns from that level of education compared to the costs in obtaining that level of education, expressed as a percentage.

Table 3 Private returns to primary and tertiary education

Country / Region	Private returns to primary education	Private returns to tertiary education
World	26.6 %	19.9 %
Papua New Guinea	6.0 %	9.2 %
Philippines	9 – 10 %	17.0 %
India	2.4 %	10.3 %
Kenya	7.7 %	25.1 %
Nigeria	2-3 %	10 – 15 %
Ethiopia	25 %	27 %

Source (World Bank, 2009)

World Bank analysis also confirms there can also be high social returns<sup>22</sup> to tertiary level education. It notes that in recent years the social returns to higher education have been increasing globally, while those for primary education have been decreasing. (World Bank, 2009) page 7. Arguably this reflects the fact that mass primary education is spreading, but modernising economies have even higher demands for highly trained graduates. Bloom, Canning and Chan find that Sub-Saharan Africa’s production level is 23 per cent below its production potential because of a shortfall in human capital. By raising the stock of tertiary education by one year, they find that these economies could raise their growth by 0.53 percentage points. (Bloom Canning and Chan, 2005).

ISP is attacking one of the key ‘binding constraints’ to a skilled workforce and human development in Africa: bottlenecks at the tertiary level. Rapid growth in primary and secondary level education is now putting intense pressure on tertiary level capacity in Africa. For example, the World Bank finds that:

**“Enrolment growth has outpaced financing capabilities, and in many cases resulted in deteriorating educational quality. Public expenditure per tertiary student has fallen from US\$6,800 in 1980, to US\$1,200 in 2002, and recently averaged just US\$981 in 33 low-income SSA countries. The ratio of academic staff to students has fallen significantly, producing overcrowded classrooms and unrelenting workloads for teaching staff. ”**

(World Bank, 2009) page xxvii

#### 4.2.4 Specific Effects and Impacts of ISP Support: the Building Blocks to Effectiveness and Impact.

This section of the report assesses the specific effects and impacts of ISP. It uses a hierarchy of building blocks to establish the case for effects and impacts. Expanding the number of graduates, activities and publications is at the base, and is arguably the easiest thing to achieve and measure. Building the capacity of universities to plan and manage their own research programmes is the next

<sup>22</sup> That is, benefiting society more broadly, not just the individual. When using taxpayer’s money, especially in an overseas aid programme, it is important to establish that there are broader social returns, rather than all the benefits accruing to the individual.

building block. This is part of ISP's mandate and vision, but is harder to measure. The top building block involves the contribution of Universities to social and economic development and poverty reduction. Each of these three building blocks are now assessed in turn.

*Expanding the number of graduates, activities and publications.*

There is strong evidence to show that, at its most fundamental level, ISP has **expanded the level of scientific research activities, supply of post-graduate science students, and numbers of scientific publications**. Details are readily available in each of the ISP Annual Reports. For example, the ISP 2009 Annual Report shows that, the ISP supported 47 separate activities; 162 PhD students; 364 Masters students; and 411 publications or conference contributions, for a total expenditure of SEK 17.7 million. (Uppsala University, 2009).

Over the 2003 to 2010 period covered by this evaluation, ISP support has contributed to the awarding of 195 PhDs , 785 MScs, 59 separate completed activities, and 1,539 published papers, for a total expenditure of SEK 157 million.

While useful, this 'activity level' form of ISP reporting does leave some "effectiveness" questions unanswered. For example, it is not clear from the Annual Reports if the various end of year output numbers (number of students enrolled, number of publications etc) exceeded or under-achieved original expectations and plans; and if there is a rising trend over time. It is not clear if some, or all of the activities attributed to ISP may have been able to secure funding support from other sources. Nor is it clear what the actual contribution was of ISP funding to the number of graduates and activities supported. It might have funded 90 per cent of a particular research activity or it might have been 10 per cent. There is however, some valuable material for IPPS provided in the 2009 IPPS Draft Activity Catalogue.

**Recommendation 17:** A structured monitoring and evaluation system should be established based upon a logical framework and include financial monitoring of agreed parameters to measure the actual additional benefits accruing to ISP support, including the percentage annual financial contribution of ISP to an activity.

Even more important when considering effectiveness and impact is whether the graduates, activities and publications that are reported are genuinely "additional" to what would have occurred in the absence of ISP support. No data base has been kept to confirm this, which makes robust assessment now difficult. However, interviews during the course of this evaluation provide anecdotal evidence that Universities in Africa tend to provide the salaries for lecturers and researchers, with ISP then providing all the necessary complementary investments such as testing equipment etc. Two interviewees independently said that domestic resourcing for science was "miserable" and that ISP therefore provided essential and much valued complementary investments. The generally low level of domestic funding for tertiary education, and the focus by other development partners on primary level education, further confirms the impression that ISP fills a gap and enables additional graduations, activities and publications to be produced that otherwise would not have occurred.

**Recommendation 18:** ISP should more systematically monitor the trends and improvements in key performance indicators so as to demonstrate that ISP supported Universities are improving their capacity to plan and manage science related teaching and research over time.

An unintended consequence of ISP might be that ISP financing has simply substituted for developing countries' own efforts.<sup>23</sup> This can either be by: (a) University administrators simply shifting an equivalent amount of domestic finances out of the science and mathematics faculties and into other activities that may or may not have development benefit; or (b) Governments simply holding back the amount of money they would have put into tertiary education by the amount of money ISP is providing, and then spending the government's "saving" on other activities outside of the education sector (though it is acknowledged that the ISP funds are small in comparison to Government budgets). While this potential is acknowledged here, it was considered out of the scope of this evaluation.

#### *Building capacity to initiate, plan and manage research.*

ISP does not aim to simply expand the number of science graduates, activities, and publications. Rather, ISP has a specific goal of strengthening the capacity of targeted Universities to identify, plan, manage and conduct their own scientific research.

The evidence for how successful ISP has been in building local capacity is mixed. On the one hand, ISP has been able to "graduate" certain activities and programmes because it believed they had reached a sufficient level of capacity that ISP support was no longer essential. For example, as Annex H shows, ISP was able to close 35 specific programmes since 1977 on the grounds that these groups had developed "satisfactory operations without ISP support". These 35 programmes that ISP have felt confident enough to "graduate" cover all disciplines – mathematics, physics and chemistry. More recently, including some of the period covered by this evaluation, the ISP chemistry programme "graduated" two research groups in Nigeria, two in Cameroon, one or two in Peru, one in Ecuador, and one in Bangladesh, over the period 2005-2010.

Furthermore, there is some evidence (although it is not being systematically collected and monitored) in the Annual Reports and indications from interviews that ISP supported Universities have been able to leverage financial contributions from other organisations. Whenever ISP supported universities successfully apply for competitive research grants from other international sources, it suggests ISP has been at least partially successful in building capacity to manage research funding (although this is only circumstantial and proxy evidence<sup>24</sup>).

There is also anecdotal – again, not systematically collected - evidence that recent graduates from the ISP coordinated bilateral programme have been recruited into local Universities, thereby helping to build local teaching and research capacity. All 33 PhD holders in Vietnam reported that they continued to do research after their ISP support. (Sida, 2009). Four former students from the ISP supported Institute for Mathematical Sciences in Ghana are currently Heads of Departments at four of the six public universities in Ghana. (Uppsala University, 2009). The survey questionnaires conducted under this evaluation also found that there is a strong commitment from ISP supported graduates to make a long term career in academic institutions. Over 80% of ISP supported students surveyed stated a commitment or ambition to continue research and teaching in their chosen field, including at national Universities in their home country.

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<sup>23</sup> Economists refer to this as the "fungibility" problem. Money is "fungible" in that it can be used in many different ways.

<sup>24</sup> The Universities may have been able to successfully apply without prior ISP support.

On the other hand, there are two important gaps in the existing monitoring and evaluation regimes that prevent a robust and complete “results based” assessment of whether ISP has achieved its goal of strengthening local capacity to plan and manage research.

First, ISP, or the Universities in the developing countries, do not capture information on the “leakage” of ISP graduates to other countries. This is an important factor to monitor, because a high level of leakage of ISP alumni to OECD countries fundamentally and substantively undermines the effectiveness and efficiency of the ISP programme in the short to medium term. There are two important subsidiary and positive aspects to be aware of: (1) In the longer term it may be that qualified personnel actually return to their home country and contribute, not only from their education, but also from their international experience and learnings; and (b) Repatriation of part of the remuneration of these people will make a substantial contribution to the wellbeing of their family, and in numbers this will have a positive economic effect.

Conversely, if African universities and ISP systematically tracked in which country their alumni were now living, and what they were doing, there would be a good basis for assessing the higher level development impacts of the ISP programme. ISP alumni could, for example, be systematically surveyed on a periodic basis to identify specific examples of how they had been able to use their scientific discipline and skills to influence broader public policy and contribute to poverty alleviation. At present, that vital link to alumni’s own contribution to broader economic development is haphazard, anecdotal, and personal, not systematic.

**Recommendation 19:** ISP should systematically monitor the geographical location, and recent professional accomplishments and contribution to development, of their alumni.

A second factor that prevents robust conclusions about the effectiveness and impact of capacity building is that there is very limited systematic monitoring of improvements in planning and management of research programmes over time. There is some anecdotal evidence: some Universities in Africa have been able to secure research grants from OECD countries other than Sweden. This is attributed to the experience gained in working with ISP. However there is no systematically collected evidence base – or incentive – to see if ISP supported universities are actually improving their internal capacity to plan and manage their own research over time. It would cost relatively little to systematically monitor some key performance indicators demonstrating that ISP supported Universities in Africa were improving their capacity to plan and manage science related teaching and research. To be meaningful, the indicators should only be assessed to identify trends over the medium term, such as five to ten years. Those indicators could include:

- The number of revisions required for research proposals to be accepted under ISP (an input indicator that captures if past lessons about proposal writing are being learnt);
- The extent of financial over and under expenditure (an input indicator that captures efficiency and effectiveness of financial management);
- A rise in the number of research proposals that are funded by other sources such as the Rockefeller Foundation or Gates Foundation, compared to the success rates from other faculties at the same University. (An output indicator

suggesting that involvement in the ISP programme had strengthened staff capacity to write grant applications of an international standard ); and

- The rate of acceptance of publications in peer reviewed scientific journals (an output indicator suggesting quality of research).

- **Recommendation 20:** ISP should strengthen its capacity for impact assessment and results based management by:
  - Having a more explicit and logical relation between inputs, outputs, outcomes and impact (while recognising that it is difficult to establish direct causality with impacts);
  - Systematically collecting and reporting on quantitative performance data on students, publications, conferences, as well as case studies involving the actual “take up” of research;
  - Proactively and systematically using the alumni of ISP programmes to consolidate data on outcomes, including intended and unintended outcomes; and
  - Working with Sida to build more purposeful and explicit upstream and downstream linkages between the ISP programmes and Sida’s broader bilateral programmes.

*The contribution of universities to social and economic development and poverty reduction.*

The ultimate effect that Sida and ISP wish to achieve is that there is increased production of research relevant to the fight against poverty in developing countries. This is an explicit goal for both the Government of Sweden and ISP as stated in several documents.

It is also worth noting that Sweden takes a realistic and pragmatic view about the extent to which enabling sciences and research can directly contribute to poverty. As stated in the latest strategy for research cooperation, the Government recognises that:

**“By no means all research generates results that can be directly applied in the search for a better society.....support for research in developing countries must offer a degree of freedom that enables researchers to be flexible in their search for new knowledge. Both basic research and applied research are of crucial importance. ”**

(Government Offices of Sweden, 2009). Page 15.

Against that background, there is some good anecdotal evidence that ISP supported work has directly or indirectly contributed to socio-economic improvement and poverty alleviation in developing countries. The evaluation team has presented a small, representative, and purely illustrative collection of examples of such effects in Annex I.

Such anecdotal evidence as collected in Annex I is generally reassuring, but it is not a sufficient base as Sida moves to a more results based management system.

Five things need to happen if ISP (and Sida) are to better learn from its operations and drive improved effectiveness over time as well as better demonstrate the outcomes and ultimate impact of their investments on socio-economic development and poverty reduction:

1. ISP needs to have a more explicit and logical relation between inputs, outputs, outcomes and impact. To date, ISP has proceeded without such an explicit link. The ISP does not, for example, have a “logical framework” (often called a “logframe”) which is one of many standard tools in development to link inputs to “results” in a systematic way. The absence of a logframe, or similar tool, has therefore allowed some ambiguity to arise as to what are the ultimate “results” that ISP could, or should, be measuring and can be accountable for. For example, at present the ISP Annual Reports describe the number of ISP supported graduates, activities, networks, publications, and conferences attended as “outcomes” and “results”. From ISP’s perspective, this is understandable. However, from Sida’s perspective, the number of ISP graduates, research activities, publications and conferences could be considered “outputs”. They are not, by themselves, necessarily development “outcomes” and they are definitely not development “impacts”.

From Sida’s perspective, there are some potentially important disconnects between the production of graduates, publications and conferences on the one hand, and development outcomes and poverty reduction on the other. Tracking the number of ISP graduates who emigrate to OECD countries, and more systematically capturing anecdotal evidence of research “take up” would significantly help to bridge those disconnects.

2. In collaboration with the partner Universities, ISP should more systematically collect and report on case studies involving the actual “take up” of research. At present, the focus of ISP reporting is the actual number of graduates, activities, and publications supported each year. Such reporting is comprehensive and important. There are also quite comprehensive, interesting and helpful references to what researchers hope and intend their work will contribute to socio-economic development and poverty reduction. However there is very little systematic follow up to see to what extent specific research activities – many of which claimed to have direct application to economic growth – are then actually taken up by policy makers. It would be a cost-effective investment if Sida, ISP, the universities or some independent body, systematically surveyed the producers and / or potential users of ISP supported research to identify the actual take up of such research. This would not simply provide a level of accountability and results management that is currently missing. It would also provide a systematic feedback loop over time to enable Universities to see where, when, why and how some forms of research get to be applied and taken up in the fight against poverty, whilst other research is ignored.
3. ISP should proactively and systematically use the alumni of ISP programmes. As discussed earlier, “leakage” of ISP alumni to OECD countries severely undermines the effectiveness, and the efficiency, of the ISP. Investing in a strong alumni programme would enable Sida, ISP, and partner universities to assess such leakage. A strong alumni programme also has the added advantage that Sida, ISP and partner universities could then more systematically and efficiently capture and report the important case studies of where ISP investments had been taken up and applied in practice.
4. ISP and Sida should build more purposeful and explicit upstream and downstream linkages between the ISP programmes and Sida’s broader bilateral programmes. The Government of Sweden’s latest research strategy specifically says (page 28) that:

**“In implementing cooperation strategies, Sida will strive to ensure that Swedish support as a whole makes use of research and research findings to a greater extent. The aim is to link researchers from partner universities to parties in other areas of development cooperation.”**

(Government Offices of Sweden, 2009)

There is little evidence either way that ISP graduates, or research products, are being actively used in Sida’s broader bilateral programmes in the countries concerned. They might be, but there does not appear to be a mechanism or even a policy to encourage “take up” of ISP investments in the broader bilateral programmes, nor a monitoring regime to track such take up.

There are, however, good opportunities for both upstream and downstream linkages between ISP and the broader Sida programmes.

An example of an upstream linkage would be for the Sida bilateral programme to invest in a ten year programme to expand the number – and quality – of upper secondary school mathematics and science teachers in the target countries where ISP is to operate. Expanding the number – and quality – of high school maths and sciences graduates is then likely to expand and strengthen the upstream pool that then feeds into ISP graduates. It is also likely to require more science teachers, and teachers of those teachers, to be provided by the supported university. If Sida’s bilateral programme invested in maths and science teaching at girls only secondary schools, this would also have the added benefit of potentially increasing the supply of female ISP graduates over time. This would be an important development outcome in its own right, given the relatively low percentage of female graduates in the ISP programme. (In 2009, 24 per cent MSc, and 20 per cent Ph D students supported by ISP were female).

There are also opportunities for downstream linkages that would strengthen the effectiveness, impact, and “results” of ISP. For example, ISP might consider holding an annual “Research Results Fair” at ISP supported universities where students present posters and demonstrations of their latest research findings. ISP could invite business leaders, policy makers in the public sector, and programme managers from Sida and other development partners. Well managed and well publicised, such Fairs could expose Sida and other stakeholders to the latest, downstream, ISP research results and graduates. This could then be a catalyst for subsequent take up of results. ISP or Sida might also consider surveying Sida staff in-country to identify what ISP supported research results are then being incorporated into Sida projects and programmes.

5. The impact of ISP’s activities could be strengthened by effective transitional arrangements to a bilateralised program. As is now well known, Sida is targeting its efforts on twelve Focus countries. Within those Focus countries, Sida intends to have a closer alignment between ISP activities – if any – and its own research priorities for that country.

This consolidation and integration of efforts clearly offers the potential for stronger and more sustained development outcomes. Swedish research resources will be more concentrated geographically. There will be more opportunities for coherence and complementarity between ISP and Sida’s bilateral programmes. (ISP can continue to build the capacity for enabling



sciences over the longer term, whilst Sida can use three year programming and budgeting cycles to then use that increased capacity to help respond to changing science related priorities over the short to medium term).

However there are risks in the transition strategy that could also undermine effectiveness and impact, and therefore need to be proactively managed. An abrupt end to an ISP supported programme, particularly in very small or poor countries, might lead to a collapse of fragile maths and science faculties. (A long, but modest, line of financial life support might be a useful option to preserve previous Sida investments in such cases). On the other hand, delays in decision making about ISP's possible role in-country are also likely to undermine development effectiveness and impact. For many universities in developing countries, it is the predictability of financial support, more than the amounts per se, that are critical to their work programme. That is because predictable funding over four or five years enables Universities to appoint staff and purchase assets. Abrupt changes to budgets and support, or uncertainty, undermine effectiveness and efficiency.

#### 4.2.5 Explaining the outcomes: Why did positive / negative results happen.

Several factors explain the generally positive results identified by this evaluation.

First, Sida and ISP have maintained clarity of purpose in building capacity for science, and maintained their commitment over a very sustained period of 50 years. This long term commitment is quite unusual in development circles, where fashions and fads rise and fall every few years. Sida and ISP are to be commended for their consistency and clarity of purpose in supporting science over the years, while allowing the programme to evolve in response to changing circumstances.

Second, ISP invested at a scale sufficient to make a difference. As noted elsewhere, ISP has invested 157 million SEK, and supported activities have produced 195 PhD and 785 MSc graduates over the period 2003 to 2010 .

Third, Sida and ISP have been able to focus their efforts in an uncrowded space. Few other bilateral, or multilateral, development partners have had such a continued presence in supporting capacity for science in the countries.

Fourth, ISP has used several Paris Declaration principles in the design and implementation of its programme. There is a clearly a genuine respect for "country ownership" and leadership. There is demonstrably a partnership approach. ISP has been careful to work through and with partner university structures, rather than build parallel structures.

Fifth, there is no doubt that personal commitment and personal relationships have been a positive factor. Researchers in Uppsala University, in other universities interviewed and in the partner countries are clearly dedicated and enthusiastic.

#### 4.2.6 Unintended consequences

One unintended consequence is the possibility that ISP financing and support has indirectly suppressed the revenue "effort" of collaborating Universities. This issue was discussed previously in this section. There is, unfortunately, no evidence either way to say whether this is happening or not. However as it is critical issue affecting ultimate impact, the issue should be monitored carefully in future.

A second unintended consequence is that support to tertiary level education could be viewed as “pro rich” and exacerbating inequity and inequality. This is because there is substantial evidence to show that richer and more privileged people are disproportionately represented at university, especially (but not exclusively) in developing countries. It could be argued that ISP is simply magnifying that trend, whereas funding to primary level education would be decidedly “pro poor” (as the poor are disproportionately represented at that level). The counter-argument is that other donors are heavily supporting the primary level of education; that the tertiary level is now increasing the bottleneck preventing stronger human development in much of Africa; and that even very poor countries with high levels of inequity and inequality need a minimum level of tertiary trained scientists for the reasons described elsewhere in this report.

### 4.3 Efficiency

Annex C refers to the contribution of enabling sciences to development and to poverty reduction and demonstrates the multi-faceted and long term approach to achieving results. This section addresses the efficiency of the ISP programme: whether inputs are combined and used in ways that maximise intended results, whether ISP provides value for money, and whether the costs of ISP's intervention can be justified by the results.

The overall design of the ISP approach achieves efficiency (defined as producing graduates and publications of good standard at minimum cost) for the following reasons:

1. The “sandwich course” approach is efficient and cost-effective. Sandwich courses are lower cost than full three or four year fellowships, yet appear to be effective (and therefore cost-effective compared to the alternative) in terms of expanding students' horizons and exposing them to high quality lecturers, facilities, equipment, libraries, and fellow students while in Sweden;
2. Low leakage rate outside of the system. There appears to be low (less than 4 per cent) loss of students from the course taking up residence in Sweden while they are on the ISP sandwich course per se. (There may well be a high leakage rate to OECD countries after they graduate, but that undermines the *effectiveness* of the ISP programme more than the *efficiency* of it);
3. Relatively low repetition rate within the system. Most students on the ISP programme complete their courses (especially the Masters courses) reasonably on time. That is, there is a relatively low per cent of students who are required to repeat a year, or simply fail in their final year (either of which would undermine the overall "efficiency" of the ISP programme);
4. Practical support for purchasing and procurement of essential supplies. ISP frequently purchases priority consumables and equipment for partner universities: (a) providing access to suppliers that may not otherwise be interested (because OECD and other suppliers are often reluctant to export to places like Ethiopia); (b) saving them a great deal of time and costs in the procurement process because of the systems in place within ISP; and (c) ensuring good governance practices are demonstrated to the partner universities and to the stakeholders in Sweden. This approach, however may not help capacity building of the recipient Universities own procurement management systems.; and

5. Regular audits lead to the conclusion that there has been relatively little identifiable corruption: a major source of inefficiency in much of Africa.

Table 1 sets out the total costs of ISP for the period 2003 to 2010 as well as the outputs recorded for those years.

An assessment of the total financial cost of managing ISP against the total programme expenditure of ISP provides the following insights:

1. Management costs (including scientific coordination) amounted to between 15% and 23% of the total expenditure of ISP in the years 2003 to 2010. The weighted average (that is, taking account of the proportion of costs arising from PhD, MSc, and other activities) was 18.6%. From the evaluators' experience in other donor programmes and other countries, this is considered a relatively low level of management costs against the total programme;
2. Costs associated with scientific coordination are generally 50% to 60% of total management costs. ISP's data separates scientific coordination of research activities from the general management and administration of ISP activities. However, these costs are largely time costs and it is unlikely that an effective split can be made between what is more technical coordination compared to overall management inputs; and
3. There has been no effective monitoring and evaluation system built into the programme and this inevitably contributes to the lower management costs.

The cost guidelines set out in the ISP Draft of the Information for Applicants for 2012 – 2014<sup>25</sup> indicate a total budget figure for post-graduates of SEK 25,700 per month per student, while studying overseas. This includes a 25% increase in Bench Fee to SEK 5,000 per month.

The following observations can be made:

1. Based on discussions and interviews during the evaluation, the budget figure of SEK 25,700 would appear to be reasonable for budgeting purposes and provides some flexibility. Interviews with student and research groups did not identify any issues with the adequacy of funding for post-graduate students;
2. The major issue with the costs is not related to staying within the monthly budget as such. Instead, the main issue, particularly for PhD students is: (a) remaining within a reasonable time spent overseas. Interviews indicate a tendency for both the student and the supervisor to request a longer period of overseas study be granted, affecting the total expenditure and therefore the efficiency of ISP delivery; and (b) focussing on their PhD research while back in their home university, particularly when there are heavy teaching commitments placed upon them. Interviews in case study countries have confirmed that while back at their home university, there are considerable teaching pressures on post-graduate students that then reduce the capacity for continuing their research projects. This tends to undermine the efficiency of the overall ISP;
3. By comparison, post-graduate studies undertaken under bilateral programmes are considerably more expensive in annual costs (with bench fees ranging from SEK 150,000 to SEK 250,000) than are those undertaken under ISP support

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<sup>25</sup> ISP, Uppsala University. (2011). *Draft Application for ISP Grants 2012 - 2014 for Research Groups and Scientific Networks - Information for Applicants*

(with bench fees of SEK 5,000 per month for a normal 6 month period equalling SEK 30,000 per year)<sup>26</sup>. This is largely due to the higher bench fee rate and often the longer time the student is overseas;

4. For understandable reasons, the ISP programme has been extended on a short term, interim basis, either one or two years at a time. This introduces a degree of uncertainty that limits longer term planning and therefore increases costs and inefficiencies; and
5. The transition to a more country-programme focused approach has the potential, over the longer term, to introduce efficiencies into the ISP. There will be for example, opportunities for cost-sharing and leverage of impact in a more integrated programme. On the other hand, the *transition* to a more country programme focused approach needs careful and proactive management to avoid inefficiencies. In the first instance for example, there is the risk of ISP and the recipient group having different goals or a misunderstanding of each others' goals. An example of this has recently surfaced in Uganda, where ISP is coordinating Sida's inputs for a bilateral programme recipient group and the group perceives ISP's objective is too focused on development of research networks, yet their group in Uganda simply want to increase their PhD graduate numbers<sup>27</sup>. Uncertainty, abrupt changes, short term decision making and miscommunication have the potential to produce waste and inefficiency.

**Recommendation 21:** Sida should continue to keep ISP activity and administration costs and benefits under review and should encourage regular Performance Audits, and not just Compliance Audits.

**Recommendation 22:** Planning for PhD students' studies overseas should be more detailed in terms of expectations of achievements and the timeframe so as to reduce the potential for extensions and delays. In addition there should be regular monitoring and reporting on progress against expectations.

#### 4.4 Sustainability

This section considers whether the benefits accrued from ISP will be maintained for the longer term. It focuses on the systems and commitments necessary to ensure processes such as those introduced by ISP are eventually sustainable. It is worth recognising at the outset that universities, especially in the twelve low income developing countries that Sweden is now targeting, are unlikely to become financially independent and be fully sustainable in the short term. Indeed, some Universities in very low income, small population, countries may not be truly independent and sustainable for decades to come. Instead, it is more realistic to look for a process of increasing sustainability over the years.

Sustainability of the processes introduced by ISP for capacity building in the enabling sciences will depend upon:

1. **Ownership and support by the recipient departments.** There is a sense of strong ownership demonstrated by the departments and research groups at the case study universities visited. It should be noted that the ISP team

<sup>26</sup> Sida's Guidelines for Bilateral Cooperation covers the range of bench fees payable, while the Draft Application for ISP Grants provides guidelines for bench fees payable by ISP

<sup>27</sup> Discussions with Prof at Makerere University, Uganda

demonstrate an approach to oversight of the research activities that will either help develop this sense of ownership by the recipient group or if the group is not committed to the responsibility and effort required, they will end up dropping out of the programme. So in effect it is self-selection for the longer term activities.

2. **Host university and government support.** Adequate support is necessary from the university administration and from the Government to continue funding capacity building in the enabling sciences over the longer term. At the government level this is largely driven by policies and strategies for economic development, including the level of support for higher education. In the case studies for this evaluation, both Kenya and Ethiopia have strong policies and plans in place for the strengthening of science and technology and this includes the need to upgrade education in science and technology. At the university level, there may be considerable variation in approach, but according to World Bank studies (see impact and effectiveness section) the substantial growth in the higher education sector in many countries will place substantial pressures on the direction of resource allocation. Support will not only be in the form of staff salaries, but also research funds and the maintenance and repairs of equipment, facilities and services.

3. **Financial capability to support.** High pressures on the allocation of financial resources are likely the norm in any university. University management must show their commitment to long term funding of the enabling sciences. While meetings and documentation would often indicate this is the case, the evidence is actually the timely release of adequate funds. Such commitment can often be distorted and difficult to confirm when a donor agency is involved. Staff interviewed at both UoN and AAU have indicated that without ISP funding they will receive no support from their university. While this would appear to be evidenced by the lack of funding provided when ISP ceased support in AAU in 2009 and 2010, no real confirmation can be provided.

As noted in the body of the report, there is a risk that Sida and ISP funding: (a) actually takes the pressure off universities to try to achieve cost recovery, or further develop small revenue raising activities; or (b) allows for funds displacement (available funds are just used elsewhere).

4. **Investment in maintenance.** It is very common for developing countries not to invest in the maintenance of buildings or expensive scientific equipment. This undermines longer term sustainability, and involves significant waste of resources. Unfortunately, the risk of neglecting maintenance is often higher when developing countries perceive they have a generous development partner who will, in effect, simply replace buildings or equipment. Sida and ISP should be aware of this risk and do all they can to counter under-expenditure in maintenance. ISP's ability to fund a skilled technician to keep scientific equipment well maintained is an excellent and cost-effective investment

5. **Sound management systems.** Strong and accountable management systems are necessary to provide the confidence needed by all parties to continue to commit resources. Good financial systems, including robust and independent performance audits, give confidence to other development partners beyond Sida that they, too, can provide financial support to a developing country university. Such diversification of funding sources can help to build sustainability over the longer term. Systems within universities often exhibit minimal flexibility, commonly being referred to as "bureaucratic" by university staff. However, it is

in the area of procurement that there are often concerns, including the risk of corruption. In both case studies, substantial concern was raised over the lack of transparency and efficiency of the university procurement offices.

6. **Staffing, and external “pull “factors.** Sustainability is not just about money. It is also about staffing and personnel. A substantial threat to longer term sustainability occurs if good quality ISP supported staff return to their home country after a sandwich course, but then emigrate to an OECD country. The Department of Pharmacy in UAA has found this to be a substantial problem, with around 80% of students moving to the US in particular. While this cannot be completely prevented, universities, need to monitor the trends and ensure they have sufficiently attractive conditions in their own Universities to keep staff.
7. **A planned exit strategy.** A planned exit strategy is a necessary precedent to sustainability. ISP provides a final three year programme for a Research Group or Network to prepare to exit ISP support. Each case will be designed specifically around their identified needs. There is no clear evidence that structured grant management processes are transferred to these groups to allow their own management of funding, though it would appear that various aspects are learnt from experience. A survey of reference group members has identified that the quality of proposals from research groups and Networks does increase over time and that some groups are now capable of attracting funds from other donors.

ISP has had defined periods in which it can operate according to the various interim agreements between ISP and Sida since 2006. This has reduced stability of activities and is a major concern to recipient organisations. Furthermore, ISP continues to operate its normal processes of inviting proposals on an annual basis even though funding for the next year is not secure. For example the 2011 invitations are likely to be sent out in June 2011 and ISP’s agreement with Sida is due for completion at the end of 2011. This is a dilemma for ISP, but fortunately to date there has not been a programme-wide close down.

**Recommendation 23:** Monitoring the career pathways including overseas appointments of ISP alumni to OECD universities is recommended as a strategically important way of monitoring achievements and the outcomes of ISP, as well as informing planners on institutional sustainability.

**Recommendation 24:** ISP should develop and implement a defined exit strategy when it is to leave a country, as part of the road map to sustainability. Sida should provide adequate time for ISP to implement an agreed exit strategy from a country.

### **In conclusion:**

The assessment of sustainability of ISP’s benefits is a mixed result. Capacity building of research groups and networks is a constant requirement and will only continue while ongoing funding is provided. ISP is currently filling that niche. The ability to apply for and manage funds is being enhanced by ISP, but the management aspect may be left up to university systems rather than be enhanced through a structured process. Such a development will build each group’s ability to attract funds.

The sustainability of ISP as an entity, is commented upon in other sections, and is considered poor without a substantial donor agency providing the core funding.





## 5. Recommendations

Table 4 below provides a list of recommendations drawn from earlier sections of this report.

Table 4 List of Recommendations from Evaluation Text

No.	Recommendation	Page Ref.	Responsibility
<b>Organisation and Cooperation</b>			
1	ISP and Uppsala University should engage vigorously with the public and government processes that establish Sweden's development policies, providing advice based on their extensive experience. Support for enabling science should remain a focus for ISP, in the context of Swedish development policy settings. ISP should position itself to respond to other opportunities (in Sweden and elsewhere) to support development research cooperation. In addition ISP should promote the "good news stories" showing the benefits of their work.	Page 7	ISP/UU
2	Uppsala University should consider the benefits of broadening the skill set of the ISP board to include members with experience in development cooperation and in the politics and bureaucracy of the focus countries.	Page 9	ISP/UU
3	Formal agreements between Sida and ISP should explicitly reflect new strategic directions and intended outcomes, including clarity of deliverables and a timeframe.	Page 13	Sida
4	ISP should further develop the programme logic in the form of a logical framework, representing ISP overall and clearly setting out the goal, relationships between outcomes and outputs, inputs and where the sources of funding contribute, This will: (a) assist in compliance with Sida's Results Based Management system; as well as (b) provide the necessary basis upon which models and model options for ISP's future operations can be developed.	Page 14	ISP/UU
5	The selection of Research Groups should be made in a more objective and transparent manner. Those groups which have attained a certain level of self-sufficient capacity, or are part of strong universities, should be encouraged to apply for support on a transparent, competitive, basis, while groups with limited capacity might be fostered and supported to a greater level for their initial period.	Page 19	ISP
6	ISP and Uppsala University can improve the effectiveness and efficiency of delivery by adjusting the roles of Reference Groups. More use of peer review to evaluate progress reports and outcomes, might strengthen ISP core activities.	Page 19	ISP/UU
7	ISP and Uppsala University should review membership, selection and performance management of the Reference Groups, especially considering the emphasis on Focus countries and further integration	Page 20	ISP/UU

No.	Recommendation	Page Ref.	Responsibility
	with the bilateral programmes of Sida.		
8	ISP should have a more systematic, and results and outcomes focussed, means of monitoring and evaluation. ISP should use a systematic tool, such as a logical framework ("logframe") or similar to capture the relationship between inputs to outputs, outputs to outcomes, and outcomes to impact. ISP should also have a more systematic way of capturing "impact" stories. The draft logframe developed by ISP should be further developed in facilitated workshops.	Page 21	ISP
9	Recognising that shifts and adjustments in Swedish development priorities are bound to continue, Sida should consider a master plan in relation to the type of research development cooperation engagement with the various focus countries. This will allow for the longer term planning required for research programmes and post-graduate training. It will also allow for the negotiation of an overarching Agreement with ISP that sets out mutual expectations and understandings over a reasonable period, and especially in relation to the transition phase to a more bilateralised programme.	Page 22	Sida
10	It is recommended that Sida reassess the prohibition of ISP core programme activities in focus countries that have bilateral research cooperation funding. If it is agreed to re-commence activities in those instances, then close cooperation between Sida and ISP is necessary to plan and review progress of all activities.	Page 23	Sida
11	While ISP is well placed, given its experience and established networks, to support Sida's bilateral programmes, Sida has an obligation to its constituents to test the market and ensure value for money is achieved. For selected bilateral research activities Sida should consider tendering the coordination and management role and closely monitoring the performance of implementation.	Page 23	Sida
12	Consideration be given by Sida to a pilot research grant programme in a selected Focus country university with appropriate management and administrative capacity. This pilot scheme would require careful design, including an M&E framework to ensure appropriate feedback of learnings.	Page 24	Sida
13	Diversification of revenues beyond the support provided by Sida and Uppsala University requires earliest attention by ISP. This would not only assist ISP's opportunity for sustainability, but could allow new development partners to capitalise on ISP's capabilities in efficient and effective ways.	Page 24	ISP/UU
<b>Relevance</b>			
14	The existing high degree of alignment between ISP and Sida's overall research priorities could be usefully reflected in an overarching Agreement between the two organisations including the need to reflect Government of Sweden's recent strategy for research cooperation 2010 – 2014.	Page 30	Sida
15	ISP should annually assess and report on the	Page 30	ISP

No.	Recommendation	Page Ref.	Responsibility
	development context within which they implement their activities, including recipient government, university and Sida priorities and plans and the socio-economic conditions within the countries in which they work.		
16	ISP has a structure, the systems and the experience to enable the broadening of scientific fields in which it supports recipient universities. This should be discussed again with Sida and if other fields are to be included, then (a) any impact on the existing activities be taken into account (including financial resources); and (b) a robust monitoring and evaluation framework be introduced prior to commencement.	Page 32	ISP/Sida
<b>Effectiveness and Impact</b>			
17	A structured monitoring and evaluation system should be established based upon a logical framework and include financial monitoring of agreed parameters to measure the actual additional benefits accruing to ISP support, including the percentage annual financial contribution of ISP to an activity.	Page 35	ISP
18	ISP should more systematically monitor the trends and improvements in key performance indicators so as to demonstrate that ISP supported Universities in Africa are improving their capacity to plan and manage science related teaching and research over time.	Page 35	ISP
19	ISP should systematically monitor the geographical location, and recent professional accomplishments and contribution to development, of their alumni.	Page 37	ISP
20	ISP should strengthen its capacity for impact assessment and results based management by: <ul style="list-style-type: none"> <li>• Having a more explicit and logical relation between inputs, outputs, outcomes and impact (while recognising that it is difficult to establish direct causality with impacts);</li> <li>• Systematically collecting and reporting on quantitative performance data on students, publications, conferences, as well as case studies involving the actual “take up” of research;</li> <li>• Proactively and systematically using the alumni of ISP programmes to consolidate data on outcomes, including intended and unintended outcomes; and</li> <li>• Working with Sida to build more purposeful and explicit upstream and downstream linkages between the ISP programmes and Sida’s broader bilateral programmes.</li> </ul>	Page 38	ISP
<b>Efficiency</b>			
21	Sida should continue to keep ISP activity and administration costs and benefits under review and should encourage regular Performance Audits, and not just Compliance Audits.	Page 44	Sida
22	Planning for PhD students’ studies overseas should be more detailed in terms of expectations of achievements and the timeframe so as to reduce the potential for extensions and delays. In addition there should be careful monitoring and reporting on progress against expectations.	Page 44	ISP

No.	Recommendation	Page Ref.	Responsibility
<b>Sustainability</b>			
23	Monitoring the career pathways including overseas appointments of ISP alumni to OECD universities is recommended as a strategically important way of monitoring achievements and the outcomes of ISP, as well as informing planners on institutional sustainability.	Page 46	ISP
24	ISP should develop and implement a defined exit strategy when it is to leave a country, as part of the road map to sustainability. Sida should provide adequate time for ISP to implement an agreed exit strategy from a country	Page 46	ISP

Annex A  
Terms of Reference (ToR)



## EVALUATION OF THE INTERNATIONAL SCIENCE PROGRAMME

### 1. BACKGROUND

#### ***Information about Sida***

Sida, the Swedish International Development Cooperation Agency, is a government authority. Our goal is to contribute to enabling poor people to improve their living conditions. As other Swedish government agencies, Sida works independently within the framework established by the Swedish Government and Parliament. They decide on the financial limits, the countries with which Sweden (and thus, Sida) will cooperate, and the focus and content of that cooperation. For additional information, please visit Sida's website, [www.sida.se](http://www.sida.se)

#### ***Information about the Research Secretariat***

The Secretariat for Research Cooperation (FORSKSEK) is where Sida's support to partner country research and research of importance for the development of these countries is handled. Support is provided for research councils, universities and research institutions, for regional research networks and for international research programmes. The secretariat also supports Swedish research activities relevant to developing countries. The Secretariat has a wide mandate in research support, encompassing natural sciences and technology, social science and humanities, natural resources and environmental protection as well as health care. The secretariat also contributes towards capacity building.

#### ***Information about the support to International Science Programme***

The International Science Programme, ISP, at Uppsala University (UU) aims at assisting least developed countries in Africa, Asia, and Latin America to strengthen their domestic research capacity within the chemical, physical and mathematical sciences. Sida and previously SAREC has supported ISP since 1975 with the purpose to strengthen basic sciences.

Prior to the agreement period 2003 - 2005 ISP, together with three other organizations supported by Sida<sup>1</sup>, were asked to focus on low income countries in their capacity building efforts and to increase the number of female participants in the programmes. ISP was also requested to ensure that the programmes were well known at the universities and to develop forms of cooperation which contributed to institutional capacity building. In June 2004 the conference "Capacity building in Developing Countries with focus on Basic Sciences" was held in Stockholm with the four organisations invited to discuss their efforts in this direction. Among the representatives of African scientists were the Science Ministers of

1. International Centre for Theoretical Physics (ICTP), Academy of Sciences for the Developing World (TWAS), Third World Organisation for Women in Science (TWOWS)

Mozambique and Rwanda. An important conclusion was the need not merely to focus on individual scientists, but to support the development of Sciences in line with national and institutional strategies. It was agreed that there was a need for an in-depth dialogue between Sida and ISP on direction, modalities and level of future support and for 2006 and 2007 support was given one year at a time. During these years a series of meetings were held with the purpose to develop a new model for engaging ISP in support of Science faculties within Sida's bilateral research cooperation. Continued support was then provided for a two-year period 1 July 2008 – 30 June 2010 in order to further develop the forms of cooperation both in relation to Sida supported bilateral university programmes and research groups, networks and resource centres. Sida's intention was also to conduct a review of its support to ISP during this period which is the background to this assignment.

ISP is organized in three sub-programs, International Programme in the Chemical Sciences (IPICS), International Programme in the Mathematical Sciences (IPMS) and International Programme in the Physical Sciences (IPPS). Each subprogram is headed by a program director and has a scientific reference group attached to function as an advisory panel to the program director, to evaluate applications for ISP support etc. Reference group members are proposed by the respective program director and decided by the ISP board.

The current support through ISP is directed towards research groups, networks and resource centers and is used for degree training (MSc and PhD), equipment, consumables, literature, travels and seminars etc involving co-operation with Sciences faculties in Sweden. In 2008, ISP supported research groups in seventeen developing countries, twelve of which are in Africa south of the Sahara. In 2010, as a result of adaption to the government's new development policy, ISP supported research groups in thirteen developing countries, nine of which are in Africa south of the Sahara, and seven of which are "focus countries" as pointed out by the policy (also denoted "category 1-countries").

The general goal of ISP is to support the development of active and sustainable research environments within chemistry, mathematics and physics in selected developing countries.

The general goals of the current agreement period is to

- More closely adapt current core support activities to Sida in bilateral programmes.
- Initiate additional support to research groups and networks, in the field of physics, chemistry and mathematics, in countries in focus in the government's new development policy, in close collaboration with Sida bilateral programmes.
- Develop a framework for systematic evaluation of supported activities.



## 2. PURPOSE AND SCOPE OF THE REVIEW

The purpose of the review is to provide Sida, ISP and Uppsala University with input to the upcoming discussions concerning the preparation of the next phase of the program. Furthermore it is to help Sida obtain a deeper understanding of the program in order to facilitate its decision-making. The scope of the review will be to assess the relevance, efficiency, effectiveness, sustainability and impact of ISP in relation to its programme objectives and to give recommendations on future directions to Sida, ISP and UU respectively. The time frame to be covered is from 2003 and onward.

## 3. THE ASSIGNMENT (issues to be covered by the review)

### ***Organisational issues***

- Describe the different modes of operation: direct support/Sidas bilateral/other. What is ISP:s added value for different types of support. What is their role in Sida's bilateral cooperation?
- Describe the system and plan for follow-up and evaluation of the ISP support.
- Describe Swedish cooperating partner's role in relation to ISP and to cooperating partners in developing countries.
- Describe Networks, resource centres and research groups in terms of thematic choice, goals, timeframes, budgets, hosts of programmes, etc.
- Governance of ISP. What do key personnel perceive their role to be? Structure, formation and mode of operation of reference groups.
- ISPs relation to and their position/status within Uppsala University. Ownership of the programme.
- Provide a motivated opinion of whether the ISP modality could be suitably applied also to fields of research and higher education in e.g. social sciences and arts.

### ***Cooperation issues***

- Describe ISP:s relation to other Swedish universities and the criteria and methods in selecting Swedish cooperation partners in relation to relevance, transparency and traceability.
- Describe criteria and methods in selecting research groups in developing country institutions in relation to relevance, transparency, traceability and ownership.
- Describe strategies and methods in transferring administration and management of project funds, procurement and systems for financial management and audits to the supported research groups, networks and resource centers during different stages of cooperating partner ability.

- Describe the relation between ISP and Sida, how does it work and why.

**Relevance**

- Is the programme consistent with the needs and priorities of the cooperating partner countries?
- How does the programme relate to the policies and strategies of Uppsala University and Sida?
- What is the scientific quality of the programme and how does the quality relate to the capacity building, both regarding cooperating partners and within the university context in Uppsala and Sweden.

**Effectiveness and impact**

- What are the overall effects of ISP support? Describe both intended and unintended, long term and short term, positive and negative results.
- Compare results achieved to expected results.
- Why did positive/negative results happen? Describe opportunities, challenges and lessons learnt.
- What is the logical relation between outputs and outcomes of the programme?

**Efficiency**

- Can the costs of the intervention be justified by the results?

**Sustainability**

- Will the benefits produced by the programme in cooperating countries be maintained after the ending of support by ISP? Describe exit strategies.
- What would happen with ISP in the case of withdrawn support from Sida? Describe exit strategies.

**4. METHODOLOGY**

The consultant shall provide Sida with an inception report outlining the methodology and giving a detailed time schedule. Field based case studies of ISP support to Kenya and Ethiopia shall be made, and the inception report shall describe the methodology of these field studies. The inception report shall also suggest a method for recreating the intervention logic since no LFA is available for the programme. Interviews shall be made with scientific and administrative staff at ISP, selected research advisors and supervisors at Sida, selected members of ISP board, deputy vice-chancellor of Uppsala University (Kerstin Sahlin) and other relevant staff at UU. Interviews shall also be made with selected cooperation partners from developing countries. The inception report shall describe what documents, e.g. annual reports, applications, proceedings etc shall be studied. The methodology shall follow the DAC Evaluation Quality Standard ([www.oecd.dac.org/evaluationnetwork](http://www.oecd.dac.org/evaluationnetwork)). After discussions with

the management group the inception report together with these terms of reference will guide the review. The consultants will make their own travel arrangements. The visits will be facilitated through contacts from Sida and ISP. The Contract's maximum value is 750 000 SEK.

The management group makes decisions about the review and consists of representatives from Sida and Uppsala University.

## 5. EVALUATION TEAM

The evaluation team should consist of one or two consultants with academic education adequate for the evaluation and documented experience of management and evaluation of research capacity building programmes in developing regions such as Africa, East and South East Asia and Latin America. One of the consultants should have documented research experience in one of the basic sciences physics, chemistry or mathematics. Criteria as listed in the tender invitation:

- Relevant academic education
  - one consultant must have research experience in basics sciences (physics, chemistry or mathematics)
- Experience in conducting project evaluations of research programmes
- Relevant work experience in Africa, Latin America and Asia
- Knowledge of conditions for scientific research in these regions
- Knowledge of "best practices" in research capacity building in these regions
- Knowledge of "best practices" in research management in these regions
- Fluent in English

The tender must include:

- A description in the form of Curriculum Vitae for the persons who will be conducting the evaluation. The CV must contain a full description of the person's theoretical qualifications and professional work experience.
- Two written specifications of previously performed similar projects by the proposed person. The specifications must contain information according to the annexed form "Reference for Project Performed by an Individual", Appendix 2.1, and relate to projects performed and concluded within the past three years.

## 6. TIME SCHEDULE

The assignment should be received in February 2011. A draft Final report shall be delivered no later than 15 July 2011.

## 7. REPORTING

An Inception Report outlining the methodology and giving a detailed time schedule shall be presented as soon as possible after the assignment has been received.

A draft Final Report shall be delivered no later than 15 July 2011 followed by a Final Report two weeks after receipt of comments on draft report. The Final Report shall follow the DAC Evaluation Quality Standard ([www.oecd.dac.org/evaluationnetwork](http://www.oecd.dac.org/evaluationnetwork)). The report shall be written in English, not exceeding 20 pages excluding annexes and follow the guidelines Format for Sida evaluation reports. Presentation of the main findings should be made either at Sida or ISP (possibly via video link) in August or September 2011.

Annex B  
Persons Met



## Persons Met

Individual(s) Met	Position	Meeting Form*
<b>Sweden</b>		
Anders Granlund	Head, Research Cooperation Unit (RCU), Sida	Interview
AnnaKarin Norling	Research Adviser, RCU, Sida	Interview and numerous phone conversations
Hannah Akuffo	Head of Team for Policy and Method Development, RCU, Sida	Interview
Viveka Persson	Head of Team Globforsk, Sida	Interview
Zinaida Iritz	Programme Officer, Mozambique Bilateral programme	Interview
Sara Graslund	Programme Manager, Regional Support to Africa for Climate Change, Sida	Interview
Stephan Molund	Evaluation Unit, Sida	Discussion
Tomas Kjellqvist	Independent consultant, ex Sida	
Kerstin Sahlin	Professor, Deputy Vice Chancellor, Uppsala University	Discussion
Kay Svensson	Director, International Relations, Uppsala University	Discussion
Peter Sundin	Head, International Science Programme (ISP), Programme Director, Chemical Sciences	Interview, Numerous communications
Leif Abrahamsson	Programme Director, Mathematical Sciences, ISP	Interview, Numerous communications
Ernst van Groningen	Programme Director, Physical Sciences, ISP	Interview, Numerous communications
Linnea Sjöblom	Assist Director, Chemical Sciences, ISP	Interview, Numerous communications
Zsuzsanna Kristófi	Head of Administration Section, ISP	Interview, Numerous communications
Pravina Gajjar, Solveig Lindberg Elisabeth Johannesson, Hossein Aminaey	Administrators, ISP	Group Interview
Lars Bohlin Ulf Göransson	Scientific Coordinator and Supervisor (resp), Bilateral Programme with College of Pharmacy, Addis Ababa University Faculty of Pharmacy, Uppsala University	Group Interview

Claes-Göran Granqvist	Board Member, ISP Prof, Solid State Physics, Uppsala University	Interview
Christer Kiselman	ISP Reference Group Member, Mathematics, Prof Mathematics, Uppsala University	Interview and survey
Mikael Passare	Board Member, ISP, Department of Mathematics, Stockholm University	Interview
Tom Britton	ISP Reference Group Member, Mathematics. Dept of Mathematics, Stockholm University	Interview
Anders Wändahl	ISP Collaborator; Librarian, Karolinska Institute	Interview
Michael Strandell	ISP Collaborating Technician, Dept. of Applied Environmental Research, SU	Interview
Dietrich von Rosen	Collaborating Supervisor, Swedish University of Agricultural Sciences (SLU)	Interview
Gunilla Kreiss	Collaborating Supervisor, Uppsala University	Interview
Sven Halldin	ISP Central America Coordinator	Interview
Anders Hagfeldt	Dean of Chemistry at UU; Collaborating Supervisor	Interview
Ewa Wackelgard	IPPS Deputy Director, 2006-7; IPPS reference group	Interview
Anders Wandahl	Librarian, Karolinska Institute; ISP Collaborator	Interview
Six students: Agnes Soto Beatriz Quesada Diana Fuentes Samsidy Goudiaby  Mariamawit Y Yeshak  Mohamed Rashid	University of San Carlos, Guatemala University of Costa Rica National University of Honduras Gaston Berger University in Saint Louis, Senegal School of Pharmacy, Addis Ababa University, Ethiopia University of Dar es Salaam, Department of Mathematics, Tanzania	Group Interview
<b>Kenya</b>		
Annika Nordin Jayawardena	Counsellor, Head of Development Cooperation Section, Embassy of Sweden	Interview
Claes Kjellström	Policy Specialist, Research, Regional Team for Environment and Economic Development, Embassy of Sweden	Interview
Lydia Njenga	Acting Dean, School of Physical Sciences University of Nairobi (UoN)	Interview



Bernard Aduda	Principal, College of Biological and Physical Sciences, UoN	Interview
Lucy W. Irungu	Deputy Vice-Chancellor (Research, Production and Extension), UoN	Group discussion
Jamen Were Kenneth Kaduki Patrick Weke	Director, School of Mathematics, UoN Chairman, Dept. of Physics, UoN EAUMP Coordinator, UoN	
Bernard Aduda Henry Mutoro	University of Nairobi, Principal, College of Biological & Physical Sci. Principal, College of Education and External Studies	Group discussion
Isaac Jumba Lydia Njenga Horace Ochanda Kenneth Kaduki Amir Yusuf	Deputy Principal Acting Dean Associate Dean Chairman, Physics Dept. Chairman, Chemistry Dept.	
Kenneth Kaduki	Dept of Physics, UoN	Interview
17 Students and Staff	Applied Laser Physics, UoN	Group interview
Mghendi Mwamburi	MSSEESA Group Leader and Dept.of Physics, Moi University	Group Interview
6 Students/staff		
Michael Gatari	Institute of Nuclear Science and Technology, UoN	Interview
Students	Institute of Nuclear Science and Technology, UoN	Group interview
Charles Nyamai Justus Barongo	Head of Dept of Geology, UoN Head, Seismology and Applied Physics, Dept. of Geology, UoN	Group interview
Jacob Midiwo	Dept. of Chemistry, UoN and Executive Secretary, NAPRECA	Group Interview
NAPRECA Network participants	NAPRECA Network participants	
Amir Yusuf Jacob Midiwo	Natural Products Chemistry, Dept. Chemistry, UoN	Group interview
Hudson Nyambaka David Malonza Walter Njoroge	Department of Chemistry, Kenyatta University Department of Mathematics, Kenyatta Univ. Department of Physics, Kenyatta Univ.	Group interview
Shem Wandiga Lydia Njenga D Kanuk Ruth Odhiambo Doris Siluma Elizabeth Ndunda	Inorganic Chemistry Research Group, UoN	Group interview

Jamen Were	Director, School of Mathematics, UoN	Interview
Jairus Khalagai	Head, Pure Mathematics UoN	Group Interview
G. P. Pokhariyal	Head, Applied Mathematics UoN	
Moses Manene	Head, Statistics UoN	
Patrick Weke	Head, Actuarial Science & Financial Mathematics UoN	
Staff and Students	School of Mathematics, UoN	Group Interview
Patrick Weke	EAUMP Coordinators from participating universities	Group interview
Sylvester Ruguhyamu		
Alasford Ngwengwe		
Isaac Tembo		
Michael Galurima		
Isidou Mahara		
Karangina Desire		
Vincent Ssembatya		
Christian Alphonse		
John Mongo		
Juma Kasozi		
<b>Ethiopia</b>		
Aklog Laike	Programme Officer, Sida, Embassy of Sweden	Interview
Jean-Pierre Ezin	Commissioner, Human Resources, Science and Technology, African Union Commission	Discussion
Alemu Abebe Woldie	Head, International Relations and Cooperation Services, Ministry of Science and Technology	Discussion
Masresha Fetene	Vice President for Research and Dean of Graduate Studies, Addis Ababa University (AAU)	Interview
Negussie Retta	Director, College of natural Science (AAU)	Interview
Berhanu Guta and Semu Mitiku	Dept of Mathematics (AAU)	Group Interview
Students: Tessema Yibeltal Yitayew Chere Nega Arega Addijalem Abathun Samuel Asefa Papim Yoseph Legesse Lemecha	Mathematics students, AAU (last student in the list is from Adama University)	Group Interview
Tsegaye Gedif Ayele Tilahun Abebaw	Former students, now Mathematics Research Group	Group interview
Mulugeta Bekele, Lemi Demeyou Tatek Yergou	Dept of Physics, AAU	Group interview
Negussie Megersa	Environmental and Analytical	Interview

	Chemistry, AAU	
Ermias Dagne	Organic Chemistry, AAU Coordinator of evaluation visit.	Interview
Wendigaegn Mammo	Dept. of Chemistry	Interview
Lemi Demeyu	Dept. of Physics	Interview
Atalay Ayele	Institute of Geosciences, AAU and member, ESARSWG	Interview
Kaleab Asres Tsige Gebre-Mariam Teferi Gedif	School of Pharmacy, AAU	Group interview
Berhanu Guta	Dean, School of Computer and Mathematical Sciences	Interview
Isabel Rapp	Adviser, University Reform Programme, German Development Cooperation,	Discussions

- \* Interview = Semi-structured questions and recording of answers/data  
Discussion = Informal meeting and general discussion



Annex C  
Role of Science in Contributing to  
Development



## The Role of Science in Contributing to Development and Poverty Alleviation

This annex of the Evaluation Report assesses the role of science in contributing to development and poverty alleviation. Section one summarises the contributions – and limitations – of the contribution of science to development in general, and notes some implications for Sida and ISP. Section two examines the particular situation of Africa.

### ***Section One: the contribution of science to development and poverty alleviation in developing countries around the world.***

This Evaluation finds there are seven reasons why aid money should be used to support enabling science.

First, **most of the flagship breakthroughs in development and poverty reduction have science at their core.** Well known examples of breakthroughs that disproportionately benefited the very poor include the Green Revolution in Asia, the eradication of smallpox and control of river blindness, and provision of modern, safe, effective methods of family planning. While each of these required important complementary inputs – especially good management and sustained financing – they could not have occurred without a strong foundation in enabling sciences.

Second, **research in the enabling sciences is a “public good”, and often a global public good.** In economics, a public good is characterised as “things that can be consumed by everybody, in a society or nobody at all”.<sup>28</sup> Examples include clean air, and public safety, but also basic research and knowledge creation. The important point for public policy is that because the private sector cannot exclude anyone from consuming a public good, they cannot charge for it. The private sector has little or no incentive to invest in enabling research, despite the large benefits to society. The public sector needs to invest on behalf of society instead.

Third, **expenditure on enabling sciences is low, both by developing country governments and their development partners.** Low income developing countries<sup>29</sup> do not have the public resources to invest in science. Not surprisingly, overall R and D funding has traditionally been much lower in developing countries (0.2 % GDP) than in OECD countries (2 per cent GDP). (Hasselgren and Nilsson, 1990).<sup>30</sup> Importantly, as Thulstrup notes, bilateral development partners - if they support science research at all - focus heavily on short term, applied science (Thulstrup, 1998). Funding for enabling sciences is largely ignored. Sida support for enabling science research in developing countries therefore fills a gap that would not be filled otherwise.

Fourth, **market forces are such that OECD research institutes, and companies, rarely invest in research of direct interest to developing countries.** As just one example, the World Health Organisation estimates one billion lives are blighted – mainly in Africa – by “neglected tropical diseases”.<sup>31</sup>

<sup>28</sup> The Economist (2000) *Pocket Economist* page 191

<sup>29</sup> Less than \$US 995 per capita GNI

<sup>30</sup> It should be noted this is for R and D more broadly, and the figures relate to pre 1990 trends.

<sup>31</sup> [http://www.who.int/neglected\\_diseases/en/](http://www.who.int/neglected_diseases/en/)

They are neglected because there is little or no commercial market associated with prevention or cure. Sida and ISP have been helpful in undertaking research in treatment for such diseases, including standardisation of herbal medicines in line with the anti-malaria drug artemisin in Africa. (Sundin and Aduda, 2009).

Fifth, **enabling science underpins productivity and international competitiveness**: key drivers of sustainable economic growth in a globalised world. Enabling science is a necessary (although not sufficient) condition for technological improvement and productivity increases in agriculture (crops and livestock) manufacturing (power generation and telecommunications) and the service industries (health sciences). “The future will be like the schools are today”<sup>32</sup> applies equally well to universities. Science and technology, while separate fields, are linked

Sixth, **enabling science provides the evidence base for responding to many of the most basic challenges facing developing countries**, and especially those in extreme poverty (<\$1.25 per day). This includes basic challenges in responding to climate change (including water stress, desertification, and pest control) and public health (including multidrug resistant tuberculosis).

Seventh, **research and training needs long term investments**. None of the breakthrough discoveries have been achieved without long term, predictable, sustained financing. The two to three year time frame of a political cycle, or of some development agencies, is not conducive to longer term investments. Sida is to be commended for taking a long term view of development in its support for science and research.

*Limitations and constraints to aid money for science contributing to development and poverty reduction.*

On the other hand, socio-economic development and poverty reduction is everywhere and always a complex process, involving many factors. There are limitations and gaps in the way enabling science contributes to development and poverty reduction. This Evaluation finds that the following factors are particularly important.

First, **well trained scientists can leave developing countries** to work in the USA or other countries where income, facilities, promotion, and recognition are all substantially better. This is understandable. The problem for public policy, however, is that aid money, including Sida money, that has been used to train a PhD student then becomes, in effect, a direct subsidy to the private (not public) gain of an individual now living overseas via that person’s income. It is also an indirect – but substantial – subsidy to the University in the USA or elsewhere that reaps all the benefits, but pays none of the costs, of training that person to Ph D standard.

Second, **even if scientists stay in the developing country, they may not be able to generate good science**. This can be due to many well-known factors: lack of financing for basic equipment and consumables or even electricity; professional isolation; lack of access to international journals etc.

Third, **even when they produce good basic research, there may be only tenuous links to development and poverty reduction because incentives are misaligned**. As Sundin notes, researchers’ incentives are (understandably)

---

<sup>32</sup> Albert Szent-Gyorgyi, Hungarian Biochemist and Nobel Prize Winner.



aligned to publication and promotion more so than to commercialisation of results and direct poverty alleviation (Sundin 2009).

Fourth, even where research results are directly relevant to development and poverty alleviation, **politicians and policy makers often tend to ignore science**. As Hasselgren and Nilsson (2009) note “Regrettably, it often happens that the political establishment does not trust scientists ....a particular aspect of this is the fact that in Third World countries national scientists generally have a low status while the opposite is true in for foreign advisors”.

Fifth, **policies and programmes are rarely evidenced based, despite what we would all wish**. Even when the science is strong, the benefits clear, and the costs low, it can take a long time before the results of scientific knowledge (as distinct from technological breakthroughs such as mobile phones) get adopted, if at all. In a landmark paper, Berwick notes that it took 264 years between the proven discovery that lime juice prevented scurvy, and the widespread adaptation of lime juice by the British navy and Board of Trade, despite the overwhelming evidence and obvious benefits (Berwick, 2003).

Sixth, even where scientific evidence is adopted as part of the policy response to a development problem, **many other socio-economic factors are required to converge** if development is to proceed, be equitable, and reduce poverty. In the field of public health alone, basic and applied scientific research has led to substantial understanding about the spread of HIV and AIDS; the links between tobacco and premature death of working age adults; the critical importance of breast feeding of newborns and infants; the causes and consequences of tuberculosis; and the links between poor sanitation and cholera. All of these examples involve unimpeachable scientific causal relationships, for problems that disproportionately affect those in extreme poverty (< \$1.25 a day) or are vulnerable (< \$ 2 a day). Yet in each case cultural, socio-economic, and management deficiencies are the binding constraints to progress, not lack of scientific knowledge.

### **Conclusion**

The main conclusion to be drawn is that good science, including enabling science, is a necessary, but by no means sufficient, condition for development and poverty alleviation. For enabling science to play its powerful role, there needs to be supplementary and supporting investments to align incentives and outcomes to the public good, with particularly measures to ensure those in poverty or vulnerable to poverty can access such benefits.

### **Section Two: The Particular Case of Africa**

Section One above summarised the contribution of science to development and poverty alleviation in developing countries across the globe.

This section now focuses on the contribution of science to development and poverty alleviation in Sub Saharan Africa (hereinafter referred to as Africa).

There are seven important things to note when considering the contribution of science to development and poverty alleviation in Africa.

First, Africa has the highest rates of extreme poverty (< US\$ 1.25 a day) of any region in the world. Indeed, the latest *Global Monitoring Report* (World Bank and IMF, 2010) estimates that just over half (50.9 per cent) of people live below the US\$ 1.25 poverty line in Sub Saharan Africa, compared to 22.4 per cent in South

Asia, the next highest region. (It should be noted that while the rates of poverty are highest in Africa, absolute numbers are still higher in South Asia given the larger population there: 595 million in absolute poverty in South Asia compared to 388 million in Africa). The latest *Global Monitoring Report* further estimates that 73 per cent of people (556 million) in Sub Saharan Africa live on less than US\$ 2 a day.

Second, Africa has traditionally had low levels of overall investment in higher education, and especially in science. World Bank analysis finds that Africa allocates approximately 0.78 per cent of Gross Domestic Product (GDP) to higher education over the last fifteen years. The figure falls to just 0.63 per cent of GDP in the poorest countries (World Bank 2009). By 2000, Africa was spending US\$0.70 on agriculture R&D from every US\$100 of agricultural output, and the region as a whole employed just 12,000 researchers. Moreover, the average expenditure per researcher in 2000—approximately US\$100,000 in constant 1993 dollars—was one-third less than what it was in 1980 (World Bank, 2009).

Third, rapid population growth and other factors means Africa needs to invest more, and invest more strategically, in higher education. The World Bank (World Bank 2009) notes that:

**“Enrolments growth has outpaced financing capabilities, and in many cases resulted in deteriorating educational quality. Public expenditure per tertiary student has fallen from US\$6,800 in 1980, to US\$1,200 in 2002, and recently averaged just US\$981 in 33 low-income Sub Saharan African countries. The ratio of academic staff to students has fallen significantly, producing overcrowded classrooms and unrelenting workloads for teaching staff. This has contributed to a severe crisis in staffing, compounded by retirements (with many more to come), brain drain, attrition due to AIDS, poor working conditions, and insufficient output from postgraduate programmes.”**

Unfortunately, the rapid rise in enrolments has not necessarily been in the fields of science. The same World Bank study goes on to note that:

**“On average, just 28 per cent of students were enrolled in science and technology fields in 2005 (i.e., agriculture, health science, engineering, sciences). This indicates that much of Africa’s recent enrolment growth (including that in private provision) has occurred in the less expensive “soft” disciplines supported by the expansion of private institutions. Comparing trends in science and technology (S&T) enrolments over nearly two decades for the 23 African countries for which this information is available, declining proportions are observed in 11 of these countries. Rising shares of S&T enrolments were recorded in another 10 countries, with Nigeria leading this group. For the declining group, more conscious efforts to manage the proportion of S&T enrolments would seem indicated.”**

Fourth, development partners do not tend to plug the investment shortfalls in science, as they tend to do in other sectors. World Bank analysis (World Bank 2010) finds that international aid in support of higher education tends to be relatively small in both absolute (US\$ 600 million annually) and relative terms (only one quarter of all international aid to the education sector in Sub Saharan Africa). Furthermore, of the relatively small amount that goes to higher education, only 26 per cent goes directly to African Universities and research centres to build local teaching and research capacity. The balance goes to support for scholarships. (World Bank 2010). The World Bank also finds that development partners have not traditionally focused their support on science. Rather, donor funding:

“Tends to be heavily concentrated on health problems, poverty analysis, environmental resources, women’s issues, and other topics with a ‘public goods’ orientation. Very little donor funded research is oriented towards economic growth, competitiveness concerns, and agricultural technologies. Consequently, were national research capabilities to be augmented, they could contribute significantly to Africa’s new “growth agenda”.

(World Bank 2009).

The fifth issue to note is that Africa has generally low levels of scientific ‘outputs’ including scientific publications and patents. The World Bank finds that only 1.37 per cent of science and engineering publications came from Africa in 2005-6 (World Bank, 2009). As shown in the table below, taken from the World Bank study, the low level of scientific publications was much lower than other regions, as was the number of patent applications.

**Table 2.6 Research Outputs by Geographical Region**

Region	Scientific publications (2005)	Patent applications filed by residents (2004)
East Asia and Pacific	44,064	66,931
Europe and Central Asia	39,975	34,121
Latin America and Caribbean	20,045	4,890
Middle East and North Africa	6,354	486
South Asia	15,429	6,795
Sub-Saharan Africa	3,563	16

Source: World Development Indicators.

Source: (World Bank, 2009)

Sixth, investment in tertiary education has the *potential* for high pay-offs for both the individual, and society more broadly. Schultz finds that wage differentials are higher in six African countries for those men – and women – who complete secondary, and then tertiary education. In Nigeria, for example, hourly wage rates increase by about 2.5 and 2.4 per cent for each year of primary school, by about 3.9 and 4.4 per cent for each year of secondary school, and by 10 and 12 per cent per year of post-secondary schooling, for men and women, respectively. Similar trends are found in Burkina Faso, Ghana, Kenya, South Africa and Cote D’Ivoire (Schultz P, 2003) .

Obwona and Ssewanyana also find there are potentially strong development impacts from higher education in Africa. Using Uganda as a case study, they find that higher education graduates are employed in those sectors which have recorded highest growth rates; that such graduates contribute to the economy indirectly through tax revenues which in turn can support social programmes; and that the private returns to higher education are higher than at any other lower education levels. University education shows the highest returns. (Obwona and Ssewanyana, 2007). There are, however, downsides as well. The researchers find there are marked disparities in access to higher education across gender and geographical locations.

Tertiary education also has the *potential* for high pay-offs in terms of economic growth more broadly in Africa. In a major study of tertiary education in Africa, Bloom and colleagues (Bloom Canning and Chan, 2005) find that:

**“Our analysis supports the idea that expanding tertiary education may promote faster technological catch-up and improve a country’s ability to maximize its economic output. Sub-Saharan Africa’s current production level is about 23 per cent below its production possibility frontier. We conclude that, given this shortfall, increasing the stock of tertiary education by one year could maximize the rate of technological catch-up at a rate of 0.63 percentage points a year, or 3.2 percentage points over five years.”**

The World Bank has come to a similar conclusion. In its landmark study on higher education in Africa (World Bank 2009) it concludes that:

**“The key to economic success in a globalized world lies increasingly in how effectively a country can assimilate the available knowledge and build comparative advantage in selected areas with good growth prospects, and in how it can enlarge the comparative advantage by pushing the frontiers of technology through innovation. Capital is a necessary handmaiden, but the arbiter of economic success—even survival—in the world today is the capacity to mobilize knowledge and to use it to the fullest. African countries have gone far in achieving high levels of literacy and raising primary enrolments, and they are increasingly seeking to improve learning outcomes as well. This progress is providing a foundation for future development. Now it is necessary to move quickly to acquire the higher order skills and expertise that will allow African countries to add value to existing economic activities and enter new industries and services.”**

The seventh and final thing to note about considering higher education in Africa is, of course, the diversity between, and within, countries of the continent. It is also important to recognise the importance of “quality” in education and its sustainability.

Annex D  
Alignment of ISP Activities with Sida  
Focus Countries



Alignment of ISP Activities with Sida Focus Countries

Annex D

COUNTRY	Sida Bilateral Programme			ISP Activity (Figures from 2009 unless otherwise indicated)								
	Exists Yes/No	Includes Research Yes/No	University Involved in Bilateral	Field of Research	Direct Funding				Bilateral Funding			
					Partner University	Field of Research	No. Network nodes at Univ w Research Groups	No. Post-Grad Students*	No. Research Groups	Partner University	Field of Research	No. Post-Grad Student
<b>Focus Countries</b>												
Burkina Faso	Yes	Yes	Several universities - including University of Ouagadougou	University of Ouagadougou	Chemistry	1	14 MSc students, 14 PhD students	2	No ISP coordination			
Ethiopia	Yes	Yes	University of Addis Ababa	Addis Ababa University	Chemistry (restart 2010, figures from 2008)	4	7 MSc students, 3 PhD students	1	Addis Ababa University	Pharmacology	2 PhD students	2
					Mathematics (restart 2010, figures from 2008)	0	4 MSc student, 2 PhD students	1				
					Physics (restart of one group 2010, figures from 2008)	1	9 MSc students, 6 PhD students	2				
Kenya	Yes	No	N/A	University of Nairobi	Chemistry (Research Groups started 2011)	3	0	2				
					Mathematics	1	7 MSc students, 3 PhD students	0				
					Physics (1 of the Research Group started 2011)	4	22 MSc students, 15 PhD students	4				
				Moi University	Physics	1	2 MSc students, 2 PhD students	1				
Mali	Yes	No	N/A	University of Bamako	Chemistry	1	3 MSc students, 4 PhD students	1				
					Mathematics (started 2011)	0	0	1				
					Physics (started 2011)	1	0	1				
Mozambique	Yes	Yes	Eduardo Mondlane University	No direct support					Eduardo Mondlane University	Chemistry, since 2008	1 MSc student, 9 MSc students, 7 PhD students	1
										Mathematics, since 2007	7 PhD students	1





Annex E  
Kenya Case Study



### Case Study – Kenya

#### 1. Introduction

Under the Terms of Reference (ToR) for the Evaluation of the International Science Programme, Kenya was identified as a case study country in which to review the performance of ISP.

This Annex provides details of the findings of a review of documentation as well as interviews with key stakeholders in Nairobi during a visit 23 to 29 May 2011.

Relevant information is then integrated into the main evaluation report.

#### 2. Relevance to the Kenyan Development Context

Kenya's development blueprint for the future is **Kenya Vision 2030**, covering the period 2008 to 2030. It is being implemented in successive five-year Medium Term Plans, with the first such plan covering 2008 to 2012. The Vision uses three pillars, economic, social and political as the categories for all planning and bases the resulting plans on macro-economic stability; continuity of governance reforms; enhanced equity and wealth creation opportunities for the poor; infrastructure; science, technology and innovation (STI); land reform; human resources development; security and public sector reforms.

Vision 2030 states that “the government will create and implement an STI policy framework to support Vision 2030. More resources will be devoted to scientific research, technical capabilities of the workforce, and in raising the quality of teaching mathematics, science and technology in schools, polytechnics and universities.

Kenya is one of the 12 Focus Countries to which Swedish development assistance is being directed. The current bilateral agreement includes a Country Strategy for 2009 to 2013 with total funds of approximately US\$50 million per year being provided for programmes in natural resources (agriculture, water and land) (70%); democratic governance (20%); and urban development (10%). The bilateral agreement does not include components of research and higher education.

ISP therefore, has the opportunity to continue support to Kenyan research groups using core programme activities.

#### 3. ISP in Kenya

##### 3.1 Background

ISP began its present support to Kenyan institutions in 1991 with a focus on the University of Nairobi (UoN) and the Institute of Nuclear Science and Technology in particular. In 1998 Moi University commenced an ISP research activity in the field of photovoltaics and in the same year the Department of Physics in UoN commenced an activity based upon research and development of solar cells.

## **3.2 Current ISP Activities in Kenya**

### **3.2.1 ISP Core Programme Activities**

Core research activities include:

#### **IPPS KEN-01/02: Application of Nuclear and Associated Analytical Techniques in Environmental Science Studies in Kenya**

*Initiated:* 1991

*Research Group:* Institute of Nuclear Science and Technology, University of Nairobi

*Research Group Leader:* Dr Michael Gatari

*Partner University:* The partners are largely individuals rather than universities, but main Swedish partner universities for hosting sandwich students are the University of Gothenburg and, Chalmers University of Technology, Sweden

*Objectives:* Capacity building in research and university teaching, and technology transfer for sustainable development.

#### **IPPS KEN-02: Research and Development of Solar Cells Based on Dye-sensitised Nanocrystalline TiO<sub>2</sub> Semiconductor Thin Film.**

*Initiated:* 1998

*Research Group:* Department of Physics, University of Nairobi

*Research Group Leader:* Prof. Bernard Aduda

*Partner University:* Main Swedish partner university for hosting sandwich students is the Uppsala University

*Objectives:* Research along a number of avenues to identify materials options for use in solar cell technology

#### **IPPS KEN-03: Photovoltaic Group**

*Initiated:* 1998

*Research Group:* Department of Physics, Moi University

*Research Group Leader:* Prof. Mghendi Mwamburi

*Partner University:* Main Swedish partner university for hosting sandwich students is the Uppsala University.

*Objectives:* Five research areas to increase the effectiveness of photovoltaic cells, including:

- 1) Optical modelling on thin film optics;
- 2) Conductivity and Hall Effect studies on such thin film samples. Further, material characterization through cooperation with other labs with regard to optical, structural and compositional analysis;
- 3) Performance monitoring of Compact Parabolic Concentrator/Photo Voltaic (CPC/PV) systems;
- 4) Spectrally selective reflector systems to make new reflector material designs for PV systems; and
- 5) Local solar radiation monitoring.

#### **IPPS KEN-04: Laser Physics and Spectroscopy**

*Initiated:* 2005

*Research Group:* Department of Physics, University of Nairobi

*Research Group Leader:* Dr Kenneth Kaduki

*Partner University:* Main Swedish partner university for hosting sandwich students is Lund University.

*Objectives:* Capacity building in laser physics and its applications and the development of laser science at UoN.

#### **IPPS KEN-05: Building Capacity of the Seismological Network in Kenya**

*Initiated:* 2011

*Research Group:* Department of Geology, University of Nairobi

*Research Group Leader:* Prof. Justus Baronga

*Partner University:* Not yet determined.

Is a part of the East and South Africa Seismological Working Group (ESARSWG)

*Objectives:*

Establish a seismological network

Establish a strong research base in the department and provide capacity building

#### **IPICS KEN-01: Inorganic Chemistry**

*Initiated:* 2011

*Research Group:* Department of Chemistry, University of Nairobi

*Research Group Leader:* Professor Shem O. Wandiga

*Partner University:* Not yet finally decided, support started in 2011. However, following visits to Lund University and Chalmers/University of Gothenburg in May 2011, it is most probable that the main Swedish partner university for hosting sandwich students will be Lund University.

*Objectives:* To strengthen the capacity and quality of Inorganic Chemistry research group at the University of Nairobi in order to address national, regional and global priority needs for human development and environmental health protection.

#### **IPICS KEN-02: Natural Products Chemistry**

*Initiated:* 2011

*Research Group:* Department of Chemistry, University of Nairobi

*Research Group Leader:* Prof. Jacob Midiwo

*Partner University:* Not yet finally decided, support started in 2011. However, it is most probable that the main Swedish partner for hosting sandwich students will be Department of Chemistry, University of Gothenburg.

*Objectives:* To identify new drugs for tropical diseases, mainly malaria, from Kenyan medicinal plants; and anchor Organic Chemistry training in the Department.

### **IPICS NAPRECA Network (Natural Products Research Network for Eastern and Central Africa)**

*Initiated:* ISP support commenced 1988

*Node:* Department of Chemistry, University of Nairobi

*Node Group Leader:* Prof. Jacob Midiwo

*Countries with other nodes:* Botswana, Cameroon, Democratic Republic of Congo, Ethiopia, Kenya, Madagascar, Sudan, Rwanda, Tanzania and Uganda.

*Objectives:*

- 1) To initiate, develop and promote research in the area of natural products in eastern and Central Africa;
- 2) To coordinate and maintain regional links among research groups; and
- 3) To foster research links with scientists in other parts of the world who are actively working in specific areas of natural products.

### **IPMS EAUMP Network (East African Universities Mathematics Programme)**

*Initiated:* ISP support commenced 2002.

*Node:* Department of Mathematics, University of Nairobi

*Node Group Leader:* Prof. Patrick Weke

*Countries with other nodes:* Tanzania (Coordinator), Uganda, Rwanda, Zambia

*Objectives:* The programme aims at alleviating the poor state of mathematics in Eastern Africa. The programme consists of four basic components:

- 1) Enhancement of postgraduate training, in particular to PhD, to build capacity in universities, and train advanced mathematics researchers needed in other socio-economic sectors, in the region. Training programmes are run jointly by staff from collaborating universities. Since there is a limited pool of PhD candidates in the region, a portion of resources under this programme is utilized to support MSc training;
- 2) Establishing and strengthening collaborative research in mathematics areas of interest in the region. These collaborative research projects must be supported by a strong postgraduate programme developed in (1) above;
- 3) Strengthening the collaborating mathematics departments in terms of equipment and literature, in order to carry out activities in (1) and (2) above; and
- 4) Development of resources for the collaborating departments. These resources include teaching and learning materials, research databases and maintenance of websites.

Besides joint research in epidemiological, ecological and hydrodynamic modeling, the network aims to strengthen areas of pure mathematics in the region, to reinforce the teaching capacity at university level and to help provide applied areas of mathematics with a solid foundation.

### **3.3 Expenditure and Outputs**

Table E.1 sets out a summary of the expenditures and outputs of the ISP programme in Kenya in total and then by Research Activity. Kenya constitutes about 10% to 12% of the total expenditure of ISP on research groups and networks.

**Table E.1: ISP Expenditure and Outputs in Kenya 2003 to 2010**

Expenditure and Output by Research Activity	Year of Expenditure and Output								TOTAL
	2003	2004	2005	2006	2007	2008	2009	2010	
TOTAL ISP Expenditure (SEK '000, Research groups and Networks)	18,774	21,840	26,640	16,951	20,229	18,584	19,365	14,730	157,113
<b>TOTAL ISP IN KENYA</b>									
Expenditure (SEK '000)	1,503	1,253	3,341	1,019	1,807	2,015	2,232	1,917	15,087
% of Total ISP Support	8.0%	5.7%	12.5%	6.0%	8.9%	10.8%	11.5%	13.0%	9.6%
Number of Master students	22	101	98	87	95	82	95	63	
Master degrees awarded	8	16	23	24	31	27	33	30	192
Number of PhD students	9	30	32	30	30	33	31	17	
PhDs awarded	2	0	0	3	1	2	3	4	15
No. published papers (Research Activities only)	9	5	4	5	5	8	5	0	41
No. published papers (incl Maths Network)	19	15	13	11	11	21	15	5	110
<b>IPMS EAUMP UoN node</b>									
Expenditure (SEK '000)	Expenditures have not been recorded node-wise before 2009						444	182	626
Number of Master students	0	68	72	65	72	56	63	63	
Master degrees awarded	0	12	20	20	24	18	25	30	149
Number of PhD students	0	18	19	18	19	21	22	17	
PhDs awarded	0	0	0	2	1	1	1	4	9
No. published papers Regional	6	6	5	3	3	5	2	1	31
No. published papers International	4	4	4	3	3	8	8	4	38
<b>IPPS KEN:01/02 Application of Nuclear and Associated Analytical Techniques in Environmental Science Studies (started 1991)</b>									
Expenditure (SEK '000)	17	242	257	198	60	417	838	341	2370
Number of Master students	10	9	14	11	13	15	17		
Master degrees awarded	5	3	2	3	6	6	6		31
Number of PhD students	2	2	2	1	1	2	2		
PhDs awarded	0	0	0	1	0	0	0		1
No. published papers	1	0	2	1	4	5	1		14
<b>IPPS KEN:02 R&amp;D of Solar Cells Based on Dye-sensitised Nanocrystalline TiO2 Semiconductor Thin Film. (started 1998)</b>									
Expenditure (SEK '000)	844	369	1680	317	718	624	322	764	5638
Number of Master students	9	10	6	5	4	4	6		
Master degrees awarded*	1	1	1	1	1	0	1		6
Number of PhD students	6	6	5	5	5	5	3		
PhDs awarded	1	0	0	0	0	1	1		3
No. published papers	4	4	2	4	1	3	2		20
<b>IPPS KEN:03 Photovoltaic Group (started 1998)</b>									
Expenditure (SEK '000)	642	642	864	184	820	303	634	455	4544
Number of Master students	3	14	5	5	5	6	2		
Master degrees awarded	2	0	0	0	0	3	1		6
Number of PhD students	1	4	4	4	3	3	2		
PhDs awarded	1	0	0	0	0	0	1		2
No. published papers	4	1	0	0	0	0	2		7
<b>IPPS KEN:04 Laser Physics and Spectroscopy (started 2005)</b>									
Expenditure (SEK '000)	no support	no support	540	320	209	671	438	357	2535
Number of Master students			1	1	1	1	7		
Master degrees awarded			0	0	0	0	0		0
Number of PhD students			2	2	2	2	2		
PhDs awarded			0	0	0	0	0		0
No. published papers			0	0	0	0	0		0

## 4. Interview Findings

No clear programme logic (as expressed in a logical framework) has been established for ISP's activities overall. Hence an evaluation of ISP's activities in Kenya can only be undertaken at a rudimentary level, with broad assumptions in place. These include the overall objectives and component objectives that were suggested in early 2010 as follows:

### Overall Objective of ISP:

*To increase the contribution of researchers in enabling sciences in developing countries to the fight against poverty.*

### Component Objectives:

1. To increase the capacity to plan research, and the production of research, in enabling sciences in developing countries and regions;
2. To facilitate an increased use of research training and research results relevant to the fight against poverty in developing countries; and
3. For the supported research group/network, to attract sufficient financial support, other than from ISP, to ensure long-term stability.

### 4.1 Relevance

A very substantial increase in student numbers is being experienced in Kenya in both high schools and higher education. At the same time investment in the education sector has grown substantially. UoN for example has taken over the Kenya Science Teachers' College and invested Ksh 500 million to establish quality chemistry, physics and biology laboratories. This campus continues to be used to train future teachers of science, and is now being integrated into UoN.

ISP supported capacity building in the sciences is consistent with the needs as stated in Kenya Vision 2030, which includes increased emphasis on Science, Technology and Innovation (STI).

ISP's support of the enabling sciences also assists develop the scientific platform to support Sida's development assistance in the natural resources (agriculture, water and land) sector which constitutes 70% of Sida's current programme in funding terms.

### 4.2 Impact

The ability to provide impact assessment of ISP in Kenya suffers from (a) the lack of any clear and agreed structure to the programme as would be provided by a logical framework; (b) the lack of a baseline assessment of the situation at some previous point of time (c) the absence of a clear counterfactual (what would have happened in the absence of ISP support) or control group. As such, genuine impact assessment can only be impressionistic, with a number of assumptions being made.

While supporting ISP as highly relevant to the needs of Kenya, interviewees also commended it for building relationships from the bottom up, with graduates moving into higher decision-making positions.

Interviews identified the following as examples of the impact of ISP:



1. Studies into air quality have identified issues of which the City Council was unaware. Air quality mapping is now being undertaken for all Nairobi;
2. UNEP has appointed an ISP-trained specialist as adviser on atmospheric quality;
3. UoN has been approached to provide specialists to advise on environmental conditions;
4. Experts from UoN have been invited onto two high level advisory panels on nuclear power; and
5. Some ISP-trained graduates have progressed to high levels in government decision-making.

Asked “what would success look like in five years time”, interviewees responded:

1. Each department will have a centre of excellence in their thematic area, recognised internationally. This will inspire collaboration and increase students;
2. A critical mass of qualified people will have been produced to make a difference;
3. Results will be produced in a timely manner to be used by industry; and
4. More competent teachers will have been produced.

### **4.3 Effectiveness**

During the period 2003 to 2010, there have been 192 MSc level degrees and 15 PhD degrees awarded in Kenya with the support from ISP. In addition there were 41 published scientific papers from research activities alone and more from the collaboration within the networks. Unfortunately, data has not been collected on the actual *share* of those outputs that can be attributed directly to ISP. It is not possible to say if, for example, ISP provided 90 per cent of the costs of the Ph Ds, or 50 per cent, or a smaller amount. Collecting such data in future would help ISP and Sida to discuss a ‘contribution analysis’ to their work.

The ISP procedures provide encouragement for the participation of females in the sciences. Through interviews with ISP staff and research group leaders in Kenya, we are confident that there is personal encouragement where relevant. There are some gains to be reported, but the overall situation is as follows.

The revised national constitution states that any public organisation should employ a minimum of 30% female staff. This may well provide for further opportunities for females and reduce gender inequities.

The Department of Physics credits ISP with raising the number of female students to 10% and claims that 2 graduate assistants have developed their skills and are now employed by the Geo-physics group. A third female student is nearing completion of a PhD overseas.

The Department of Chemistry reports that 15% of students are female.

The Department of Mathematics reports that 50% of MSc students and 30% of PhD students are female. It credits ISP for doubling the rate of females undertaking PhDs to 60%.

Despite these achievements in increasing the number of females participating, interviewees claim the basic constraints to equal participation still exist. The top two are:

- a. A shortage of females graduating from high schools who are then available and interested in higher level education; and
- b. The field related work of sciences restricts interest of women for cultural reasons.

#### **4.4 Efficiency**

Over the period 2003 to 2010 there were 15 PhDs and 192 MScs awarded with the support of ISP. These were all within the field of physics. Assessment of the numbers registered for the courses and numbers of degrees awarded, would indicate a reasonable rate of completion. This, of course, is relevant to operational efficiency..

In addition, there were 41 published scientific papers and numerous more produced by the Mathematics network, EAUMP, to which UoN researchers contributed. However it was not possible to capture if this output was close to the expected output, and capacity, of the programme, which would give some sense of the efficiency of the programme.

On a day-to-day basis, staff and students interviewed considered ISP was run efficiently and no substantive suggestion for improvement was identified.

Observations indicated that the staff of ISP transferred as much of the planning, preparation and management responsibilities to the respective research groups and networks. This enabled ISP staff to focus their time on the more strategic tasks of oversight, support and mentoring. This approach not only assists in efficiency, but is crucial to ensuring ownership of the activities and responsibilities.

#### **4.5 Sustainability**

Staff and students interviewed consistently claimed that if ISP funding is withdrawn, then activities that have already been initiated will ground to a halt. However, at higher levels in UoN, there was optimism that further funds could be attracted.

To improve the number of females attending science courses, science department personnel in UoN indicate a number of initiatives are underway, including:

- Partial financial support in the form of a stipend;
- Funding tuition fees for female students (ISP is funding 3 female MSc students);
- German aid now provides one scholarship per annum for females;
- Public advertising of courses indicates females are encouraged to apply; and
- Use successful female graduates as role models.

There appeared to be no awareness (or if there was, then there was no concern expressed) over the possibility of ISP not continuing past the end of 2011 (given the current ISP/Sida agreement finishes at the end of 2011).

Annex F  
Ethiopia Case Study



## Case Study – Ethiopia

### 1. Introduction

Under the Terms of Reference (ToR) for the Evaluation of the International Science Programme, Ethiopia was identified as a case study country in which to review the performance of ISP.

This Annex provides details of the findings of a review of documentation as well as interviews with key stakeholders in Addis Ababa during a visit 30 May to 3 June 2011.

Relevant information is then integrated into the main evaluation report.

### 2. Relevance to the Ethiopian Development Context

The Ethiopian population, largely rural based, has grown at 2.6% p.a. over the period 1994 to 2008. At the same time, effective government policies and strategies have seen encouraging growth, such that the average annual increase in GDP over the period 2003 to 2009 was more than 10%. Two sequential programmes between 2002 and 2010 were aimed at attaining the Millennium Development Goals (MDGs) and they further supported this impressive growth. More recently the long term vision, which has inspired educational reform is to transform the Ethiopian economy into a middle income country within 15 years. This is set out in the 2009/2010 Green Paper of the Ministry of Science and Technology.

The Education Sector Development Programme IV (ESDP IV) covering the period 2010/2011 to 2014/2015 supports this vision of transforming Ethiopia into a middle income country and *“demands a transformation of the economy through, among other things, conscious application of science, technology and innovation as the major instruments to create wealth. This, in turn, requires unfolding commitment to increasing the overall level of education of the population and a focus on science and technology education in particular.*

*It demands..... that human resources development be strengthened by training competent and innovative people with special attention to engineering, technology and natural sciences through introducing high quality science and mathematics curricula at primary and secondary schools and the recently adopted policy of 70:30 university intake policy in favour of science and technology.”*

This 70:30 policy stipulates that at least 70% of all enrolments in university should be in engineering or science, while the other 30% could be in the social sciences field. This target, together with the large number of students entering the education sector, is placing significant pressures on the availability of teachers in all fields. This is especially true for the enabling sciences.

**Sida has a Bilateral Agreement with Ethiopia**, including an agreement on the development of research and higher education at Addis Ababa University (AAU). However, Sida’s country strategy is currently under revision and indications are that it will focus on: (1) democracy and human rights; and (2) private sector development. While research activities may be overlaid, given this new focus and without further detail, it is hard to visualise this research including the basic programmes of mathematics, physics and chemistry. Cross-cutting issues such as gender, the environment and climate change will be integrated throughout.

Notwithstanding these points, it is clear that human resources with higher university degrees will be needed in private sector development and a better informed and educated community is a strong step towards better democracy and human rights. University graduates will contribute significantly to this over time.

AAU's vision statement<sup>33</sup> includes that "AAU aspires to be a pre-eminent African graduate education and research university.....". The AAU campus currently supports approximately 50,000 students of which 8,000 are Masters students and 1,250 are PhD students.

### **3. ISP in Ethiopia**

#### **3.1 Background**

ISP commenced supporting capacity building in research in Ethiopia in 1990 with a focus on the Addis Ababa University (AAU). By agreement with Sida, if both a bilateral agreement is in place and it includes research and education, then ISP will not provide direct support in that country. This is the case in Ethiopia and ISP wound down activities with the expectation that 2008 would be the last year of support. This did not, however, mean that all activities were completed by the end of 2008 and numerous research activities and post-graduate students were left unfunded into 2009 and 2010.

Bilateral activities of Sida in Ethiopia have recently included a substantial rural development programme (completed in 2010) and the funding of numerous small projects including some through the United Nations. The bilateral programme also includes support to the School of Pharmacy at AAU and ISP has been requested by Sida to coordinate this programme.

Currently a block grant totalling SEK 31 million per year is being provided to the AAU for the 2.5 year period mid-2009 to end of 2011. This grant is provided through the Office of the Vice President for Research and the Dean of the School of Graduate Studies, who administers and reports on the funds utilisation.

It is understood that the Departments of Chemistry, Physics and Mathematics expressed substantial concern that funds were not being provided from this Block Grant for the continuation of post-graduate training and related research expenditures and that these activities were at real risk of ceasing, with the resultant loss of substantial previous Sida investment. Consequently negotiations were held with ISP and an amount of SEK 2.4 million is being provided to ISP to support the ongoing studies and research activities. These funds are a part of the SEK 82 million commitment to AAU.

Hence ISP activities were re-commenced and are continuing until the end of 2011 under current arrangements (the current agreement between ISP and Sida will be completed at the end of 2011).

#### **3.2 Current ISP Activities in Ethiopia**

##### **3.2.1. ISP Core Programme Activities**

Core programme activities being implemented with ISP support ceased at the end of 2008 due to the commencement of the bilateral programme including research. Each of these activities then recommenced in early 2011, when agreement was

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<sup>33</sup> Addis Ababa University General Information booklet, March 2011

reached that ISP research activities could be implemented, despite there being a bilateral programme including research.

The research activities include:

#### **IPICS ETH-01: Synthesised Conjugated Polymers.**

*Initiated:* 2002

*Research Group:* Department of Chemistry, Addis Ababa University

*Research Group Leader:* Prof Wendimagegn Mammo

*Partner University:* Chalmers University of Technology, Sweden

*Objectives:*

1. To build capacity in chemistry of organic conjugated polymers and to synthesize stable, soluble and processable polymers with the potential to be used in organic solar cells, stable photodiodes, and other high technology devices;
2. To study the physical properties of synthesized polymers;
3. To train candidates at MSc and PhD levels; and
4. To establish strong linkages with electrochemists, theoretical physicists and device physicists in the Departments of Chemistry and physics at AAU, and ultimately establish a Materials Science Laboratory at the Faculty of Science, AAU.

#### **IPMS ETH-01: Capacity Building in Research and Graduate Education in Mathematics in Ethiopia.**

*Initiated:* 2005

*Research Group:* Department of Mathematics, Addis Ababa University

*Research Group Leader:* Dr Semu Mitiku

*Partner University:* Stockholm University

*Objectives:* To strengthen capacity in three different technical research areas:

#### **IPPS ETH-01: Synthesis and Device Characterisation of Organic Semiconductors.**

*Initiated:* 1990

*Research Group:* Department of Physics, Addis Ababa University

*Research Group Leader:* Mulugeta Bekele

*Partner University:* Linköping University, plus a number of other collaborating universities

*Objectives:* Studying the electrical and optical properties of stable polymers and organic molecules that could yield solar cells with high efficiency of 5% or more.

#### **IPPS ETH-02: Monitoring Seismic and Volcanic Activity in Ethiopia.**

*Initiated:* 2005

*Research Group:* Department of Geophysics and Astronomy, Addis Ababa University

*Research Group Leader:* Atalay Ayele

*Partner University:* A group of collaborating universities including Universities of Leeds and Bristol (UK) and Penn State University and University of Rochester (USA).

*Objectives:* Reliable monitoring of the volcano-tectonic activity in Afar and the main Ethiopian rift, using the national seismic station network as well as the temporary broadband seismic experiment.

### **3.2.2. Coordination of Sida Bilateral Programme Activities**

ISP coordinates Sida's bilateral support to the PhD training programmes in Pharmacy at AAU. The activity commenced in late 2005 after Sida/SAREC assisted AAU in identification of a suitable supervisor – Lars Bohlin at Uppsala University. Four PhD students commenced sandwich courses, with three of them being supervised through Uppsala, and one through a university in California. It was anticipated that the sandwich course would include 50% of the students' time at their supervising institution overseas and the remaining time at AAU furthering their studies and teaching. As at June 2011 it is expected that only one will remain in Ethiopia to provide the country with the benefits from Sida support.

### **3.3 Expenditure and Outputs**

Table E.1 below 1 sets out a summary of the expenditures and outputs of the ISP programme in Ethiopia in total and then by Research Activity. Ethiopia constitutes only between 5% and 8% of the total expenditure of ISP on research groups and networks.

While 57 MSc degrees have been awarded, which is a reasonable output for the number of students registered, the number of PhDs awarded is lower than expected at two. Interviews indicated there were a number of students well progressed, now that ISP support has recommenced and staff consider there will be a number of PhDs awarded in the next couple of years



**Table F.1: ISP Expenditure and Outputs in Ethiopia 2003 to 2010**

Expenditure and Output by Research Activity	Year of Expenditure and Output								TOTAL
	2003	2004	2005	2006	2007	2008	2009	2010	
<b>TOTAL ISP</b>									
<b>Expenditure (SEK '000, Research Groups and Networks)</b>	<b>18,774</b>	<b>21,840</b>	<b>26,640</b>	<b>16,951</b>	<b>20,229</b>	<b>18,584</b>	<b>19,365</b>	<b>14,730</b>	<b>157,113</b>
<b>TOTAL ISP IN ETHIOPIA</b>									
Expenditure (SEK '000)	632	614	1425	1070	1605	932	0	0	6,278
% of Total ISP Support	3.4%	2.8%	5.3%	6.3%	7.9%	5.0%			
Number of Master students	11	8	11	24	33	17			
Master degrees awarded	6	5	8	7	17	14			57
Number of PhD students	4	6	9	9	5	11			
PhDs awarded	0	0	0	2	0	0			2
No. published papers	4	6	14	36	14	16			90
<b>IPICS ETH:01 Synthesised Conjugated Polymers (Started 2002)</b>									
Expenditure (SEK '000)	127	102	488	371	481	421	0	0	1990
Number of Master students	1	0	0	6	6	7			
Master degrees awarded	0	1	0	0	6	7			14
Number of PhD students	0	1	1	1	1	3			
PhDs awarded	0	0	0	0	0	0			0
No. published papers	2	1	3	10	4	2			22
<b>IPMS ETH:01 Capacity Building in Research and Graduate Education in Mathematics in Ethiopia (Started 2005)</b>									
Expenditure (SEK '000)	0	0	341	209	339	266	0	0	1155
Number of Master students			2	2	2	1			
Master degrees awarded			2	0	2	0			4
Number of PhD students			2	2	2	2			
PhDs awarded			0	0	0	0			0
No. published papers			2	2	1	3			8
<b>IPPS ETH:01 Synthesis and Device Characterisation of Organic Semiconductors (Started 1990)</b>									
Expenditure (SEK '000)	505	512	497	490	651	213	0	0	2868
Number of Master students	10	8	8	12	21	7			
Master degrees awarded	6	4	6	7	8	7			38
Number of PhD students	4	5	6	5	2	6			
PhDs awarded	0	0	0	2	0	0			2
No. published papers	2	5	7	11	5	7			37
<b>IPPS ETH:02 Monitoring Seismic and Volcanic Activity in Ethiopia (Started 2005)</b>									
Expenditure (SEK '000)	0	0	99	0	134	32	0	0	265
Number of Master students			1	4	4	2			
Master degrees awarded			0	0	1	0			1
Number of PhD students			0	1	0	0			
PhDs awarded			0	0	0	0			0
No. published papers			2	13	4	4			23

### 3.4 Evaluation Findings

No clear programme logic (as expressed in a logical framework) has been established for ISP's activities overall. Hence an evaluation of ISP's activities in Ethiopia can only be undertaken at a rudimentary level, with broad assumptions in place. These include the overall objectives and component objectives that were suggested in early 2010 as follows:

#### Overall Objective of ISP:

*To increase the contribution of researchers in enabling sciences in developing countries to the fight against poverty.*

#### Component Objectives:

1. To increase the capacity to plan research, and the production of research, in enabling sciences in developing countries and regions;
2. To facilitate an increased use of research training and research results relevant to the fight against poverty in developing countries; and
3. For the supported research group/network, to attract sufficient financial support, other than from ISP, to ensure long-term stability.

### 3.5 Relevance

The substantial growth in undergraduate student numbers drives a high demand for university teaching staff. The main source of these staff are the graduated PhD students, though some indications are that MSc graduates are also filling the gaps.

In addition, the large number of newly established universities and those planned for the near future is creating a high demand for teaching staff.

Furthermore, the current 70:30 government policy adds emphasis to the need for teaching in enabling sciences at universities in Ethiopia.

However, Sida's priorities in Ethiopia appear to be in areas other than higher education and the sciences, with a new country strategy being developed now and said to be focusing on (1) democracy and human rights; as well as (2) private sector development. While this Country Strategy is still in preparation, it remains to be seen whether capacity building in the enabling sciences will receive some attention at a country programme level (ie. under the bilateral programme) or whether it will be left to a regional strategy and therefore to ISP or similar programme.

ISP core activities in the research and training fields would not normally be operating in a country in which Sida has a bilateral programme including research. In Ethiopia's case, a block grant is being provided by Sida to AAU. It is understood that the Departments of Physics, Chemistry and Mathematics felt none of these funds were reaching them to enable continuation of the activities initiated under ISP prior to December 2008. As a result, it is understood that these departments put a case to the university and subsequently to Sida, that ISP support be restored to enable existing commitments to be met. This was agreed and ISP support was re-started in early 2011. However, the umbrella agreement between ISP and Sida will be completed at the end of 2011 and further plans will need to have been prepared and agreed before that time.

### 3.6 Impact

The ability to provide impact assessment of ISP in Ethiopia suffers from (a) the lack of any clear and agreed structure to the programme as would be provided by a logical framework; (b) the lack of a baseline assessment of the situation at some previous point of time (c) the absence of a counterfactual or control group to assess what might have happened in the absence of ISP support.. As such impact assessment can only be impressionistic and based on lower level outputs, with the assumptions that these will contribute to desirable impact.

The most important factor driving the potential impact of the programme in Ethiopia is the potential loss of graduates to OECD countries. The School of Pharmacy at AAU reports that of four Ph D candidates:

- The first candidate asked for substantial additional time in Sweden per year (9 to 10 months). AAU could not agree as the individual was needed for lecturing obligations. The student left, is now married and in the USA.
- The second candidate visited the USA to attend a conference and never returned.
- The third candidate attained a PhD and published 4 papers and was offered a post-doctoral position by his supervisor in California.
- The fourth candidate is expected to complete her PhD in December 2011.

The School of Pharmacy advises that losses such as these are common and in another German funded programme only one student out of 12 returned to work in Ethiopia. This means that the German funded programme is, in effect, subsidising the expansion of human capital in the USA and other OECD countries, rather than Ethiopia.

While positive in its recognition of the quality of trained personnel, this is a major "brain drain" for Ethiopia and substantively undermines the effectiveness, efficiency, and sustainability of the programme to Ethiopia.

### 3.7 Effectiveness

ISP support to AAU has resulted in the training of 57 students to MSc level and 2 students to PhD level over the 2003 to 2010 period. The majority of these students aspire to undertake lecturing and research at university, as evidenced by the recent student survey undertaken for this evaluation and interviews during the visit to AAU. This supports the government's policy of increasing enrolments in science and technology compared to social sciences to a ratio of 70:30.

*The Departments of Mathematics, Physics and Chemistry at AAU are better able to plan and manage research as a result of the interventions provided by ISP.*

- Reference Group members report an increase over time in the quality of proposals being submitted for research activities. A number mention an increasing ability to attract research funds from other sources.
- To a substantial degree, research groups are given the ability to manage their portfolio of activities on a day-to-day basis, with reference back to ISP only when external (to the country) action and funds are required.
- ISP has facilitated an increased use of research training and research results relevant to the fight against poverty in developing countries.

- Provision of equipment and training under IPPS ETH-02: Monitoring Seismic and Volcanic Activity in Ethiopia is allowing development of the only group within Ethiopia with the knowledge and equipment to monitor and research potential major disasters. The Ethiopian Government relies on this group for all its data and advice.
- ISP does not track the use of research training and research results.
- The ISP supported research groups and networks are increasingly able to attract financial support.
- Research proposal quality is reported to be increasing over time, though at individual research group level there may be some variability.
- Records in the ISP Annual Report reflect the fact that other funding is being attracted to the various research groups.
- The increase in the ability to attract other funds as a result of ISP support is only based upon interviews and survey results and cannot be adequately assessed with current information and lack of baseline data.

The ISP procedures provide encouragement for the participation of females in the sciences and through interviews with ISP staff and research group leaders in Ethiopia, we are confident that there is personal encouragement where relevant. There are some gains to be reported, but the overall situation is as follows.

The Department of Mathematics advises that 30% of its staff are female. However, of 105 undergraduate students to complete their studies in 2011, only two are female. This low participation in mathematics is a constant problem, but is not unique to Ethiopia. In contrast there are 30% females in the current undergraduate group in chemistry and interviewees were unsure of the reason for this relatively high figure. They advise that they have not had a female PhD candidate since 1984.

Despite these achievements in increasing the number of females participating, interviewees claim the basic constraints to equal participation still exist and the top two are:

- a. A shortage of females graduating from high schools and available and interested in higher level education; and
- b. A preference by female students for courses in the social sciences, languages and biological fields.

### **3.8 Efficiency**

The numbers of Masters degrees awarded compared to numbers enrolled in masters studies appears a reasonable outcome. However, the number of PhDs awarded compared to the number of students enrolled indicates a very poor result. More specifically .....*Allan/ Lawrence, I think we have to substantiate that claim with some numbers.* Documentation does not provide an explanation for how or why this is happening.. In-country interviews indicated that there may be a number of students complete their PhD studies in the near future, but no detailed analysis of this situation has been possible to confirm these claims.

Costs incurred by ISP for overseas tuition (bench fees) are significantly below costs under fellowship based programmes. This is because of ISP's approach to

negotiating rates, their understanding of the costs and the “market” and their close support of the students.

Over the 2003 to 2008 period, ISP expenditure has been almost SEK 6.3 million. This has been expended on four research groups and participation in two networks as well as the outputs of two PhDs and 57 MSc degrees.

On a day-to-day basis, staff and students interviewed considered ISP was run efficiently and no substantive suggestion for improvement was identified.

Observations indicated that the staff of ISP transferred as much of the planning, preparation and management responsibilities to the respective research groups and networks, thus focussing their time on the more strategic tasks of oversight, support and mentoring. This approach not only assists in efficiency, but is crucial to ensuring ownership of the activities and responsibilities.

Beneficial results of education in the enabling sciences is long term and often difficult to measure its direct contribution.

### **3.9 Sustainability**

Interviews indicated a poor level of support from AAU at the higher levels (above Department level). This has been demonstrated during the 2009 – 2010 period when ISP activities had ceased and no funds were provided from within the block grant to AAU to support the ongoing research activities and training that were commenced earlier under ISP.

ISP’s approach of commencing both research activities and post-graduate training without the assurance of long term funding is a concern, but recipients in AAU do not appear aware of the issue and assume funding will continue.

In an effort to increase the participation of females, AAU is providing 100 scholarships per year and the science departments report that there are additional support mechanisms being provided as well.

#### **School of Pharmacy**

Plans for the future to overcome this “brain-drain” are to confer PhDs from AAU only and have the students largely work from their AAU base. A target of 20 PhDs is set for the next 3 years.



Annex G  
Draft Logical Framework





### **Draft (22 June 2011) Logframe overview of the International Science Programme (ISP) for the Period 2012 – 2015**

The following material has been drafted by ISP during the evaluation mission and using the evaluators as advisors on the process and logical framework structure. It is recommended that it be further developed in participatory workshops and incorporating an agreed approach as a result of discussions with Sida. This should be undertaken as an iterative and highly participatory process, facilitated by an external advisor.

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The overall objective of the Swedish research support *is to strengthen and develop research of relevance to the fight against poverty in developing countries.*<sup>34</sup> In order to achieve the overall objective under Sweden's development research policy, Sida is to focus on three specific areas:

1. Research capacity building in developing countries and regions
2. Research of relevance to developing countries
3. Swedish research of relevance to developing countries

The ISP support to increased capacity for research and higher education using Sida funding falls mainly within the first two of the specific areas, the objectives of which are: 1) *Partner countries and regional research actors are better able to plan, produce and use research in the fight against poverty*; and 2) *Increased production of research relevant to the fight against poverty in developing countries*, respectively

To achieve these objectives, there is a need to increase the capacity of research in the basic sciences, and to produce research in basic sciences relevant to the fight against poverty. Basic sciences are of fundamental importance in this respect, and ISP has the mandate to support activities to develop capacity in chemistry, mathematics, and physics. An increased domestic capacity for research and higher education in basic sciences has a long-term impact on economic growth and poverty alleviation, driven by an increasingly knowledge-based society. A country's domestic competence in basic sciences is crucial for:

- an increased quality of education, at all levels;
- the development of scientific, critical thinking based on reproducible evidence;
- the development of applied sciences to meet local needs;
- the development of technology, innovation, and engineering on a local ownership basis;
- the adoption of a sustainable use of natural resources;
- the engagement in business and global trade at a level of knowledge which matches global partners, industry and investors; and
- the development of scientific excellence on own terms.

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<sup>34</sup> Research for development. POLICY FOR RESEARCH IN SWEDISH DEVELOPMENT COOPERATION 2010 – 2014 AND STRATEGY FOR SIDA'S SUPPORT FOR RESEARCH COOPERATION 2010 – 2014. The Department for Development Policy and the MFA Information Service, Government Offices of Sweden, UD 10.016.

**ISP logframe table.**

**Overall objective:** To increase the production and use of results relevant for the fight against poverty by researchers in the basic sciences in developing countries

Outputs by supported activities	Activities by ISP	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy (method/who/when)	Assumptions
<b>Specific Objective 1: To increase the capacity to plan and carry out research in the field of basic sciences in developing countries and regions.</b>						
Submission of quality research proposals	a) Provide a robust selection and feedback process with regard to applications to ISP b) Provide guidelines, training and mentoring for grant application	Increased funding for research	Amount of funding granted	Annual activity reporting to ISP	Compilation of activity reporting by supported activities to ISP Annual Report	a) Research funding is available b) Quality of application will effect level of funding
Research activities to meet the needs as expressed in granted proposals	a) Provide opportunities for scientific collaboration and training b) Assist in obtaining technical means for carrying out research	a) Scientific collaboration is increased; the number of scientifically trained researchers and university staff is increased b) Improved technical resources for carrying out research	a) Extent of collaboration, and number of staff trained at higher levels b) Acquisition of technical resources needed	Annual activity reporting to ISP	Compilation of activity reporting to ISP Annual Report	a) Suitable collaborators are available, and staff is available for training  b) Technical resources can be obtained and used locally
Capacity to manage research grants	Provide means and templates for accounting and reporting. Set up MoUs with supported institutions.	Funding is well managed, used and reported, scientifically and economically	Fulfillment of budget, transparency and correctness of local account, completeness of scientific reporting	Annual activity reporting to ISP, audit reports (if applicable)	Compilation of activity reporting to ISP Annual Report, review of submitted audit reports	Willingness to take the necessary responsibility

Outputs by supported activities	Activities by ISP	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy (method/who/when)	Assumptions
<b>Specific Objective 2: To increase the production of high quality research results in basic sciences in developing countries.</b>						
Opportunities for post graduate training	Funding, coordination, and mentoring, including activities to fulfill Specific Objective 1	Increased production and quality of Master and PhD theses	<ul style="list-style-type: none"> <li>a) Numbers of Master and PhD graduations</li> <li>b) Qualifications of PhD external examiners engaged</li> <li>c) Scientific publication of theses results</li> <li>d) Professional development of graduates</li> </ul>	<ul style="list-style-type: none"> <li>a,b) Annual activity reporting to ISP</li> <li>c,d) Earlier annual activity reports to ISP, and records with supported activities</li> </ul>	<ul style="list-style-type: none"> <li>a,b) Compilation of activity reporting to ISP Annual Report</li> <li>c,d) Longer term follow-up by ISP</li> </ul>	<ul style="list-style-type: none"> <li>a,b) Students are available for training</li> <li>c,d) Longer term data is accessible</li> </ul>
Documentation of scientific results, writing manuscripts, and submission of contributions to scientific journals and conferences.	Funding, coordination, and mentoring, including activities to fulfill Specific Objective 1	Increased dissemination of scientific results, and increased quality of dissemination	<ul style="list-style-type: none"> <li>a) Number of scientific publications, and share of publications in high quality journals</li> <li>b) Number of scientific conference contributions, and international share</li> <li>c) Number of citations of scientific articles published</li> </ul>	<ul style="list-style-type: none"> <li>a,b) Annual activity reporting to ISP</li> <li>c) Earlier years' annual activity reports to ISP</li> </ul>	<ul style="list-style-type: none"> <li>a,b) Compilation of activity reporting to ISP Annual Report</li> <li>c) Longer term follow-up by ISP</li> </ul>	<ul style="list-style-type: none"> <li>a,b) Fora are available for disseminating results</li> <li>c) Results are published in journals indexed for citations</li> </ul>
Further developing scientific production after ISP support has been phased out	Use of previously supported activities as resources for currently supported activities	Continued increase in the production of high quality research results	(as listed above under this Specific Objective)	Records at previously supported activities	Follow-up of previously supported activities by ISP at regular intervals	Contact with previously supported activities can be maintained.

Outputs by supported activities	Activities by ISP	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy (method/who/when)	Assumptions
<b>Specific Objective 3: To increase the application of research results in basic sciences useful for the fight against poverty in developing countries.</b>						
Making research results available to society	Funding, coordination, and mentoring, including activities to fulfill Specific Objective 1	a) Increased exposure of research results in public media  b) Increased exposure of research results to government and industry	Number and nature of outreach activities	Annual activity reporting to ISP	Compilation of activity reporting to ISP Annual Report	Results are of public interest
Providing applicable research results and engaging in activities contributing to development of applications	Funding, coordination, and mentoring, including activities to fulfill Specific Objective 1	Increased use of research results by society, leading to poverty mitigation	Number of recorded instances of relevant use and application of research	Annual activity reporting to ISP	Compilation of activity reporting to ISP Annual Report	Outreach activities will generate interest with stakeholders
Graduating skilled PhD and Master students	Funding, coordination, and mentoring, including activities to fulfill Specific Objective 1	Graduated group members being recruited to positions where they contributing to societal development	Number of staff trained that leave for relevant positions outside the supported activity	a) Annual activity reporting to ISP  b) Records with supported activities	a) Compilation of activity reporting to ISP Annual Report b) Longer term follow-up by ISP	Training contributes to successful competition for relevant positions by staff of ISP-supported activities

Annex H  
Research Groups and Networks  
Phased Out



## Research Groups and Networks Phased Out 2003 -2009

(All progressed to not requiring ISP support)

Code/Accronym	Category	Field	Location	Start year	Final year
IPICS MOLCAS	NW	Biochemistry	Interregional	1999	2008
IPICS BAN:01	RG	Natural products chemistry	Bangladesh	1977	2004
IPICS BAN:03	RG	Medicinal chemistry	Bangladesh	1995	2008
IPICS CAM:01	RG	Biochemistry	Cameroon	1988	2008
IPICS CAM:02	RG	Natural products chemistry	Cameroon	1991	2008
IPICS COL:01	RG	Biochemistry	Colombia	1987	2004
IPICS COL:03	RG	Food chemistry	Colombia	1992	2004
IPPS COL:01	RG	Materials science	Colombia	1976	2004
IPPS COL:02	RG	Materials science	Colombia	1985	2005
IPICS ECU:01	RG	Food chemistry	Ecuador	1984	2007
IPPS ECU:01	RG	Materials science	Ecuador	1992	2006
IPMS IMS	RG	Mathematical sciences	Ghana	2002	2010
IPPS GHA:01	RG	Laser spectroscopy	Ghana	2005	2010
IPICS LANFOOD	NW	Food Chemistry	Latin Am.	1994	2007
IPICS LATSOBIO	NW	Biochemistry	Latin Am.	2003	2007
IPICS SSN	NW	Biochemistry	Latin Am.	1994	2006
IPICS NIG:01	RG	Natural products chemistry	Nigeria	1977	2004
IPICS NIG:02	RG	Food chemistry	Nigeria	2002	2005
IPPS NIG:01	RG	Geophysics	Nigeria	1984	2010
IPPS NIG:02	RG	Meteorology	Nigeria	1997	2009
IPICS PER:01	RG	Materials chemistry	Peru	2002	2006
IPICS PER:02	RG	Chemical ecology	Peru	2003	2007
IPPS PER:01	RG	Materials science	Peru	1983	2009
IPPS PER:02	RG	Materials science	Peru	1982	2006
IPPS SEN:01	RG	Laser spectroscopy	Senegal	2005	2010
IPICS SRI:03	RG	Crop protection	Sri Lanka	1981	2003
IPICS SRI:04	RG	Biotechnology	Sri Lanka	1985	2004
IPICS SRI:07	RG	Food chemistry	Sri Lanka	1995	2009
IPPS SRI:01/1	RG	Atmospheric physics	Sri Lanka	1978	2010
IPPS SRI:01/2	RG	Mass Spectroscopy	Sri Lanka	1981	2010
IPPS SRI:01/3	RG	Instrumental development	Sri Lanka	2005	2010
IPPS SRI:02	RG	Materials science	Sri Lanka	1984	2010
IPICS TAN:01	RG	Biochemistry	Tanzania	1981	2005
IPPS THA:03	RG	Materials science	Thailand	1982	2004
IPPS THA:04	RG	Geophysics	Thailand	1987	2007
IPICS URU:01	RG	Biochemistry	Uruguay	1978	2005
IPICS URU:02	RG	Biotechnology	Uruguay	1974	2003





Annex I  
Examples of Anecdotal Evidence  
Demonstrating Outcomes



### Examples of Anecdotal Evidence Demonstrating Outcomes

The following provides some examples of anecdotes identified during the evaluation, of both intended and unintended positive impacts as a result of ISP support.

#### Environmental protection in Kenya

The ISP supported group managed and directed a two month study of Nairobi traffic emissions under the project Nairobi Traffic Contribution to Air Pollution, on behalf of the Centre for Sustainable Urban Development, Columbia University, New York, and in collaboration with the Jomo Kenyatta University of Agricultural Technology.

ISP researchers also supported the screening and mapping of nutraceutically dense biodiversity on women smaller holder farms. Source: (Uppsala University, 2009)

#### Analysis of pesticides in food and water in Asia

In Bangladesh, ISP supported research groups assessed the levels of DDT and other chemicals in poultry and fish, and residues in tomato and tea also identified. ISP supported activities collaborate closely with the Bangladesh Agricultural Research Institute, the Bangladesh Rice Research Institute, and the Bangladesh Tea Research Institute.

In Laos, ISP supported research analysed the occurrence of pesticides in drinking water, vegetables, and fruits in the capital, Vientiane. The research group is now in dialogue with the Water Resources and Environment Agency; the Ministry of Industry and Trade; has contributed to Environmental Impact Assessments studies for several projects in Laos, and has recently shared its findings on pesticides in water and food at the 11<sup>th</sup> ASEAN Food Conference. Source: (Uppsala University, 2009)

#### Liquid Nitrogen Production

ISP Supported University: Addis Ababa University, Ethiopia

Addis Ababa University had been provided with equipment to make their own liquid nitrogen some years ago using donor funding. However, it was with ISP support that reliable power back-up systems were provided to the various sets of equipment in the Department of Chemistry, including this unit and ideas were generated to possibly produce nitrogen on a commercial basis.

Now the Department of Chemistry produces and sells liquid nitrogen on a commercial basis earning approx. 200,000 Birr (SEK 75,000) per year in income.

#### Network of Instrument Technical personnel and User scientists of Bangladesh: NITUB

Launched in 1994, the ISP-supported network NITUB provides a range of services that overcome the problems of acquiring, maintaining and using scientific instruments in countries that do not have strong vendor/supplier support. NITUB provides training, repair, spare parts, and a manufacturing capability for researchers in Bangladesh, Nepal, Myanmar and Bhutan with extensions being considered to Laos and Cambodia.

NITIB trains approximately 50 technical experts each year, and repairs approximately 100 instruments valued at over \$US2M.

### **Access to Research Literature through Discovery and Open Licences.**

The UK based organisation International Network for the Availability of Scientific Publications (INASP) is supported by a number of development agencies including Sida and IFS. With a global reach, INASP supports research sector capacity building by strengthening the production, access and dissemination of information and knowledge.

ISP has amplified the value of INASP by supporting travel by Anders Wandahl (Karolinska Institute) to provide training workshops for PhD research students in focus country Mozambique and elsewhere.

### **Pan-African Centre for Mathematics**

The Pan-Africa Centre for Mathematics is a collaborative project between the University of Dar-es-Salaam and Stockholm University. The Centre aims to support the African Union strategy of intensifying scientific and technological development by establishing a Pan-African programme that awards the degrees of Stockholm University through Dar-es-Salaam as the autonomous host university.

The ISP Board has agreed to administer the programme, and in doing so to provide the benefit of ISP experience in this innovative approach to research development cooperation.

Annex J  
List of References



## List of References

- Berwick. (2003). Disseminating Innovations In Health Care. Journal of American Medical Association Vol 289 Number 15,
- Bloom Canning and Chan. (2005). Higher Education and Economic Development In Africa. Harvard University.
- Edqvist, O. Abegaz, B. Sing, L. and Noller, B (1994) The International Science Programmes of Uppsala University – An Evaluation Report.
- Embassy of Sweden (2011) The lake Victoria initiative – Ten years of Sweden-EAC Partnership
- Gibson, J and McKenzie, D. () The economic consequences of “brain drain” of the best and brightest: microeconomic evidence from five countries, World Bank Policy Research Paper WPS 5394, <http://ideas.repec.org/p/wbk/wbrwps/5394.html> (retrieved 17 July 2011)
- Government of Sweden (2008). Sweden's Policy for Global Development. Government Communication 2007/08:89.
- Government of Sweden (2009). Research for Development: Policy for Research in Swedish Development Cooperation 2010-2014 and Strategy for SIDA's Support For Research Cooperation 2010-2014.
- Government Offices of Sweden (2010) Research Shapes the Future, <http://www.sweden.gov.se/sb/d/574/a/155332> (retrieved 17 July 2011)
- Government of Sweden, Swedish Development Cooperation: This Is How It Works  
Government of Sweden *Strategy for Development Cooperation with Kenya January 2009-December 2013*
- Government of the Republic of Kenya. (2007) Vision 2030 The Popular Version
- Griffiths, P (2008) Losing Faculties, Nature 456, 9-11.
- Harris, E. (2004) Building scientific capacity in developing countries, EMBO Reports, 5(1), 7-11
- Hasselgren and Nilsson. (1990). Reflections on the Role of Basic Sciences in Third World Countries.
- International Science Programme, (2003) Research Cooperation with Developing Countries, Strategy Plan 2003 - 2007
- International Science Programme, Uppsala University. (2011). Draft Application for ISP Grants 2012 - 2014 for Research Groups and Scientific Networks - Information for Applicants
- Karunanayake, E. Two Decades of Capacity Building in Molecular Life Sciences in Sri Lanka: A Personal Account
- LSE Public Policy Group (2011) Maximising the impacts of your research: A handbook for social scientists, <http://blogs.lse.ac.uk/impactofsocialsciences/the-handbook/> (retrieved 19 July 2011)
- Obwona and Ssewanyana. (2007). Development Impact of Higher Education in Africa: The Case of Uganda.
- Schultz P. (2003). Evidence of Returns To Schooling in Africa From Household Surveys: Monitoring and Restructuring the Market for Education. Economic Growth Center Yale University.
- Sida (2006) Eduards. K, Review of Sida's Research Cooperation – Synthesis Report. Sida Evaluation 06/57.

Sida (2006). Boeren, A. Aleberts, T. Aveteg, T. Thilstrup, E. and Trojer, L. Sida/SAREC Bilateral Research Cooperation: Lessons Learned. Sida Evaluation 06/17

Sida (2007) Mouton, J. Fagerström, T. Louw, A. Tusubira, F. and Volmink, J. The Swedish Research cooperation with Ethiopia. Sida Evaluation 07/36

Sida (2008) Are Sida evaluations good enough? Sida Studies in Evaluation, 2008:1

Sundin and Aduda. (2009). The Role of Science in Development and Poverty Alleviation. In Proceedings of the International Conference on Regional and Interregional Cooperation to Strengthen Basic Sciences in Developing Countries. Uppsala University.

The Economist (2000) *Pocket Economist*

Thulstrup. (1998). How Training In The Basic Sciences Affects The Development Process.

Uppsala University. (2009). ISP Annual Report 2009.

Uppsala University. (2008). ISP Annual Report 2008.

Uppsala University. (2007). ISP Annual Report 2007.

Uppsala University. (2006). ISP Annual Report 2006.

Uppsala University. (2005). ISP Annual Report 2005.

Uppsala University. (2004). ISP Annual Report 2004.

Uppsala University. (2003). ISP Annual Report 2003.

Uppsala University and Sida, (1995) Declaration and Recommendations for Action: International Conference on Donor Support to Development-Oriented Research in the Basic Sciences, 15 – 16 June 1995, Uppsala, Sweden

Uppsala University. (2010). Action Plan for Internationalisation at Uppsala University 2010-2012.

Uppsala University, (2011). Proceedings of the International Conference on Regional and Interregional Cooperation to Strengthen Basic Sciences in Developing Countries. Editor: Christer Kiselman

World Bank. (2009). Accelerating Catch-Up: Tertiary Education for Growth in Sub Saharan Africa.

World Bank. (2010). Financing Higher Education in Africa.

World Bank and IMF. (2010). Global Monitoring Report 2011: Improving the Odds of Achieving the MDGs.

World Bank. (1998). World Development Report: Knowledge for Development.

World Bank. (2009). Accelerating Catch-Up: Tertiary Education for Growth in Sub Saharan Africa.

[www.oecd.dac.org/evaluationnetwork](http://www.oecd.dac.org/evaluationnetwork)



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The opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the time of visits to Sida and Uppsala University in May 2011 as well as to Kenya and Ethiopia in May – June 2011. GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with those opinions, conclusions and any recommendations.

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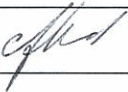
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