2018:18 Sida Decentralised Evaluation

Adam Pain
Trish Silkin
Gonçalo Carneiro

Evaluation of the Sida supported programme "International Science Programme 2014–2018"

Final Report

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Gonçalo Carneiro

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Authors: Adam Pain, Trish Silkin and Gonçalo Carneiro

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SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

Address: SE-105 25 Stockholm, Sweden. Office: Valhallavägen 199, Stockholm
Telephone: +46 (0)8-698 50 00. Telefax: +46 (0)8-20 88 64
E-mail: info@sida.se. Homepage: http://www.sida.se

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Abbreviations and Acronyms

ACE	African Centres of Excellence
ARUA	African Research Universities Alliance
AAU	Addis Ababa University
DAC	Development Assistance Committee
EQ	Evaluation Question
IPICS	International Programme in the Chemical Sciences
IPMS	International Programme in the Mathematical Sciences
IPPS	International Programme in the Physical Sciences
ISP	International Science Programme
RBM	Results Based Management
RG	Research Group
RUPP	Royal University of Phnom Penh
SN	Scientific Network
SEK	Swedish Kroner
Sida	Swedish International Development Cooperation Agency
SO	Specific Objective
ToC	Theory of Change
ToR	Terms of Reference

Executive Summary

The International Science Programme (ISP) at Uppsala University provides long-term funding to the development of research capacities in low income countries in Chemistry, Mathematics and Physics. It focuses on supporting research groups (RGs) and scientific networks (SNs) the majority of which are working in defined applied science problem areas within the basic sciences. These groups and networks in turn collaborate with better resourced scientific teams and individuals either within or outside their own region. A focus on capacity development, long-term support, improved research environments, collaborative links, exchange activities and a sandwich model of PhD training have characterised the programme. In 2017 ISP supported 40 RGs and 19 SNs in 12 countries, nine of which are Sida focus countries. Sida has been the main funder of ISP's core programme since 1965, providing about 162 MSEK (80% of its overall budget) for the 2014-2018 programme period.

The stated aims of the 2014-2018 ISP, which is the subject of this evaluation, align with Sida's interests in promoting the role of scientific knowledge for addressing development challenges and contributing to social and economic development. Three specific objectives (SOs) structure the ISP and are concerned with (a) improved organisation, conditions for and planning of research and training, (b) greater production of high quality research outputs and (c) increased relevance and use of trained graduates and research results for society. The ISP fulfils a direct, facilitating and promotive role in supporting scientific activities in its partner research groups and university departments.

Based on a review of the programme and its activities, this evaluation takes stock of the results achieved and aims to provide new thinking on the future development of the ISP. This will contribute to Sida's assessment of its support to a possible new phase of the programme and also provide input into the ISP learning on how the programme implementation may be developed in a new phase. Although focused on the 2014-2018 period, the evaluation has taken into account the historical development of the ISP. The primary users of the evaluation are the Unit for Research Cooperation within Sida and the management team of the ISP.

The evaluation took place between February and June 2017. The evaluation methods followed the approach developed in the inception report. It was participatory and implemented according to a Theory-Based Evaluation model. It was guided by using a reconstructed Theory of Change for the 2014-2018 programme period. Data was collected from documentary analysis, analysis of ISP monitoring information, interviews with the ISP management team, field visits to two country programmes in

Ethiopia and Cambodia. Data was also collected in three secondary case study countries (Bangladesh, Burkina Faso and Uganda) through telephone and skype interviews with RG and SN leaders and document review.

ISPs capacity development activities have primarily focused on the capabilities of RGs and SNs to generate results and it has not generally addressed other necessary capabilities to support the development and sustainability of good research environments in the partner universities. The changing landscape in higher education, particularly in Africa with new partnerships and networks in support of science and technology development, will place demands on the ISP model to more clearly position itself in the future. Moreover while ISP's strategy emphasises both the principled and instrumental reasons to support the basic sciences, the limited reach of its capacity development interventions are justified more by the public good argument to support such research than its broader societal relevance in terms of development and poverty reduction.

The ISP programme has considerable strengths and all those who have benefited from its support speak to how responsive it has been to their needs and priorities, its supportive and participatory approach and its long-term flexible funding. Its support through funding for skill development, equipment provision, consumables, as well as ability to facilitate international research collaboration and exposure has done much to bring its grantees[1] into a wider community of research. Its pragmatic approach to problems and issues has been effective. Much of the research that has been supported has clear relevance to country-specific development needs and where the application is less clear, the research has been of intrinsic merit. In this sense ISP has contributed significantly to the public good in its domain of activities.

ISP management has done much to bring in routines and systems in order to bring coherence to the programme, and this started before the 2014-2018 period. However it has been working to a results framework that is not coherent and not helpful to formal programme learning and reporting. Data is collected for compliance purposes and limited analysis of it has been undertaken. Formal learning from monitoring of change processes has not been systematic. At the heart of the challenge is a disconnect between what ISP actually does in relation to capacity development and its monitoring framework, which gives insufficient attention to the chronology of the development of those capacities it is engaged with and to what its activities can and cannot deliver with respect to the development of capabilities. We also sense this, combined with ISP's long term funding and commitment to RGs and SNs, may have trapped these groups into forms of financial dependency on ISP. ISP has no mandate or means to build the capacities of the institutions where the RGs and SNs are located

[1] The term grantee is applied to both individuals and RGs and SNs.

and since many of these institutions suffer severe capacity constraints and the RGs and SNs are financially dependent on ISP, they do not progress to independence.

Relevance

There is no question that ISP's support to the development of research capacity has been broadly relevant and aligned with Swedish policies for research in development cooperation. However while all the recipients interviewed see the ISP support as being highly relevant to the development of their scientific research capacity, ISP does not have specific objectives or an over-arching strategy for developing scientific research capacity. In many cases it is evident that much of the research is very relevant to local development challenges. But the picture is uneven as the ISP's concern to see RGs engaging in outreach is not reflected consistently in the assessments and there does not always appear to be consistent follow-up where doubts are raised about the relevance of research to national development challenges.

Effectiveness

The 2011 evaluation of ISP recommended changes in the governance of the ISP programme. Although the Board membership has been diversified during the current programme period, the ISP Board would benefit from broadening its skills sets even further. The recommendation on the membership and selection of members of Reference Groups which guide the RGs and SNs has been addressed but performance management of the Reference Groups remains underdeveloped. Further the Reference Groups are not playing a sufficient and systematic role in evaluating progress reports and outcomes and evaluating new research proposals. While there have been changes in the invitation and selection of RGs, the weaning of RGs or SNs off ISP funding has not happened in a systematic way.

The logical framework developed by ISP has not provided a coherent approach to relate activities and outputs to higher level outcomes. Monitoring has focussed primarily at a lower level of the results chain. While a considerable volume of data has been collected it has not provided a basis of learning or a tool for management of the programme. The aggregation of data across all RGs and SNs and the presentation of averages in annual reports has limited use for learning about the chronology of development of specific RGs and SNs over time. While the contribution of ISP to the improvement of scientific research facilities and technical resources has been a core strength of the ISP the absence of relevant data means that it is not possible to assess whether capacities to formulate research problems or improve research proposals have changed. Nor is there systematic evidence of changing capacities to attract external research funding. ISP's monitoring has not addressed developments in research leadership.

In sum there is no coherence between how ISP carries out capacity development in practice and what is contained in its strategy and results framework for capacity development. This leads to a lack of clarity about capacity development objectives and the processes that ISP uses to achieve them. ISP does not specify what the

capacity gaps are for each RG or SN, or establish baselines of capacity at the time that funding starts to a RG or SN, or set out specific strategies that will be used to address these. Its monitoring data, both because the indicators poorly address the development of capacities and because ISP averages its metrics across the total population of its grantees offer no systematic understanding of ISP's contribution to enhanced research capacity.

Impact

The ISP's strategic objective 3 (Increased use by society of research results and of graduates in development) is set at too high a level to be achievable, since ISP has little or no influence over whether and how research results are disseminated or taken up by the public or private sectors. The related logframe indicators – which list examples of uptake – are an inadequate measure of any contribution that the ISP may have made to the achievement of this objective. Simply enumerating examples of results in this way does not provide evidence that they can be attributed to the ISP. A degree of attribution to ISP can be assumed where there has been uptake of outputs from research that ISP funding made possible and there are some persuasive cases where ISP support has clearly contributed to such outcomes. But the effects of the ISP support on the policy level are too far removed from ISP's actual operations and sphere of influence to be meaningfully measured.

Gender

Annual ISP reporting includes some basic gender-disaggregated data i.e. on the number of men and women in PhD and MSc student cohorts. In line with most global trends, these show low rates of participation by women, and they generally indicate no significant changes in the gender balance in RGs and SNs since 2014. On the whole, chemistry RGs and SNs have higher proportions of women than either physics or mathematics. Findings from the evaluation did not clarify the reasons for this. The very different contexts in which RGs and SNs are located mean that cultural norms alone cannot explain the small number of female postgraduates in science. Other country- and institution-specific factors need to be considered. In its 2013-2017 strategic plan, ISP committed to initiating a focused approach to promoting gender equality in its PhD and MSc intakes and a Gender Equality Working Group was accordingly set up. A number of initiatives have resulted including a grants programme to promote gender equity that started in 2017. Initial results from this look promising but it is still too early to reach a full assessment of its impact.

Environment

The ISP collects information in its activity reports on whether RGs and SN have implemented any of the 9 measures listed to reduce or avoid negative natural environmental impact. However the data is not complete and its current organisation did not allow time for group and network based analyses. Moreover the scoring approach on predefined issues might speak to some of the environmental issues faced by individual RGs but not necessarily all of them. They tell us little about the environmental impacts of activities of ISP-supported research.

Sustainability

With respect to the sustainability of RGs and SNs, the analysis of financial data made available to the evaluation for the period 2014-2016 shows that most RGs and SNs remain highly dependent on ISP. The sixteen RGs/SNs that have received ISP support for 20 years or more had funding levels that varied between 32 percent and 100 percent with a median of 79 percent. Similarly, funding levels to groups and networks in the case study countries ranged between 13 percent and 100 percent, with most lying between 60 percent and 80 percent. The prospects for financial sustainability of most ISP-supported groups and networks therefore appear poor.

For the ISP as a whole few if any donors are prepared to focus on capacity development processes and give the time for it that Sida has been willing to do. The chances of getting significant complementary funding for ISP given its current mode of operation and weaknesses in the performance monitoring are also slight. ISP has not communicated well on what it has done and a more articulated and managed process that could speak more convincingly to external actors of the strengths of the ISP approach and achievements might be more likely to find co-funding. There are actions that ISP could take in the design and development of its programme that could make it more attractive to complementary funding.

Recommendations

ISP's strengths can be leveraged in new ways and there is a future role for ISP. It offers a modality of working in capacity development support that is all too rare in allowing its partner national scientists the opportunity and support to develop their capacities. ISP needs to develop a robust Theory of Change and articulate which specific capacities it is focusing on supporting and from this develop an appropriate monitoring framework. Such a framework should enable both accountability to Sida and learning within the programme.

The current model of operation provides the basis for continuation, albeit within a phased and time bound modality. A time horizon for support to RGs/SNs at should be defined at the outset, linked initially to five three-year cycles of funding. This would then be subject to external review if a case was to be made to extend funding for a further defined period. This would encourage more systematic monitoring of capacity changes and joint assessment by ISP and the concerned RG/SN of progress towards sustainability. This would take account of both baseline conditions in the institutional environment as well as any subsequent changes. In deciding how to position itself after 2018 and how to focus its support to groups and networks, ISP will need to consider whether it has the responsibility and the capacity to assist RGs and SNs to develop and implement fund-raising plans so that, by the end of an agreed period of ISP support, they have diversified their funding and significantly reduced their financial dependence on ISP.

The ISP could consider moving its support a little more upstream and provide selective support to a post-doctoral scheme. Linking such a scheme to building collaborations or working in new research environments with existing RGs and SNs would provide real opportunities for career development and wider research experience.

ISP could also consider moving towards a competitive research funding approach, particularly for more mature RGs/SNs specifically designed to bring them up to competitive standards. The principle of this would be for ISP to identify core areas in the basic sciences that it considers are in the public interest, in need of support and are not being addressed by others. The funding could support all the modalities that ISP currently deploys, including training, mentoring, collaboration, etc. However the funding should be fixed term and subject to progress which must be closely monitored.

The report concludes with ten specific recommendations.

1 Introduction

The International Science Programme (ISP) at Uppsala University was established in 1961. It provides long-term funding to the development of research capacities in the basic sciences of chemistry, mathematics and physics in low income countries, tied to support for postgraduate education in these disciplines. Originally based on a model of individual training it has evolved over time. It now focuses on supporting research groups (RG) and scientific networks (SN) the majority of which are working in defined applied science problem areas within the basic sciences. These groups and networks in turn collaborate with better resourced scientific teams and individuals either within or outside their own region. A focus on capacity development, long-term support, improved research environments, collaborative links, exchange activities and a sandwich model of training have characterised the programme.

Sida has been the main funder of ISP's core programme since 1965, providing currently about eighty percent of its overall budget. Other important funders of ISP are Uppsala University and Stockholm University. The scope and scale of the programme have reflected the ambitions and principles guiding Sida's international engagement. From 2008 there were a number of years of uncertainty over Sida funding, but from 2014 it committed support of 162 MSEK to ISP over a five year period. In addition to this core programme of ISP, the ISP provides coordination services for a number of Swedish bilateral programs in research cooperation in Ethiopia, Mozambique, Tanzania and Uganda. It also has four other partnerships funded by the collaborating partner and there was a Minor Field Studies programme that provided stipends to students to work with ISP supported research groups which was centralised in 2016 by Uppsala University, thus ending IPS's role in it.

The stated aims of the 2014-2018 ISP, which is the focus of this evaluation, align with Sida's interests in promoting the role of scientific knowledge for addressing development challenges and contributing to social and economic development as stated in the Swedish Government policy for research in Swedish development cooperation in force at the time of the ISP design and is consistent with the Government of Sweden's subsequent strategy for research cooperation.[2] Three specific objectives (SOs) structure the ISP and are concerned with (a) improved organisation, conditions for and planning of research and training, (b) greater

[2] Government Offices of Sweden, (2015), 'Strategy for research cooperation and research in development cooperation 2015-2021'. Government Offices of Sweden: 'Policy for research in Swedish development cooperation 2010-2014 and strategy for Sida's support for research cooperation 2010-2014' and 'Strategy for research cooperation and research in development cooperation 2015-2021'.

production of high quality research outputs, and (c) increased relevance and use of trained graduates and research results for society. The ISP aims to fulfil a direct, facilitating and promotive role in supporting scientific activities in its partner research groups and university departments.

The ISP has three constitutive programmes: the IPICS (the International Programme in the Chemical Sciences), the IPMS (the International Programme in the Mathematical Sciences) and the IPPS (the International Programme in the Physical Sciences). In 2017 these supported 40 research groups and 19 scientific networks[3] in 12 countries, nine of which are Sida focus countries. The IPICS and the IPPS date back to the early days of the ISP and have the largest number of research groups and networks while the IPMS was established more recently (2002) and is the smallest programme. ISP is subject to the governance of Uppsala University, where it is hosted. It has an International Board appointed by the University's Vice Chancellor and an Executive Committee. The Board appoints the scientific reference groups for each programme to advise the programme directors on the granting of financial support to RGs and SNs. There is an IPS secretariat comprised of a director, programme directors and assistant directors with supporting administrative staff.

[3] Research Groups have at least one senior scientist and one postgraduate student and are supported directly by ISP. They will also partner with a Collaborator who supports the research. The collaborator may be based in the region or in a northern country. Funding is normally in cycles of about three years. A Scientific Network consists of a group of scientists in a number of developing countries that share interests, facilities, undertake exchanges and organise meetings.

2 The context

The ISP in its 2013 strategic plan positions its contribution as follows:
'[Its] vision is to efficiently contribute to a significant growth of scientific knowledge, so promoting development. The expected outcome is more well-qualified postgraduates, and an increased production and use of high quality scientific research results. Collaborating universities all gain an expanded global perspective. Support to basic sciences is important for the development of applied sciences, of quality education and of technology. The nurturing of evidence-based, critical thinking, also impacts on democracy development, economic growth and poverty alleviation.' (ISP, 2013:1)

In essence this position paraphrases the arguments made in the 2011 evaluation of ISP[4] (GHD, 2011) on the role of science in contributing to development and poverty alleviation. This places ISP's contribution at a relatively high level of capacity development and at an institutional level. The GHD evaluation offers a number of reasons why aid investments to support enabling science are justified. These comprise both issues of principle (research in basic sciences is a public good; market forces rarely provide this; science is not easily afforded in the global south; and research and training requires long-term investments) and more instrumental aspects (the links between research outputs and poverty reduction; the links between science, productivity and competitiveness; and the role of science in providing the evidence base to meet development challenges). GHD (2011) also noted that while good science might be a necessary condition, it is far from being a sufficient condition for development and poverty reduction.

A striking feature of ISP is the continuity of its programme model over the last three decades or more. Although it started with an individual fellowship programme, it fairly quickly evolved to the research group and scientific network model that has been kept to this day although elements within this have changed. The key interventions of modest but repeat research grants, equipment provision and training in various forms, were all seen as contributing to capacity development. But we need to be clear about the scope and dimensions of capacity development and practices to build it in evaluating the ISP and its contributions to capacity development. There is also a need to take account of the changing landscape in higher education, particularly in Africa and what this might imply for the ISP (and its capacity development model),

[4] GHD Pty Ltd (2011) Report on the Evaluation of the International Science Programme. Swedish International Development Cooperation Agency.

as well as critically consider the instrumental assumptions being made about the contribution of the ISP. These issues are discussed in the three sections below.

2.1 THINKING ABOUT CAPACITY DEVELOPMENT

Capacity development as a concept and practice has been described as confused, contested, contextual, counteracted and complex.[5] What is capacity, what shapes it, where is capacity located and how it can be influenced? We follow the findings of Morgan[6] in breaking capacity down into five specific capabilities that successful institutions (e.g. Universities) demonstrate and that can be seen as outcomes of capacity development:

- *The capability to self-organise and act*: the ability to mobilise resources (financial, human, organisational), to create space and autonomy for independent action, motivate unwilling partners and to plan, decide and engage collectively to exercise other capabilities;
- *The capability to generate results*: the ability to produce outputs and outcomes and sustain production over time and add value to society, citizens or beneficiaries;
- *The capability to establish supportive relationships:* the ability to establish and manage linkages, alliances and partnerships with others to leverage resources and actions; build legitimacy in the eyes of stakeholders; and deal effectively with competition, politics and power differentials;
- *The capability to adapt and self-renew*: the ability to adapt, modify plans and operations based on monitoring of progress and outcomes; proactively anticipate change and challenges; and cope with shocks and develop resilience;
- *The capability to achieve coherence*: the ability to develop and share short and long term strategies and visions; balance control, flexibility and consistency; integrate and harmonise plans and actions in complex, multi-actor settings; and cope with stability and change;

Thus the more capacity development efforts manage to support and integrate the development of these five capabilities, the more capacity to achieve a desired collective purpose is generated and enhanced. Accordingly strong overall capacity to generate results is not just the presence of resources or a sufficient level of scientific knowledge. It is also a set of 'soft' skills for key personnel and the creation of

[5] James, R and Wrigley, R (2007) Investigating the mystery of Capacity Building: Learning from the Praxis Programme' Praxis Papers 18, International NGO Training and Research Centre (INTRAC). To address those five challenges, the authors propose that stakeholders need to articulate more clearly ('confused') and negotiate a shared understanding ('contested') of capacity development; root that understanding in the specific context and culture ('contextual'); mitigate the obstacles to capacity development in the aid system ('counteracted'); and appreciate the degree of difficulty inherent to capacity development ('complex').

[6] Morgan, P (2006) The Concept of Capacity, Maastricht: European Centre for Development Policy Management (ECDPM):8-16.

institutional environments that support cross-sector collaboration and constructive negotiations.

Our understanding of ISP's mandate as evidenced in its practice is that it works almost entirely at an individual and group level rather than at an institutional/university level. It contributes at the individual/group level to the second of these capabilities, the capability to generate results. To a certain extent it also contributes to the 'capability to establish supportive relationships', mostly with respect to scientific/academic linkages between groups and networks. However the broader issues of competition, politics and power that these groups and networks face within their university environment is beyond ISP's mandate. The other three capabilities largely lie outside ISP's reach, thus raising questions over the ambitions of ISPs vision stated above.

As Morgan makes clear, capacity is not just a technical issue determined by an individual's knowledge or an organisation's administrative limitations. Rather it is a function of a broader socio-political and historical context of the university in which the RGs or SNs with which ISP engages are located. The university and national contexts within which the RGs and SNs operate influence the levels of capacity that can be exercised and the potential for capacity development and the design of ISP support needs to take this into account.

Within a university where ISP operates there are three key levels to consider: first, the key actors or agents (research leaders and scientific members of that group); second, at the organisational level of the department or faculty level; and third at the systems level of the university (the broader administration and its practices). There are also cross-organisational processes of governance across these levels such as procurement systems and delivery chains. The actions of researchers are mediated by the norms, procedures and mandates of the organisation in which they work. Despite these interrelations, capacity is not developed in a linear way. The graduation of new PhD students does not necessarily translate, for example, into higher aggregate capacity at the research group, departmental or university level although it might.

It follows that support to capacity development can be targeted in various ways and for different purposes. The extent to which a particular capability can be referred to as strong or developed depends on the right mix of factors or conditions being in place. There are broadly five different way in which capacity can be targeted that can contribute to the strengthening of capabilities:

- *Resources* (who has what): e.g. money, equipment etc.
- *Skills and knowledge* (who knows what): academic training
- *Organisation* (who can manage what): management skills
- *Politics and power* (who can get what): governance in the university and society
- *Incentives* (who wants to do what): university procedures, accountability structures

Our understanding of ISP is that its support to capacity development primarily focuses on the first two of the above – resources and skills and knowledge. However the ISP research grant process also contributes to the development of research and education management skills. More recently specific short-term training programmes on management skills have been run. This understanding informs our analysis of the ISP contribution to capacity development with its partner organisations. It also provides the lens through which we will consider the functioning of the ISP Secretariat itself.

2.2 THE CHANGING HIGHER EDUCATION LANDSCAPE

Over the last decade and particularly in Africa there have been marked changes in the higher education landscape and context. From a position of neglect, which might have been the setting in which the ISP model was developed, there has been a resurgence of interest and support for higher education in Africa. There has been a dramatic expansion in the number of universities and students over the last decade, much of it driven by private universities to meet a growing demand from school leavers. This expansion in numbers has had effects on quality and generated in turn problems of unemployed graduates.[7]

But there has also been a growing interest in promoting the role of investments in science and technology to move African countries to knowledge-based societies and to strengthen the role of applied science, engineering and technology in the development agenda.[8] Diverse actors have been involved in this. Sixteen leading African universities have formed an African Research Universities Alliance (ARUA) in order to develop centres of excellence and are seeking international funding to leverage that position. The second Next Einstein Forum[9] was recently held in Kigali, Rwanda drawing scientists from throughout Africa. It not only promoted a new journal launched by Elsevier publishers for African Science, The Scientific African, but it also saw presentations by 'New African Einstein' fellows, many working on more basic science issues. Many of these were located in academic institutions outside Africa though. The World Bank through its African Higher Education Centres of Excellence I(ACE) project is promoting centres of excellence in order to support the role of science in development. A regional scholarship and innovation fund in

[7] The Economist, April 12th 2017: More can be less: African universities recruit too many students.

[8] The World Bank and Elsevier (2014) A Decade of Development in Sub-Saharan African Science, Technology, Engineering & Mathematics Research.

[9] https://www.nexteinstein.org/next-einstein-forum/?lang=en accessed April 25th, 2018.

Applied Sciences, Engineering and Technology has been funded by the Government of Senegal, Ethiopia and Rwanda with support from the Word Bank to address gaps in skills and knowledge in Sub-Saharan African and build the capacity of African education and training institutions.[10]

The question arises, particularly in Africa where the majority of ISP's partner universities are located: what does this mean for ISP's model of engagement which is based on a collaborative partnership that is needs based, process driven and long term which contrasts strongly (see section 4.2.7, evaluation question 16) with the World Bank support, for example. What is ISP's future niche and to what extent and in what ways will it need to engage in more collaborative arrangements and build synergies with the processes of change that are underway or seek to focus where such programmes do not reach? A case in point is the extent to which the ISP should work with the African Institute for Mathematical Sciences, which the Einstein initiative has supported and which is now setting up regional centres to promote practical mathematical and scientific skills for African graduates.

2.3 SCIENCE, TECHNOLOGY AND DEVELOPMENT

In the increasingly dominant view of the instrumental value of higher education, and the role of science and technology in particular in contributing to economic development, the public good role of higher education should not be neglected. This speaks to the intrinsic merits of scientific knowledge and the empowering aspects of that knowledge to ISP's partners and the countries within which they work. As one formidable critic of the assumed links between higher education and economic development in the UK argued, education in itself has wider public good values.[11]

Moreover, and noting ISP's vision statement, science and technology is not a sufficient condition for development or poverty reduction. As a recent analysis of rural poverty reduction rates made clear,[12] politics is central to the ways in which economic growth does or does not contribute to poverty reduction. Relatively speaking Ethiopia, Cambodia, Burkina Faso and Uganda (all ISP partner countries) have had relatively fast rates of poverty reduction although under different conditions of structural transformation, while Bangladesh, which has an advanced scientific programme, has not. As the Economist recently observed[13] the answers to economic

[10] https://www.rsif-paset.org/about/

[11] Alison Wolf (2002) Does Education Matter?: Myths about Education and Economic Growth, Penguin.

[12] International Fund for Agricultural Development (2016) Rural Development Report.

[13] The Economist: Root and Branch: Economists understand little about the causes of growth, April 14th, :70.

growth lie more in history and politics than in elegant mathematics or in science and technology *per se*.

All of which suggests that it is the public good arguments, given the nature of the ISP, that are as important to make as the instrumental ones for the value of the programme and ISP's contribution.

3 Evaluation methods

The evaluation took place between February and June 2017. During the inception phase[14] there was a review of primary documentation, an informal meeting with the Director of ISP and a request was made for disaggregated data (see Annex 5) on the programme, which was collated by ISP by the time of the start of the data collection phase.

In late March a week was spent by two of the NIRAS team at ISP offices in Uppsala University discussing the programme with the ISP staff, meeting the three programme directors, interviewing staff members, reference group members, Uppsala-based collaborating partners and reviewing documents.

The team collected data from its two major focus countries for the evaluation, (Cambodia and Ethiopia) with field visits to each for a week during April and May by one each of the team members. During these field visits (see Annex 2 for a list of people met) interviews were held with RG and SN leaders, RG members and current and past graduates from the ISP supported Masters and PhD programmes. In addition interviews were held with key informants outside the university. The reports on ISP support to Cambodia and Ethiopia are presented separately in Annex 3.

Data was also collected by a third member of the team from the ISP supported RGs and SNs for the evaluation's minor focus countries (Bangladesh, Burkina Faso and Uganda). This was done through telephone and skype interviews with RG and SN leaders and a review of documentation. The schedule of skype interviews is provided in Annex 2. A set of five standard questions was asked of each of the interviewees as follows:

- What capacities have been developed over the period of ISP funding?
- What role has mentoring by ISP played in this?
- What have been the key areas of support from ISP and how does this compare with other funders that they have had?

[14] During the inception phase a review of the ISP logical framework and the programme monitoring was undertaken. It was concluded that the approach to monitoring did not address country and university context and did not provide a basis to systematically question the overall programme logic or formally learn from the process of implementation. A broader Theory of Change was needed to relate programme activities to overall outcomes and goals was developed. There was a thorough review of the original 15 evaluation questions. Based on this it was proposed to expand the scope of the evaluation to address not just the DAC criteria of effectiveness and sustainability but more clearly those of relevance and impact. Issues of gender and environment were positioned separately. The original questions were developed to address these issues and a revised set of questions including new ones were developed incorporating key elements of the original ones.

- Who have been their principle collaborators and what role have they played in the development of the research group?
- What do they see as their future trajectory (scientific content, funding etc.) and what expectation do they have of future ISP support?

The third member of the team also analysed the disaggregated data provided by ISP and the findings from this analysis are presented in Annex 5.

The evaluation methods followed the approach developed in the inception report. It was participatory in approach, implemented according to a Theory-Based Evaluation model and applied a contribution analysis perspective that allowed a detailed investigation of the ISP programme structure. The evaluation was guided by a reconstructed Theory of Change (ToC) for the 2014-2018 programme period (see section 4.2). The participatory approach aimed to ensure that the evaluation was a learning experience for all stakeholders and a shared dialogue between the evaluation team and the participants of the evaluation process. In line with this, the evaluation incorporated feedback throughout the process of evaluation, and a debriefing with the ISP secretariat at the end of the Uppsala visit.

The design of the ISP evaluation addressed primarily three levels of analysis. First there was the overall ISP programme level with its constituent programmes of the IPICS, IPMS and IPPS. Second was the research group or scientific network level within a country and university, and third was the individual level of RG and SN leaders and members, and current and past students of the MSc and PhD programmes.

The evaluation design centred on the deployment of contribution analysis, mapped against the various levels and sub-levels of analysis. This assessed the contribution of the ISP to capacity development at individual and group (RG and SN) level consistent with the focus of its interventions and to a limited extent at departmental level, although the IPMS has a greater departmental focus. The contribution from the range of activities and support provided by ISP was assessed in relation to the impacts seen at various individual and group levels. The analytical framework sought to capture data relating to all levels of analysis and the spectrum of phenomena relating to ISP activities, across the time period covered by the evaluation.

The evaluation design incorporated a case study approach, in line with the scope of the evaluation, capturing country contextual contrasts, duration of ISP support and research content. As required by the nature of the evaluation, a mixed method approach was adopted, using qualitative and quantitative methods of data collection. An evaluation matrix was formulated, with the contents mapped against the analytical framework. This was developed during the desk review, after the submission of the inception report, using additional documentation provided by ISP.

The evaluation adopted a gender-sensitive framework to ensure that the analytical design, the process of data collection and analysis, and the synthesis of findings, was effective in capturing and understanding patterns of gender mainstreaming.

3.1 LIMITATIONS

As ISP's annual reports indicate, the ISP is rich in data and indeed ISP's ability to meet our request for disaggregated data, although it provided some challenges, was met. However little of these data has been systematically analysed to provide information (except across-programme averages) and even less has been systematically documented to provide programme knowledge and learning. In our attempts to analyse the data we have come across a number of issues which bring into question what the data are actually telling us.

A case in point is the number of Masters and PhD graduates supported by ISP. ISP practice is to collect numbers for any Masters or PhD graduate who has had any form of support either indirect (e.g. use of equipment provided by ISP), or direct but partial (contribution to subsistence) or complete (e.g. sandwich PhD student). These are very different categories of support, and one would expect the effects of the ISP in terms of outputs and trajectory of each of those categories to be very different. The fact that the data on graduates does not distinguish between categories of support does not enable an analysis of the distinct effects they might have and questions the relevance of this as an indicator for programme monitoring.

Equally it is not evident to us that the annual activity reports that provide the key monitoring data follow a consistent method across groups – e.g. what is reported as funding other than ISP, or whether everyone treats collaboration in the same way. We have considerable doubt therefore that the average values of indicators produced by ISP are systematically handling comparable data across the various research groups and networks. This has made it difficult to be clear about what the monitoring data are actually telling us.

It should also be noted that our analyses primarily focus on the 2014-2018 period. To have extended the analysis back to the start of funding for each RG and SN would not only have challenged the ISP to produce the data, but would have required more resources and time to analyse. In that sense our analyses of the data and our conclusions from the analyses should be seen as indicative and contributing towards a debate, rather than as absolute truth. Fuller analyses need to be developed, working with the complete set of time series data for each RG and SN, which, to our knowledge, have not been produced yet. Notwithstanding the focus on the 2014-2018 programme period, some of the monitoring data did cover slightly longer or shorter periods. Such differences have been duly noted in the analysis presented in Annex 5. Similarly, discussions with ISP stakeholders during the interviews often encompassed

the entire history of engagement with the programme, and not only the period since 2014.

Finally, as explained later in the report, reporting on uptake does not provide evidence that these effects can be attributed to ISP.

It had been hoped to have an intermediary stage of debriefing in Stockholm after the country field visits had been completed. However because of New Year celebrations in Cambodia, the university was closed in early April and the fieldwork there had to be delayed by several weeks leaving insufficient time to hold a debriefing meeting on the findings from the fieldwork and to draft this final report to meet the deadline.

4 Findings

4.1 SUMMARY ASSESSMENT

The ISP programme has considerable strengths and all those who have benefited from its support speak to how responsive it has been to their immediate needs and priorities, to its supportive and participatory approach and to its long term flexible funding. Its support through funding for skill development, equipment provision, consumables, as well as its ability to facilitate international links and exposure has done much to bring its grantees[15] into a wider community of research. Its pragmatic approach to problems and issues has been effective. Much of the research that has been supported has clear relevance to country-specific development needs and where the application is less clear, the research has been of intrinsic merit. In this sense ISP has contributed significantly to the public good in its domain of activities. The evidence from the field (see Annexes 3 and 4) strongly supports this conclusion.

ISP management has done much to bring in routines and systems in order to bring coherence to the programme, and this started before the 2014-2018 period. However it has been working to a results framework that is not coherent and not helpful to formal programme learning and reporting. Data is collected for compliance purposes and limited analysis has been done. ISP is drowning in data but short of information, and formal systematic learning from monitoring of change processes is limited. At the heart of its challenges is a disconnect between what ISP actually does in relation to capacity development and its monitoring framework, which gives insufficient attention to the chronology of the development of those capacities it is engaged with and to what its activities can and cannot deliver with respect to the development of capabilities. We also sense that the insufficient attention to the chronology of capacity development that ISP supports and ISP's long term funding and commitment to RGs and SNs may have trapped these groups into forms of financial dependency on ISP. ISP has no mandate or means to build the capacities of the institutions where the RGs and SNs are located and since many of these institutions suffer severe capacity constraints and the RGs and SNs are financially dependent on ISP, they cannot progress to independence and sustainability. The evidence from the analysis of the monitoring data (see Annex 5 and 6) speaks to this assessment.

[15] The term grantee is applied to both individuals and RGs and SNs.

4.2 SPECIFIC ASSESSMENT

4.2.1 Theory of Change

The inception report for this evaluation noted the absence of an overall coherent framework in the ISP to relate activities and outputs to higher level outcomes. Accordingly, based on a reading of its programme documentation, a retrospective Theory of Change (ToC) was developed in the inception report for the 2014-2018 period to situate the ISP interventions in relation to what it seeks to contribute to,. This working draft of this ToC drew on ISP's existing log frame, separating out clearly its outputs and intermediate outcomes from outcomes and goals, and was accepted as a working argument at the start of the data collection phase.

Our subsequent analysis and learning, and drawing from the framing of the five specific capabilities identified in section 2 and the five different ways in which capacity can be targeted, suggests that this initial draft ToC is too ambitious in terms of the role that ISP plays. It was made very clear in our discussion with the reference groups and collaborators that ISP cannot be compared to a research grant application process with a Swedish funding body. Rather it aims to support research groups to reach a state where they can apply for competitive research grants. Our understanding of ISP's support to capacity development indicates that it is very clearly limited to resource provision and supporting skills and knowledge development in the three science areas in its mandate.

This is not a criticism but a statement of the strengths of ISP in that its programme essentially addresses the first generation of capacity development processes. Without these basic skills and basic equipment no basic science would happen, and a second generation of capacity development could not be achieved. The development of capabilities by RGs and SNs, let alone the institutions in which they are embedded, to self-organise and act, establish supportive relationships, adapt and self-renew and achieve coherence lies beyond the direct reach of the ISP interventions, although it might indirectly contribute to them.

Accordingly we have proposed scaling back the ambitions of the ToC to focus on the first generation of capacity development issues. If the ISP can demonstrably contribute to achieving Intermediate Outcomes 2, and within a time bound period, then it has been effective.

Table 1 - A working Theory of Change for ISP

Outputs		**Intermediate Outcomes 1: The ability to produce scientific outputs (1st generation CD)**		**Intermediate Outcomes 2:**		**Longer Term Outcomes (2nd generation CD)**
- Production of Post graduates - Better equipped departments ▲ **Activities** - Funding - Training - Mentoring - Meetings - Coordination ▲ ***ISP & collaborating partners core organisational functions*** ▲ **Internal Enablers**	⏩	Available skilled scientists to undertake research Improved conditions for carrying out scientific research The development of relevant research programmes supported Research leadership supported Academically strong Masters and PhD programmes supported Improved gender balance promoted ▲ **External Enablers**	⏩	Improved quality of research grant applications More quality research publications Increase in non ISP funding More qualified women scientists Stronger research groups **Supportive institutional environments** ▲ **External Enablers**	⏩	The capability to self-organise and act The capability to establish supportive relationships The capability to adapt and self-renew The capability to achieve coherence ***Supportive and receptive national contexts*** ▲ **External Enablers**

4.2.2 Relevance

1. Is the ISP 2014-2018 programme consistent with Sida's strategies for research cooperation and research in development cooperation?

The ISP's support to the development of research capacity in Ethiopia and Cambodia in the basic sciences is broadly relevant to and aligned with the two Swedish policies

for research in development cooperation that span the period under review.[16] The latter was developed after the start of the 2014-2018 phase of the programme but the ISP remains relevant to the most recent Sida policy iteration. Swedish policies and strategies focus on building scientific research capacity in developing countries and regions and on promoting the production of high quality research that is relevant to addressing poverty reduction and developing countries' priorities and problems.

In Cambodia (see annex 3) it is significant that ISP support and the establishment of a basic science capacity is seen to have provided the basis for the establishment of a Sida bilateral programme to further develop research capacity. Accordingly ISP will now withdraw from direct support to basic science although it will continue to play a role at the minimum in coordination of the bilateral programme.

In Ethiopia (see Annex 3), there is some alignment between Sida's bilateral support to Addis Ababa University (AAU), which includes supporting the expansion of PhD programmes and strengthening research capacity, and ISP's support to the six RGs and one network in the basic sciences. The similarity in objectives between the bilateral and ISP programmes and the fact that they offer complementary forms of support to AAU suggest that there are good opportunities for mutual learning that could usefully be developed further. It also raises questions about how to optimise ISP's positioning in relation to the bilateral programme.

The evidence from the secondary case studies in Bangladesh, Burkina Faso and Uganda is consistent with the ISP support being broadly relevant to Sida's strategies. Several RGs and SNs are engaged in applied research directly addressing issues affecting people living in poverty and the resilience of communities and society. As is the case in Cambodia and Ethiopia, ISP support in Uganda is aligned with the Sida bilateral research support programme in that country.

2. To what extent does the ISP ensure the relevance of its support to the development of scientific research capacity?

ISP has not articulated specific objectives or an overarching strategy for developing scientific research capacity. It follows from this that it does not carry out and document systematic baseline assessments of individual RG's capacities or analyse whether the university contexts within which different RGs function provide a favourable or discouraging environment for research. Where basic science capacity is very limited, as in the Royal University of Phnom Penh RUPP in Cambodia or Daffodil International University in Bangladesh, the need for an analysis of research

[16] Government Offices of Sweden: 'Policy for research in Swedish development cooperation 2010-2014 and strategy for Sida's support for research cooperation 2010-2014' and 'Strategy for research cooperation and research in development cooperation 2015-2021'.

capacity and of the research environment was perhaps not great. In these cases it was more relevant to identify key people and to start building capacity from there. It is also clear from interview data from all the case study countries that RGs and SNs supported by the ISP see this support as highly relevant to their needs.

The ISP's approach is to identify capacity needs on a case by case basis, mainly through discussion with each RG and SN. This is done through a process of dialogue and assessment which culminates in a presentation by RGs/SNs of their proposed research topic, plan and budget in which they engage with reference group members in detailed face to face discussions. Several RG/SN leaders appreciated this process as an opportunity for learning and for improving the research focus, activities and plans for equipment purchase and/or graduate training.

A number of RG leaders also mentioned the assistance that their overseas collaborators, who are often identified or facilitated by ISP, as being helpful in this regard. Similar appreciation was expressed for the relevance and comprehensiveness of the ISP's reviews of progress during ISP's periodic visits to RGs/SNs.

While the face-to-face defence of their funding applications may be challenging, ISP is seen as broadly responsive to and supportive of the needs and priorities that RGs/SNs themselves identify as relevant to building capacity in scientific research. For example, many RGs are located in countries and universities where it is difficult to procure the equipment and materials that are prerequisites for implementing research activities, sometimes because they lack contacts with suppliers or access to hard currency, or because of slow and cumbersome procurement procedures. For many RGs, ISP has been their main source of equipment and materials, which has contributed to building a scientific infrastructure and to allowing experimental work to proceed on a much more continuous basis than would otherwise be the case. The ISP's facilitation of international engagement – though funding of sandwich training, fellowships, participation in conferences and regional networking – is particularly highly valued because postgraduate students learn from the exposure that it provides to new and less familiar ideas and perspectives and from the experience of working in well-resourced laboratories.

It should be noted that there were variations in the extent to which RGs/SNs considered that they needed support from ISP to develop their capacity, other than in equipment and materials. RG/SNs that were more confident in addressing the 'softer' aspects of capacity themselves tended to be from among those that had been supported over a longer period, but it is unknown whether or not this is due directly or indirectly to ISP support. However, some among this group also pointed out that support to capacity development would continue to be needed as older RG leaders retired and as new generations of postgraduates came through. The ISP does not have procedures or criteria for determining when a RG or SN has attained the level of maturity which means that its support to capacity development is no longer a relevant

intervention so that these RGs/SNs can be phased out, allowing the ISP to take on new RGs that are still in the early stages of development.

3. To what extent has the ISP provided support to partner research groups and networks to ensure that research topics are relevant to local development challenges?

Applicants for ISP funding are required to explain or justify their proposed research focus and activities under the heading of relevance, understood as relevance to addressing development needs and priorities in the national context. It is clear from the written assessments of applications that reference group members are concerned to see that funded research should include plans for outreach to government, the private sector and/or the public. In one case, this led a researcher working with biopesticides in Burkina Faso to shift her research focus from the laboratory to engaging directly with farmers and other stakeholders in sustainable agriculture. The picture is uneven, however, as the ISP's concern to see RGs engaging in outreach is not reflected consistently across all assessments – as one would expect to be the case if relevance is a criterion in assessment - and nor does there appear to be much in the way of follow-up where doubts are raised about the relevance of research to national development challenges.

In any event, the ISP's Strategic Objective 3 of its 2013-2017 Strategic Plan (Increased use by society of research results and of graduates in development) appears over-ambitious. The truth is that ISP is very limited in its capacity to influence the uptake of research results, since this is largely determined by the very different national political contexts in which RGs and SNs operate. . Cambodia is beginning to see a shift and a focus on development of science and technology is closely aligned with government strategies. There also appears to be an associated strong ethos amongst the researchers of focusing on problems that are of relevance to their country and addressing local needs.

By contrast, in Ethiopia, government and academia appear to function largely within quite discrete spheres with little or no engagement or interaction between them, and researchers face an uphill battle to promote the uptake of research results in either the private or public sectors. Moreover, for some RGs, one of ISP's strengths is that – unlike some other donors – it is willing to finance fundamental research that cannot be shown to have immediate application to national development problems but, rather, that facilitates engagement with an international science community.
In several cases of ISP-supported RGs – for example the biomedical physics and technology group in Bangladesh or the water and clays research group in Burkina Faso - advances in fundamental research were essential for RGs to progress to applied science that directly address societal needs.

The extent to which RGs and SNs in Cambodia and Ethiopia which were visited by the evaluation team have successfully addressed national development priorities is discussed below (Impact).

4.2.3 Effectiveness

The evaluation questions on effectiveness address the extent to which ISP has been able to contribute to the building of research capacity through providing equipment, supporting improved research proposals and promoting research leadership. The section first starts with a review of the extent to which the ISP, in response to the 2011 evaluations has responded to the recommendations in relation to programme governance.

4. To what extent has the governance of the ISP programme responded to the recommendations made in the 2011 evaluation?

Four specific recommendations were made by the 2011 evaluation (GHD, 2011:49-50)[17] with respect to the governance of the ISP programme and they will be considered in turn.

- *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. (SR14)*

The 2011 evaluation noted the clear lines of accountability and management arrangements, ISP's strong external orientation and its reliance on relationships with Swedish government agencies. It recommended that it might be useful to broaden the membership base of the ISP Board to foster improved awareness of the external environment in order to ensure that the Board was aware of emerging pressures and challenges.

The current ISP Board consists of five members who are academics at Uppsala University, three academics from other Nordic Universities, one member from an International Organisation (The Global Network of Science Academies) and one from a developing country institution (The Nelson Mandela African Institution of Science and Technology). There is also one retired Swedish diplomat on the Board. The Board membership remains strongly academic.

The Board meets once a year and from a review of the minutes its primary function is concerned to receive reports, discuss and approve the annual financial workplans, grant applications and activities related to the strategy implementation. There is also

[17] GHD (2011), 'Report on the Evaluation of the International Science Programme'.

an Executive Committee of seven members that meets on a quarterly basis consisting of the three ISP programme directors and four Uppsala University academics who are also members of the Board. It is here that the planning of the development of the ISP programme is mandated and where a broader skills set might be required.

We therefore conclude that in spite of improvements in diversifying Board membership during the current programme period, the ISP Board would benefit from broadening its skills sets even further, particularly in relation to strategic planning and monitoring.

- *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 (SR15).*

The 2011 Evaluation concluded that the selection and management of the performance of the Reference Group members were unclear and suggested that changes to the membership were rare. The Terms of Reference for the Reference Group (updated 2017) indicate that a Reference Group member is appointed for a term of five years, which can be extended for two further terms (a total of 15 years). They are appointed on the basis of academic qualifications and relevant experience and are expected to do the following:

- Assist in identifying suitable research groups and networks to invite for application, in accordance with the ISP strategy;
- Assess applications from research groups and networks, following given criteria; beside the scientific quality also the development potential is essential to consider;
- Assist in providing feedback to research groups and networks;
- Participate in the formulation of recommendations to the Board of ISP for decisions on the applications from research groups and networks;
- Visit research groups and networks to provide mentoring and guidance and to gather more knowledge about the work conducted; and
- Assist ISP to plan exit strategies for support to research groups and networks.

Given the possibility of a 15 year term on a reference group, and the fact that it is only seven years since the 2011 evaluation there does not appear to have been a major turnover of Reference Group members although a younger generation of members is emerging. There do not appear to be formal measures for assessing the performance of Reference Group members or the Reference Group as a whole, a point to which we return. From the interviews with six Reference Group members it appeared that there was very variable understanding of context and capacity development processes.

We conclude that the issues of membership and selection to the Reference Groups seem to be adequately addressed (despite the limited time to observe significant changes in membership), but that performance management remains underdeveloped.

- *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. (SR16)*

The 2011 evaluation noted that Reference Groups did not review annual progress reports, but only considered progress when an extension of ISP support is requested. It also noted that it understood that the Reference Groups undertook a subjective assessment of whether or not a RG or SN had developed its skills sufficiently to graduate from ISP support, in effect questioning whether this was a sufficiently robust or transparent process.

Matters do not seem to have changed much. It was noted in a discussion with an Executive Committee Board member during the review that he was emphasising the need to have a clearer chronology of capacity development in order for such decisions to be made. This is consistent with our view of the need for much greater clarity on the capacity development processes.

We conclude that this recommendation has not been fully responded to by ISP during the current programme period.

- *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. (SR13)*

The 2011 evaluation noted that the selection of a RG for funding was more personal and intuitive rather than open and structured by guidelines. It also saw the positive side of the process given the focus of ISP on building up capacities where they were limited but had potential. There appear to have been few selection mistakes made through this approach. ISP has moved in establishing new RGs and SNs to have a more open discussion at a university level across potential research groups and proceed on the basis of applications made. This has happened for example in the case of IPPS East African Astrophysics Research Network. However the absence of a chronology of capacity development and more systematic judgement as to when a certain level of self-sufficient capacity has been reached has meant that weaning RGs or SNs off ISP funding has not happened. Interviews with RG and SN leaders revealed that despite ISP's frequent encouragements to apply for other funding, none have developed a schedule or targets for the scaling back of ISP funding. This

includes at least one case where an end date is already set for the ISP support, namely the RG on organic pollutants in food and the environment at Dhaka University in Bangladesh.

We conclude that this recommendation has been responded to only to a small extent. The questions raised in the 2011 evaluation over programme governance are consistent with this evaluations view on processes not being sufficiently systematic.

5. To what extent has the logical framework enabled the ISP to monitor programme progress and to demonstrate the achievement of outcomes? How far has it facilitated learning about what works well and less well in the programme? Has it enabled adjustments to be made to improve programme effectiveness?

The inception report contained a detailed analysis of the logical framework and the analysis and arguments are attached as Annex 6. Drawing on this, a number of comments can be made. First, there is redundancy in the five tiers of the goal hierarchy (vision, overall goal, general objective, expected outcomes and specific objectives) and the relation between each tier is not self-evident. Moreover the monitoring framework is confined entirely to the achievement of the bottom tier (specific objectives) and therefore the causal connections between achievement of specific objectives (SOs) and higher-level results are assumed rather than systematically argued and evidenced.

Second, there are points of disconnect: the expected outcomes for collaborating partners are not underpinned by any SO and are not clearly connected to higher level results. In addition SO3 should not be at the same hierarchy level as the first two SOs and it is more likely to be an outcome of them. Moreover, it is doubtful that this is a realistic objective. While ensuring that proposed research is relevant to a country's development challenges is within the reach of ISP, ensuring that there is uptake of research results is not.

Third, there are assumptions made about relevance and contribution to development challenges that are not tested and monitored. Relevance and contribution are positioned at too general a level e.g. fight against poverty and need to be much more specific e.g. knowledge and monitoring of pollution of water resources.

Fourth, the bias to quantitative metrics and average values in the outcome indicators for the SOs are not helpful to understanding and learning about causal relations between programme interventions and outcomes, and strip out the specifics of country, university context and time. Indeed it is not clear that ISP has seen the results framework as a basis for learning what works well and less well in the programme, and while they draw on it to some extent, their comments to the evaluation team emphasised more the learning that took place outside the framework.

While the collection and reporting of monitoring data may have served an accountability function, this has not helped formally monitor progress, demonstrate outcomes, facilitate learning or guide adjustments to the programme. We stress the emphasis on formal because we find evidence of informal and intuitive understanding of what is happening in individual RGs and SNs, but this is neither systematic nor documented. Thus ISP in discussions noted that they saw the reduction in number of PhDs on sandwich training and an increase in the number of home-grown PhDs as a useful indicator of capacity change. Tracking this (see Annex 6) would be a means of formally recognising a process of change.

6. What are the results (adequacy, functionality, use and maintenance) of ISP's efforts to contribute to the improvement of scientific research facilities and technical resources?

The field evidence from both the two main focus case study countries, as well as from the three minor focus countries present a consistent story of the contribution by the ISP programme to the improvement of scientific research facilities and technical resources being a core strength of the ISP.

The evidence from Ethiopia illustrates the point:

The ISP's provision of equipment and materials was identified as an exceptionally useful aspect of its support, without which it would be difficult for RGs, particularly those working in experimental fields, to carry out any research at all. There is a particularly acute problem at AAU because procurement procedures are cumbersome and slow, supplies need to be procured overseas, and researchers have little or no access to the foreign exchange required for these purchases. A PhD graduate who had completed his studies in Taiwan[18] observed that in that country a researcher could order supplies in the morning and receive them in the afternoon, whereas at AAU a researcher might put in an order for supplies and have to wait for months or even years before they arrived. The ISP's role in identifying good suppliers and then managing the whole procurement and payment process is therefore seen by RGs as a core strength of its support.

Specific examples of this include funding for the seven stations that have expanded the national seismic data collection network (IPPS ETH:02) and funding of the consumables required to run the nuclear magnetic resonance NMR spectrometer in the Department of Chemistry (IPICS ETHALNAP), which had been provided under Sida/Sida's Department for Research Cooperation support. Although supplied for IPICS ETHALNAP, the equipment is available to and used by other researchers at

[18] This student had received a scholarship from Taiwan and had not been supported by the ISP.

AAU. In 2011 a similar spectrometer was provided by Sida/SAREC for the Department of Pharmacy at the College of Health Sciences.

This was still standing unused in its packaging in the college foyer when the RG leader (IPICS ETH:02) returned to Ethiopia in 2012. The first inspection of the equipment commissioned by the college concluded that the spectrometer was broken. However, ISP staff located an engineer in South Africa who examined it and judged that it could be fixed and installed. After a long period of inactivity since the equipment arrived, this is now in hand. This is an example of where ISP has been able to add value to equipment provided by other donors, as well as being a source of essential equipment and materials itself.
Source: Annex 3.

Similar accounts were provided from the Physics (IPPS CAM:01) and Chemistry (IPICS CAB:01) in Cambodia, as well from grantees in Uganda and Bangladesh, where constraints in procurement similar to those described for Ethiopia seem to be frequent. Note should also be made of the support provided by ISP to the Network of Instrument Technical Personnel and User Scientists of Bangladesh (IPICS NITUB), where according not only to its coordinator, but also to leaders of RGs benefitting from NITUB's services, the ISP support has been instrumental for ensuring quality and timely installation and servicing of research equipment.

The pragmatic support of ISP to keep equipment functioning and maintained is undoubtedly a strength. But it is not a long term solution to the underlying institutional capability requirement for universities to be able and willing to fund and support equipment maintenance and have procurement procedures that are supportive of research activities. There is one example where this has happened. In Bangladesh (IPICS BAN:04) the University Grants Commission has provided state of the art equipment bound to a commitment by Dhaka University to guarantee operation and maintenance costs.

7. How has the programme increased the capacity to formulate research problems and proposals, as well as designing research projects and attract external research funding?

The simple answer to the question of whether or not the program has increased the capacity to formulate research problems and proposals and design research projects is that there is not systematic evidence to address this question and therefore we do not know. It may well be that research groups or their leaders have this capacity. Indeed it is clear in the case of IPPS CAM:01 for example that the research leader's sandwich PhD experience in Sweden and the training that he received endowed him with those capacities. The benefits of the sandwich PhD experience in developing these

capacities is likely to be widespread[19] and further supported by the collaborations that endure after the PhD training and continue with the establishment of RGs. In addition facilitating international collaborations and exposure also has capacity benefits, as the Ethiopia case study shows (Annex 3) and as observed by several interviewees from the three minor focus countries.

But the absence of systematic and documented baseline assessment of RG or SN capacities at the start of ISP funding, the lack of any model and chronology of the development of specific capacities that provides a basis for tracking and documenting change and the limits of the assessment process by the Reference Groups means that this question cannot easily be answered. A wider analysis of the data on change in the quality of applications to ISP (See Annex 5, Figure 12) could find no evidence that over time groups produced better proposals that received progressively higher grades by the reviewers. Moreover, there were striking differences between how some applications were assessed by different reviewers and there is no evidence that ISP Reference Groups apply common criteria in their assessments. Assessors fill in a chart giving their grading against various criteria, but are then not required to justify why they have given that grade, making this something of a box ticking exercise. The lowest ranking on the scale used by ISP is 'to be improved'. We have found examples where there is text about what needs to be improved, but only occasionally are comments found on why it needs to be improved and we have not seen any comments on how this improvement should be done.

That said, it is also clear from the case studies of Cambodia and Ethiopia, and from about one third of the interviews with grantees in Bangladesh, Burkina Faso and Uganda, that the applicants for the research grants found the meetings and discussions with the reference groups extremely helpful and valuable and in certain cases written feedback to which they gave a written response helped them improve their proposal. Unfortunately this process does not seem to have been systematically documented or practiced or linked with a chronology of capacity development.

There is no systematic evidence that links changing capacities (the proxy for which is duration of funding) and the ability to attract external research funding (see Annex 5. Figures 1-5). This was true both for the entire population of ISP programmes and for each of the three individual programmes.

The review of the second minor case studies found that the majority of the grantees, in the three countries have been long term partners to ISP, and depend heavily on ISP funding. Based on the figures for 2014-2016 supplied by ISP, of the 19 grantees included in the study, only ten report less than 80% average dependency on ISP for

[19] Andersson, R (2017) The Sandwich Model: A Successful Case of Capacity Building. *Internationalisation of Higher Education: A Handbook*, 1, 53-65.

their budget, and six report an average dependency between 90 and 100 percent. ISP therefore remains essential to the very survival of several of the groups. No distinction was found between older/more established groups and networks, and newer ones in terms of this financial dependency – which suggests that the length of the ISP support does not increase the likelihood of grantees being able to attract other sources of funding.

A slight geographical variation was found though, with grantees from Burkina Faso reporting slightly lower average financial dependency rates than groups in Bangladesh, and lower than grantees in Uganda. This may be because grantees in Burkina Faso have access to funding from donors and collaborations in French-speaking countries (especially France and Belgium), funding which is not accessible to grantees in the two other countries.

The contrast between Cambodia and Ethiopia is interesting in this respect. Given its history and the relatively short period of time that Cambodia has been supported by ISP in comparison with Ethiopia, it is unlikely that the Cambodia programme has reached the same level of scientific capabilities as that of Ethiopia. Yet because alternative funding sources have emerged in Cambodia, including a Sida bilateral programme, ISP is deliberately withdrawing. In the case of Ethiopia, where arguably scientific capabilities are more fully developed, ISP has not withdrawn because of the absence of other funding sources.

8. What effects does ISP support have on the development of research leadership among groups and networks and how has this, and if so in what ways, impacted on research quality and a scientific research culture in the supported groups and networks?

ISP's monitoring does not address research leadership and nor, in the absence of a chronology of capacity development, is research leadership identified as a key attribute of capacity development to be systematically addressed. More broadly, one may justifiably ask 'What does research leadership mean?', in particular in the contexts in which ISP operates. In a resource-constrained environment it is likely to mean being able to keep things going despite the many uncertainties. For PhDs it is a professor who makes sure the conditions to do a PhD are available (See Ethiopia case study), which in such environments might demand great creativity in combining funding from different sources. It probably implies rather more of an entrepreneurial streak than would be required in a Swedish university and which one therefore might not directly associate with the term 'research leadership'. Informally and as much by intuition, ISP has selected RGs where they see potential, much of which is related to the qualities of individuals. There clearly are many examples of RGs led by charismatic individuals who have what it needed to drive a research group forward. Cases were found of such individuals in both the primary and secondary case study countries.

Whether it is simply ISP support that has enabled those leaders to exercise their skills, or whether the support has contributed to the development of those skills is unknown. Nor can effects of leadership skills on research quality and research culture be answered. One aspect of leadership and research culture is nurturing the next generation of research leaders and it is known that in certain cases that has not happened, as in the phased-out groups. The evidence from the 57 groups and networks phased out from ISP support between 2003 and 2014 found that over 80 percent of them were still active.[20] For the minority (9) that were not active, loss of leadership through either retirement or moving to another position was a common reason for non-continuation. All of which suggests that most of the supported RGs and SNs have good leaders, but whether ISP has contributed to this or not is unknown.

In the last two years ISP has been undertaking short training courses in Africa on research management, which may contribute to the development of research leadership, but it is too early to judge effects.

9. To what extent has the ISP contributed to enhanced research capacity in the basic sciences in selected institutes of higher education in the target countries in supported groups and networks (with particular reference to capacity development, long-term support, improved research environments, collaborative links and sandwich model of training)?

There is no doubt, as the case study material evidences, that ISP has contributed to capacity development in the areas of basic sciences that it has supported. All grantees in the second tier case studies for example (see Annex 4) acknowledge that ISP support has been and remains key to their operations and to improving the quality of their scientific work. It should be remembered that annual grants are relatively modest ranging from 100 – 500,000 SEK a year. In some cases that support was essential to the very establishment of the group or network, and in those cases where financial dependence is higher, also to their survival.

The three areas of capacity where ISP support has made the greatest contribution include:

- Equipping research facilities, which has been essential for a small fraction of the groups and networks to start doing any research work on their own, and in other cases to advance to more complex analyses;
- Developing human resources, primarily through financial support to graduate students (both full and short-term scholarships) and senior staff;

[20] Andersson, R (2017) Phased out groups and networks, 2003-2014 – Experiences and continued activities. ISP, Uppsala University.

- Promoting and facilitating scientific cooperation, at the national, regional and international level, mainly through the following mechanisms: support to scientific networks (in some cases established with the support of ISP), support to student and staff mobility, support to the acquisition of equipment that is shared by different groups, and support to scientific meetings and workshops;

The extent to which ISP provides mentoring or other types of advisory support varies significantly. Some groups receive close to nothing, others have more regular contact and some even benefit from support for improving the grant applications.

Those with closer ties/collaborations with Swedish research groups seem to enjoy more proximity to ISP, which could in part be due to the regular exchange visits. The support from ISP has been particularly useful for establishing collaborations with other groups and in some cases for adjusting the content and direction of the research. This latter aspect appears to be connected to decisions on the size and implementation of the ISP grants. ISP reviews the research plan (and the way the grant is spent) jointly with the grantee to make sure that money is spent wisely and coherently. Those that do not get much mentoring support did not express any discontent with the situation; they commonly observed that ISP is available should they have any particular request, but that generally they can cater to their own needs.

In sum there is not coherence between how ISP carries out capacity development in practice and what is contained in its strategy and results framework for capacity development. This leads to a lack of clarity about capacity development objectives and the processes that ISP uses to achieve them. ISP does not specify what the capacity gaps are for each RG or SN, or establish baselines of capacity at the time that funding starts to a RG or SN, or set out specific strategies that will be used to address these. Its monitoring data, both because the indicators poorly address the development of capacities[21] and because ISP averages its metrics across the total population of its grantees offer no systematic understanding of ISP's contribution to enhanced research capacity.

4.2.4 Impact

[21] Of the monitoring data provided by ISP, the two indicators that relate to scientific capacity are the number of graduates and the number of publications. The usefulness of these indicators is limited by two main factors: first they pertain to a very limited sub-set of the much broader set of capacities that ISP aims to develop. Second, we believe there are differences in how RGs and SNs report their data in those two categories, which affects the validity of comparisons across grantees. Please see Annex 5 for details.

As indicated above (section 4.1) the ISP's strategic objective 3 (Increased use by society of research results and of graduates in development) is set at too high a level to be achievable, since ISP has little or no influence over whether and how research results are disseminated or taken up by the public or private sectors. Connected to this, the related logframe indicators – which list examples of uptake – are an inadequate measure of any contribution that the ISP may have made to the achievement of the objective.[22] Simply enumerating examples of results in this way does not provide evidence that they can be attributed to the ISP.

10. How have ISP-supported groups and networks gained recognition for their research or achievements (e.g. through awards, promotions, appointments to committees, patents, etc.)? What have been the effects of such recognition on the ability of ISP researchers and alumni to address development challenges?

With respect to awards, honours and promotions, ISP Annual Reports itemise an impressive number of such distinctions achieved by members of the supported groups and networks. It is pleasing to see progress in the careers of group and network members, but listing these changes provides insufficient evidence of the ISP's impact on career development. Information that a recently graduated PhD has been appointed to a university post, or that a RG leader has received an academic distinction or been appointed to a national committee may be proof of academic quality, but it does not tell us whether or how far support from ISP played a part.

It is not possible to draw conclusions about the effects of such recognition on the ability of ISP researchers and alumni to address development challenges.

11. To what extent have ISP-supported research groups, networks and alumni used research findings and results to engage in debates on national priorities and challenges with external stakeholders (public institutions, industry, civil society actors)? Can this engagement be attributed to support and encouragement from the ISP?

A degree of attribution to ISP can be assumed where there has been uptake of outputs from research that was made possible only because of ISP funding. The most significant example of this is ISP funding for the seismic network (IPPS ETH:02). Ethiopia's national development plans (the Growth and Transformation Plan I and II)

[22] The indicators associated with SO 3 are the number of outreach activities carried out by groups and networks, of awards, appointments to committees, etc.., of instances of use (including in teaching); of external assignments; patents, etc.. and of staff trained who leave for positions relevant for development.

prioritise construction and hydro-electric power. Ethiopia's location in the Rift Valley and consequent vulnerability to earthquakes mean that the country needs to have access to comprehensive, reliable and timely data on the strength and distribution of seismic activity. These national priorities together with Ethiopia's geographic location have positioned the seismic network to be a key source of data for government and the construction sector. This has enabled the RG to make critical inputs to improving safety standards in construction, both with respect to the Grand Ethiopian Renaissance Dam[23] (Africa's largest hydro project) and to domestic and commercial buildings.

For Ethiopia, this appears to be a rather exceptional example, however. In general, government and academia appear to function within quite discrete spheres with little or no engagement or interaction between them. Although the Growth and Transformation Plan I and II and other official policies and strategies see a crucial role for science and technology in driving national development, the perception of RG leaders is that government interest in their work is intermittent at best. This perception may, in turn, have discouraged researchers from making greater efforts to bring their work to the attention of the public and private sectors. A notable exception is a PhD graduate in mathematics who is initiating discussions between private and publicly-owned companies and academic mathematicians on the importance of mathematics in the economic sphere. This is an idea that he brought back to Ethiopia from an ISP-funded fellowship at a German university, which has strong links between industry, the private sector and the German university's department of mathematics.

Further examples of influence on policy or practice from ISP-funded research include contributions from IPICS ETH:04 on pesticide residues in agriculture and hazardous wastes from industry to a national committee on major chemical pollution. The committee's deliberations were then followed up with training on the use of pesticides for farmers and agricultural development agents. In Bangladesh, Burkina Faso and Uganda results from ISP-supported research have been significant inputs to legal and policy changes on food safety and the use of harmful pollutants, to improvements in child nutrition and to the delivery of health services through smartphone apps. In another example, the SN IPICS RABiotech, hosted by the Research Centre in Biological, Food and Nutrition Sciences at the University of Ouagadougou in Burkina Faso has been instrumental in developing a post-graduate curriculum in biotechnology and food sciences that has been taken up by most universities that engage with the network.

In instances where there has been uptake of outputs from ISP-funded research, we can reasonably assert that the ISP contributed to making this possible. Obviously,

[23] The dam is being constructed on the Blue Nile to generate hydro-electricity for Ethiopia.

however, the national development priorities in each country are a far more significant determinant of whether research outputs feed through into policy and practice. In general, resource-constrained governments are concerned to address development challenges over a medium term timeframe, and they are therefore far more interested in applied than in basic research. As an astrophysicist in EAARN put it: African leaders want something tangible that can transform society; they want "downwards astrophysics" (i.e. remote sensing) rather than "upwards astrophysics" (i.e. space science). In Cambodia there is as yet little evidence of uptake, which may reflect in part a difficult political environment. Findings for example on levels of pollutants in water by IPICS CAB:01 cannot at the moment be easily translated into policy action given the interests of key political players.

12. Have positive changes been made in development policies or programmes and can they be associated with ISP-supported research? To what extent can such changes be attributed to (a) engagement by the research groups, networks and alumni supported by the ISP and (b) the support provided by the ISP to those research groups, networks and alumni?

The ISP needs to reflect on whether strategic objective 3 is realistically achievable, given the limits on the ISP's scope of activities and bearing in mind the primary role played by contextual factors in determining whether uptake happens . If it is not a realistic objective, then the ISP needs to be clear to itself and to others what level of change it does have the capacity to influence and effect. Some indications of this are given in Annex 6. In general, we consider that the effects of the ISP support on the policy level are too far removed from ISP's actual operations and sphere of influence to be meaningfully measured.

4.2.5 Gender

13. How far has the ISP itself analysed factors influencing rates of participation by men and women in the programme (in target countries, research groups and networks)? How does the ISP identify potential barriers to equitable gender participation and what steps has the ISP taken to address barriers which it has some capacity to influence, and with what results?

This section discusses the gender balance in basic sciences in case study countries, factors contributing to low rates of female participation and efforts made locally to address this. It then assesses how the ISP has sought to improve the gender balance in target RGs and SNs during the period under review. Finally, it considers how the ISP might build on the initiatives that have been started.

Annual ISP reporting includes some basic gender-disaggregated data i.e. on the number of men and women in PhD and MSc student cohorts. In line with most global

trends, these show low rates of participation by women, and they generally indicate no significant change in the gender balance in RGs and SNs since 2014. Global averages and averages for Asia and Africa on female representation among Masters and PhD levels in ISP-supported RGs and SNs are shown in Table 2 (data at national or institution level in ISP target countries are not available).

Table 2 - Percentages of female Masters and PhD students in ISP-supported RGs and SNs 2014-2016

	2014	2015	2016
Global			
Masters	31	29	31
PhD	23	20	26
Asia			
Masters	25	29	31
PhD	28	20	26
Africa			
Masters	33	28	29
PhD	21	17	20

Data on the gender composition of RGs and SNs show similar minor variations with only a small number progressing towards a greater gender balance.[24] On the whole, chemistry RGs and SNs have higher proportions of women than either physics or mathematics. Findings from the evaluation did not clarify the reasons for this.

Global data provided by the ISP on PhD drop-out rates and on number of years to completion of PhDs in RGs and SNs show no discernible variation by gender, suggesting that the main source of gender imbalance is in recruiting females for postgraduate studies, rather than in retaining female postgraduates once they have embarked on their studies. This premise tends to be supported in the responses from RGs and SNs to enquiries made by the ISP in 2014 about the then gender balance in their groups. Across different countries, and regardless of whether affirmative action policies and strategies existed at national or university levels, RGs reported similar types of problem in recruiting women to study science at postgraduate levels. Even Cambodia, which has more or less equal numbers of female and male undergraduates in chemistry, reported a marked drop in the number of women continuing to postgraduate study.

ISP reporting tends to attribute lower female participation rates to a lack of encouragement for girls to take up science subjects in the first place, to socially imposed restrictions on their freedom of movement, and to increasing domestic and family demands on women's time as they get older. Similarly, the evaluation found

[24] See Annex 5.

that interviewees in the case study countries usually attributed lower female enrolment to cultural traditions concerning men's and women's roles and to family pressures on women, factors that most of them saw as beyond their capacity to influence or control.

The very different contexts in which RGs and SNs are located mean, however, that cultural norms alone cannot explain the small number of female postgraduates in science. Other country- and institution-specific factors need to be considered. It is also important to examine whether there are factors connected to how postgraduate training is delivered. In Cambodia, Masters courses are specifically designed to upgrade high school science teachers who may have completed their first degrees some time ago. They are offered on a part-time basis that extends over a minimum of two years with teaching taking place at weekends, with many of the teachers travelling in from the provinces to attend. It seems likely that the weekend format, as well as having to travel into Phnom Penh from outside, presents a considerable barrier to women who, in addition to their jobs as teachers, also shoulder the main burden of domestic and family responsibilities.

The only female RG leader in Ethiopia (IPICS ETH:02) considered that, although cultural barriers to female participation in science exist, they are neither insurmountable nor necessarily decisive. While acknowledging that, as a woman, it is easier for her than for male colleagues to invite female undergraduates to join her department, she noted that male staff in her department also actively encourage and promote participation by women. This may be at least part of the reason that her department has more female than male Masters students. It may also be that the nature of her research into traditional medicine appeals to female students. Other RGs/SNs reported that they had attempted to attract female postgraduates by designing research that they considered would attract women e.g. mathematical modelling for malaria, bilharzia and mother-to-child HIV transmission (Burkina Faso) or research on women's health (Bangladesh). A RG in Bangladesh in chemistry achieved gender parity through operating a policy of gender quotas. Some RGs focused their efforts further downstream, aiming to increase the number of female school leavers opting for science at university. For example in Ethiopia, physics summer schools were run for high school students, targeting girls, where students were given hands-on experience of experimental lab work.

Mainstreaming gender equality in development cooperation is a Sida priority, and ISP's intentions with respect to promoting gender equality in target countries have featured in annual review meetings with Sida. Reference Group assessments have frequently stressed the need for RGs/SNs to increase the number of their women postgraduates, although with little or no evidence of follow-up from these initial

comments. In its 2013-2017 strategic plan,[25] ISP committed to initiating a focused approach to promoting gender equality in its PhD and MSc intakes (pp.1, 12-13) and a Gender Equality Working Group was accordingly set up.

The working group formulated a Gender Equality Plan[26] for 2015-2018 with three overarching aims to: (1) collect and analyse data on the female:male ratio in RGs and SNs; (2) raise knowledge and awareness of gender issues in supported institutions and (3) (in the long-term) achieve a gender balance (i.e. at least 40% of women among staff and PhD students. Strategies included conducting context analyses to identify barriers to female participation, offering gender training, making available grants to RGs and SNs for local gender promotion activities, and promoting gender equality policies in all ISP supported institutions.

In commenting on the lack of women postgraduates in their disciplines, several RG leaders noted that they could seek to redress this more effectively if ear-marked funds were available to support women students.[27] The grant-making facility established by the ISP in 2015 partially responded to this need by funding one-off outreach activities to young women. Grants were made for a conference for undergraduates in Uganda and for outreach to secondary school students in Uganda, Tanzania and Kenya. Some preliminary results from these investments look promising: the conference in Uganda is reported to have significantly increased the number of young women applying to join the maths and physics departments and to take up leadership positions in their colleges.[28]

ISP later concluded that supporting initiatives over the longer-term was likely to produce more sustainable results than single initiatives, and from 2017 they began making three-year grants. The first of these was funding for a female PhD student in Bangladesh that will allow the grantee to combine part-time work and study with domestic responsibilities. The importance attached to this was signalled by the presence of the Pro Vice Chancellor and Dean of Science at the award ceremony for the first beneficiary. RGs in mathematics and physics in Ethiopia, Burundi, Kenya and Rwanda and the MSSEESA SN have also been awarded three-year grants. The RG in mathematics in Ethiopia will use the grant for a series of affirmative actions (due to start in 2018), including tutoring for female undergraduates by female postgraduates and staff, providing additional financial resources for female students, and forming female mathematics clubs.

[25] ISP (2013) Strategic Plan, 2013-2017.

[26] ISP (2015) ISP Gender Equality Plan, 2015-2018.

[27] One interviewee noted that the ISP's flexibility over budget allocations did allow some funds to be directed towards women.

[28] Grants made in 2016 for similar activities in Bangladesh, Kenya and for MSEESA have not yet been reported on.

Other aspects of the 2015-2018 Gender Equality Plan appear to be over-ambitious (and in practice not all have been followed up). For example, because ISP works at RG and SN levels it has very limited capacity to promote gender equality policies at a university level. Similarly, it does not appear realistic for ISP to have an objective of reaching a gender balance among all staff and students, given the range of national and institutional contexts in which RGs and SNs are located and the different factors and influences beyond the ISP's control that will therefore determine how gender relations develop. It would be more realistic for the ISP to have an objective of promoting greater gender equity among RG leaders, since this is the level at which the ISP works and where its decisions on funding could be influential.

4.2.6 Environment

14. To what extent did the ISP ensured that potential environmental impact was considered in identifying, designing and implementing research projects and programmes? Where possible, assess whether the impact on the environment from the ISP-supported research was positive, negative or neutral?

The ISP collects information in its activity reports (yes or no answers) on whether RGs and SN have implemented any of the 9 measures listed to reduce negative natural environmental impact. The questionnaire format is shown in Table 3

Table 3 - ISP questionnaire on the implementation of environmental impact mitigation measures

Does your group/organisation have/use:	Yes	No
A strategy to reduce negative environmental impact causes by travelling and transportation?		
The use of e-meeting techniques?		
A strategy to reduce the use of electric power?		
Consider environment impact criteria in procurement?		
Practice sorting of waste categories for recycling?		
A system for scrapping decommissioned equipment?		
A management system for chemical and hazardous waste?		
Internal discussions of how any negative environmental impact of your activities can be reduced?		
Engagement in external activities – in research, dissemination and/or society outreach – on how negative environmental impacts may be reduced?		

If there are any 'no' answers the form then asks for explanations for this, what future plans are and if there are any obstacles to implementing the measures. The same format is used in the grant applications. It is understood that the format is derived from one that is applied as Uppsala University.

The data on the implementation of environmental impact mitigation measures was not analysed by group or network, because the data are not complete. Further the organisation did not enable inter-year comparison for each group or network (annual

data in rows and not in columns, for each group/network) and there was insufficient time to reorganise it to enable group- and network-based analyses. The average level of implementation of environmental management measures as reported by groups and networks has generally improved in the period 2009-2016 (Annex 6, Table 24). Although a generally positive trend can be observed, the significant inter-annual variation in the number of groups and networks reporting makes a more disaggregated analysis difficult.

The scoring approach on predefined issues might speak to some of the environmental issues faced by individual RGs but not necessarily all of them. It does not reveal what impacts were identified and addressed by design. They tell us even less about the environmental impacts of activities of ISP supported research. The approach therefore speaks more to ensuring compliance to a prescribed format rather than potential effects in given contexts.

4.2.7 Sustainability

15. What is the potential sustainability of ISP and the supported groups and networks?

The prospects for financial sustainability of most ISP-supported groups and networks are poor. An objective of ISP support is for RGs and SNs to reduce their financial dependence on ISP over time by diversifying their funding sources. Reference Group assessments frequently recommend only partial funding of requested budgets and for applicants to seek alternative and complementary sources of funds. From time to time ISP has also warned individual groups that funding will cease after a number of years, although end dates have not always been specified, which may leave groups in a state of uncertainty. ISP does not systematically request details of grantees' plans for fund-raising or to offer guidance on this, and follow-up on the extent to which grantees have sought and secured alternative funding has been inconsistent. This was the case even in the RG included in the case studies (IPICS BAN:04) that already has a date set for the end of the ISP support.

The analysis of financial data made available to the evaluation for the period 2014-2016 shows that most RGs and SNs remain highly dependent on ISP. The sixteen RGs/SNs that have received ISP support for 20 years or more had funding levels that varied between 32 percent and 100 percent with a median of 79 percent. Similarly, funding levels to groups and networks in the case study countries ranged between 13 percent and 100 percent, with most lying between 60 percent and 80 percent. When interviewed, most RG leaders were unable to set out fund-raising plans in other than the most general terms. According to them, ISP has never required concrete plans for attracting other funding, or set out plans for the phase-out of ISP support. On the face of it, it appears that high levels of funding from ISP over an extended period has relieved RGs and SNs from the need to make serious efforts to look for alternatives.

As most groups and networks were anticipating that ISP funding would continue for the foreseeable future, it also appears to have created an attitude of dependency on a single donor. The almost certainty of ISP funding removes the pressure to seek additional donors and alternative sources.

The situation in Ethiopia is typical of the programme as a whole, with ISP support ranging between 62 percent (IPPS ETH:01) and 85 percent (IPPS ETH:02) of total funding. Each RG leader cited approaches that had been made to other donors and foundations, including through consortia that they had joined in order to apply for grants, but on the whole their applications had been unsuccessful. Where grants had been awarded they were typically for relatively small amounts. In what they saw as a very competitive funding environment, most RG leaders were discouraged and pessimistic about their chances of success, and at something of a loss as to what else to try. They considered that, if they were reliant only on support from AAU, it would have a significant negative impact on their research activities and on the level of support that they were able to provide for postgraduates. Grantees in Bangladesh, Burkina Faso and Uganda also felt that they lacked sufficient capacity or experience to succeed in the arena of large international competitive grants, and some requested more support from ISP in drafting and reviewing applications to such grants.

Cambodia presents an atypical case. Sida bilateral funding will replace ISP support towards the end of 2018. In addition, major funding will come from the World Bank Science, Technology, Engineering and Mathematics project. This has been a fortunate development in that new funding has come on board allowing the ISP to withdraw. It means that the ISP supported science activities will have guaranteed funding for the medium term, will have a relatively secure future and can build on what ISP has contributed to. As ISP funding was initiated in 2005, this has been a relatively short period of support in comparison with other country programmes. It is early days to say whether or not the research capacities that ISP has contributed to building will be sustained under new funding modalities.

16. What complementary funding opportunities would be conceivable for the continued operation and development of ISP?

There are few if any donors that would have been prepared, as Sida has been, to fund in the way that it has, long term under a relatively open ended commitment ISP's programme. In an era of results based management where output and results trump process, the allocation of public money in this manner to deliver a public good is a difficult to defend, even though in the scheme of things we are not talking about large sums of money to each RG and SN (as noted earlier 100 – 500,000 SEK a year).

But a contrast with the World Bank Development and Innovation Grant scheme, USD $23 million over five years, rolled out in Cambodia (2010-2015) is also instructive.[29] A component of this grant (USD 4.58 million) gave awards to Cambodian universities to improve quality of research, training and learning, to be allocated on a competitive basis in order to 'enhance the capacities of HEIs (Higher Education Institutions) to seek innovative solutions to address national/local development issue'. Tied in closely to the World Bank's procurement and operations guidelines, the project largely failed to produce research, let alone 'innovation'. Few researchers were in a position to write grant proposals to the specifications of the World Bank, let alone negotiate the procurement process. As the reviewers noted the funding for research component would have been better spent giving young promising Cambodian researchers with a Master's degree the opportunity to do a PhD or support a post-doctoral scheme to give PhD holders time for research. The comparison with what the ISP has been able to achieve in Cambodia between 2008 and 2018 is worth bearing in mind.

However the example illustrates the challenge that ISP faces in attracting complementary funding to Sida. Few if any donors are prepared to focus on capacity development processes and give the time for it that Sida is. But it also has to be said the chances of getting significant complementary funding for ISP given its current mode of operation and structural weaknesses in the programme are also slight. ISP has also not communicated well on what it has done and a more articulated and managed process that could speak more convincingly to external actors of the strengths of the ISP approach and achievements might be more likely to find co-funding. There are actions that ISP could take in the design and development of its programme that could make it more attractive to complementary funding and these are discussed in the conclusions.

[29] These comments are derived from Rappleye, J and Un, L (2018) What drives failed policy at the World Bank? An inside account of new aid modalities to higher education: context, blame and infallibility, *Comparative Education* https://doi.org/10.1080/03050068.2018.1426534.

5 Conclusions

A core conclusion that emerges from this evaluation, strongly supported by the field evidence (Annexes 3-4), is that ISP's core programme delivers a significant public good from its support to the development of basic scientific research capacity with the RGs and SNs that it works with in Sida's focus countries. In speaking of a public good we emphasise the value of the skills and knowledge that the ISP funding encourages its partners to develop, enabling them to engage with the international research community. Much of the focus of the work has strong development relevance. The modalities of programme engagement – long-term, supportive, collaborative, facilitative and pragmatic – have built relationships of mutual trust and respect. These modalities are to be admired, are highly valued by partners and they are strengths to be built upon.

However there is a disconnect between what the ISP does in practice and its formal programme structure and monitoring framework which positions ISP's contribution at too high a level. This leads to a lack of clarity over its contribution.

Theory of Change and monitoring framework

ISP has not developed a robust Theory of Change based on a clear understanding of where it positions itself in capacity development. As a result it has not developed an appropriate results framework that clarifies what is useful to monitor, suggesting that the contribution that a strong results framework could make to ISP has not been fully institutionalised. The indicators that it tracks do not enable it to follow up on the full range of support that it provides. For example, in the debriefing meeting in May 2018 it was learnt that ISP aims to increase local training of Masters and PhDs (leading to an associated decrease in overseas sandwich courses) and to encourage networking. These objectives are not reflected in the current results framework and current outcome measures therefore do not track what the ISP is aiming to achieve.

The instructions it gives to grantees create inconsistencies in reporting and render comparisons difficult. ISP has been recording averages that cut across the entire grantee population, but this says little about change over time for each individual grantee and whether or not each grantee is diversifying funding, expanding collaborations, or doing anything about gender. As a result individual grantee analyses are not used in decisions for continued funding in a consistent manner. Reference group members at present are not analysing the evolution of each grantee's time series for the selected indicators jointly with applications for new funding. As a consequence of these weaknesses, ISP's reporting, as evidenced by the Annual

Report is both lengthy and descriptive and does not do justice to what ISP does. Moreover it provides no evidence of programme learning.

We understand that the results framework was developed in line with Sida's requirements but it has not been helpful to ISP for it to be required to monitor and report against goals and objectives that do not fit with its mandate and capacities.

Capacity development processes

ISP supports capacity development primarily through providing resources and skills and knowledge to research groups and scientific networks. These contribute to the ability of these research groups and the individuals within them to build research capacities and generate results. The provision of resources, notably of equipment has been a core strength of the ISP programme. The development of human resources and facilitation of scientific cooperation has been a key contribution of ISP. Much of the research that has been undertaken has strong development relevance.

But the specific capacity development processes that ISP has been involved in have not been fully and clearly set out. Systematic baselines when initiating new collaborations have not been explicitly established. Thus a clear chronology of stages in capacity development for each RG/SNs has not been outlined addressing issues, for example, of ability to formulate research problems, design research projects, develop research leadership or seek additional funding. The absence of systematic detailed procedures for the role and activities of reference groups in mentoring and monitoring progress indicate in our view weaknesses in the internal procedures for performance monitoring, accountability and learning, notably with respect to following up the implementation of the programme's strategic plans. We conclude that much of the support to RGs and SNs has been intuitive rather than transparent, and it has not supported systematic programme learning and renewal. In our view a greater attention to the detail of capacity development that ISP is involved in would not only clarify for ISP its monitoring needs, it would encourage greater programme learning and leverage the case of what is unique and important about ISP. The analogy to be made is with the study programmes and key stages of progress through which a PhD training would pass although stretched of course over a much longer period and at a different level.

Progression of RGs/SNs to independence from ISP

Support to most of the RGs and SNs has effectively been allowed to continue indefinitely with no formal evidence of graduated increases in capacity. This long-term support without clearly including support to fund-raise as part of capacity development or setting out of explicit time-tabled phased out plans has contributed to financial dependency on ISP.

Synergies between the ISP and Sida bilateral programmes

The synergy between the ISP and Sida bilateral programme that was found in Cambodia was not the case in either Ethiopia or Uganda in the past, where gaps in

funding in the period 2009- 2011 had negative effects on the capacity to carry out research. To what extent this reflects country specific factors or Sida strategies is not known.

Gender

The gender equality grant mechanism has the potential to gather context-specific experience in how to promote gender equity which can generate lessons that are of wider relevance and application. The mechanism is essentially demand-driven, with grants applied for on a competitive basis by people who daily confront issues of gender inequity. The funding enables them to test out new initiatives and possible practical measures for addressing gender inequity in their disciplines and institutions. Applicants for funding should be encouraged to consider the barriers that need to be addressed in their own practice and within their institutions (e.g. in terms of course formats and/or research topics), as well as in culture and society. Reporting on funded initiatives should give attention to results that were disappointing, as well as setting out what worked well, and should identify the key lessons learned from both. ISP has a good track record in promoting regional collaboration and networking among RGs. Networking between RGs and SNs has been initiated through the gender equality grant mechanism and ISP can use this experience further to encourage the sharing of lessons learned so that positive lessons may be incorporated into common practice across ISP-supported RGs and SNs.

Maintaining relevance

We acknowledge the extent to which ISP has moved during the 2014-2018 in following up through tracer studies and phased out groups on the effects of the programme on ISP. The innovation in establishing the gender equality grant is commended and offers an important route forwards in addressing gender issues in science. But at a time of major changes in the higher education landscape, particularly in Africa both with stronger support for higher education in general and the specific focus on science and technology skills, the question of the ISP's future positioning arises. On the one hand ISP clearly has a specific niche in supporting RGs/SNs in weak institutions and its mode of operation reflecting a long term commitment is distinctive. It is unlikely that there will be many more Cambodia's amongst the countries that Sida cooperates with, where starting building basic science capacity from the ground floor is required. There will be cases, Afghanistan for example, where the current ISP model may well be appropriate, but in most other contexts the challenges lie rather in advancing research that has passed that very basic level and, more importantly, where there is a wider and dynamic landscape of funding sources and modalities. In sum a core conclusion is that ISP may need to more explicitly leverage its distinct contribution and seek synergies with other actors, including Sida's bilateral programme, in order to maintain its relevance in view of the changing landscape in higher education.

6 Key findings and recommendations

There are many strengths in the ISP programme and it delivers a significant public good in supporting skills and knowledge development that allows its partners to engage with global science and be in a position to contribute to their country's development needs. It offers a modality of working that has been successful in capacity development support that is all too rare in being long term, needs based and process driven rather than short term and output oriented. It has also been appreciated by its partners. The ISP Secretariat has many capabilities – to self-organise and act, to generate results and establish supportive relationships. ISP's strengths can be leveraged in new ways.

It needs to focus on adapting and changing to the shifting landscape in support of science education with new actors and networks, greater levels of funding and an increased global emphasis on science and technology. ISP needs to be more strategic in leveraging its distinct contribution to capacity development in this changing landscape. It needs in its governance structures a wider range of skills and experience to draw on to do this.

ISP needs to strengthen its comparative advantage from working at the RG/SN levels and develop synergies with, for example, Sida's bilateral programme. This is likely to be the case with the new Sida Cambodia programme. This would combine the bottom-up approach of ISP with Sida's focus on capacity development at an institutional level. Greater coordination between ISP and the Sida bilateral programme in Ethiopia would facilitate learning about how institutional constraints impact on the activities of university researchers which should in turn generate thinking on how those constraints might be addressed and mitigated.

There are a number of specific recommendations to make on programme design and management and Table 4 identifies those findings where recommendations are made for specific changes. The current model of operation would provide the basis for these, albeit within a phased and time bound modality. A case could be made for defining a time horizon for support to RGs/SNs at the outset, linked initially to five three-year cycles of funding. This would then be subject to external review if a case was to be made to extend funding for a further defined period. This would encourage more systematic monitoring of capacity changes and assessment jointly by ISP and the concerned RG/SN of progress towards sustainability. This would take account of both baseline conditions in the institutional environment as well as any subsequent changes. In deciding how to position itself after 2018 and how to focus its support to groups and networks, ISP will need to consider whether it has the responsibility and

the capacity to assist RGs and SNs to develop and implement fund-raising plans so that, by the end of an agreed period of ISP support, they have diversified their funding and significantly reduced their financial dependence on ISP.

ISP should also consider moving its support a little more upstream and provide selective support to a post-doctoral scheme. All too often new PhDs or those in early career, have little opportunity to embark on an independent research career after graduating since they are quickly moved into positions of responsibility. Linking such a scheme to building collaborations or working in new research environments with existing RGs and SNs would provide real opportunities for career development and wider research experience.

ISP could also consider developing part of its programme and move towards a competitive research funding approach specifically designed to bring research groups up to competitive standards. This would be consistent with developing a graduated approach towards capacity development where RGs/SNs who are moving towards sustainability are exposed more to the competition process for research funding. The principle of this would be for ISP to identify core areas in the sciences that it considers are in the public interest, in need of support and are not being addressed by others. The funding could support all the modalities that ISP currently deploys, including training, mentoring, collaboration etc. However the funding should be fixed term: for example two or three rounds of funding over a 10 year period, subject to progress which should be closely monitored.

Table 4 - Overview of key findings and recommendations

	Key Findings	**Recommendations to ISP**
1	There is a lack of coherence between ISP's activities and achievements in capacity development and its results framework. The latter is pitched at too high a level.	ISP needs to be much clearer about the research capacities that it can contribute to and design a Theory of Change and Results framework that is consistent with this.
2	ISP's monitoring framework has not provided relevant data, information and knowledge. Many of the current indicators are inappropriate and its focus on assessing 'averages' that cut across the entire grantee population that exists in diverse contexts is not helpful to learning.	ISP needs to rethink its indicators in relation to a new Theory of Change and Results Framework. It should revise its set of indicators to capture essential aspects of capacity development it wants to develop and focus more on analysing time series data for each individual grantee. Such a revision should be done in dialogue with Sida (cf #8 below)
3	The ISP has not established systematic baselines and identified a chronology of capacity development that is assessed and monitored over time by the Reference Groups.	ISP needs to develop for each RG/SN that it supports a baseline and chronology of capacity development stages which must be assessed and monitored over time by the Reference Groups. These should contain a clear timetable of change.
4	The Reference Group procedures are not consistent across the programmes and do not appear to consistently review and assess research grant applications.	More formal procedures for the Reference Groups need to be implemented, including more structured review processes whereby judgements are supported by argument and recommendations followed up.

	Key Findings	Recommendations to ISP
5	ISP funding appears to have created a dependency for groups that it has been funding long term.	ISP needs to proactively support groups that it has been funding long term to attract new sources of funding and with a clear cut-off date for ISP funding.
6	The gender equality grant mechanisms offers a very useful mechanism for understanding gender constraints.	ISP should build on the early experience of implementing the gender equality grant mechanism and ensure that positive and negative lessons learned from this are disseminated widely and that good practice in promoting gender equality is taken up throughout the programme.
7	The higher education landscape is changing with new networks, forms of cooperation and funding for science and technology. ISP's strategy needs to take this into account leveraging its specific contribution to build synergies with other actors.	ISP should develop a new strategy that builds on its strengths and what it can contribute to scientific research capacity in a changing higher education landscape. It should consider a competitive grant approach in thematic areas of science where there is a public good interest.
		Recommendations to Sida
8	Sida's accountability requirements have not been helpful for ISP to establish a monitoring and reporting framework that supports learning within the programme. We understand a formal results based framework is no longer a statutory requirement for Sida funding.	Sida and ISP should negotiate and agree on a revised set of indicators that serve both the purpose of accountability towards Sida and learning for ISP and its grantees.
9	Synergies between the ISP programme and the bilateral programme have not been fully realised.	Sida should more systematically ensure that the complementarities between ISP and its bilateral programmes are supported.
10	ISP offers a model of cooperation that has immense value and is consistent with Sida's principles.	Sida should continue to support ISP but subject to the rethinking and re-positioning of its approach

Annex 1 – Terms of Reference

Terms of Reference for the Evaluation of the Sida supported programme "International Science Programme 2014-2018"

Date: 2017-11-27

1. Evaluation purpose: Intended use and intended users

The purpose or intended use of the evaluation is to 1) provide Sida with input to Sida's assessment of supporting a possible new phase of the International Science Programme (ISP), and 2) provide ISP with input of what works well and less well in order to inform decisions on how the implementation of the programme may be adjusted and improved in the new phase.

The primary intended users of the evaluation are Sida's Unit for Research Cooperation and the management team of ISP.

2. Evaluation object and scope

The object for this evaluation is the Sida supported programme International Science Programme (ISP). ISP was established at Uppsala University, Sweden in 1961, to support low-income countries to build and strengthen their domestic research capacity in the basic sciences chemistry, mathematics and physics, and to develop postgraduate education in these sciences. The ISP-model of support is based on five core features: capacity building, long-term support, improved research environments, collaborative links, and sandwich model training.

ISP provides long-term support, coordination and mentoring to research groups and regional scientific networks at universities and research institutes in Africa, Asia and Latin America. Supported groups and networks use ISP-funding to improve their research quality, environments and conditions by purchasing e.g. laboratory equipment, consumables, literature, and computing tools. Funds are also used for organizing and attending conferences and workshops, and for exchange of scientists and postgraduate sandwich students with scientific hosts at collaborating research groups abroad.

The activites of the groups and networks are carried out in close, long-term, collaboration with one, or several, more established host groups within the same field of science at

universities or research instituties abroad. The host groups are mainly located in Sweden and Europe, but also in the regions of ISP's supported partners. ISP functions as a link between the supported groups and network and the scientific hosts world wide.

The ISP *vision* is to efficiently contribute to a significant growth of scientific knowledge in low-income countries, thereby promoting social and economic wealth in those countries, and, by developing human resources, in the world as a whole. In support of this vision, the *overall goal* of ISP is to contribute to the strengthening of scientific research and postgraduate education within the basic sciences, and to promote its use to address development challenge.

ISP therefore has the *general objective* to strengthen the domestic capacity for scientific research and postgraduate education, by long-term support to research groups and scientific networks in these fields. To achieve its general objective, ISP defines three *specific objectives*:

1) Better planning of, and improved conditions for carrying out, scientific research and postgraduate training.
2) Increased production of high quality research results.
3) Increased use by society of research results and of graduates in development.

The Swedish International Development Cooperation Agency (Sida) has been the main financial contributor to ISP since 1965, although support was channelled through the former Swedish Agency for Research Cooperation with Developing Countries (SAREC) during 1978-1992.

The scope of the evaluation shall cover Sida-funded activities for the period 2014-2018. However,
in order to have a broader view, and if relevant, the evaluators may allow their assessment to extend to earlier years. The geographical scope of the evaluation is to look spefically on ISP activities in Ethiopia, Burkina Faso and Cambodia. The analysis should be put into a larger context of Sweden's strategy on research cooperation, ISP's strategic direction, as well as the broader context of global and regional trends with relevance for scientific research and research training.

For further information, the project/programme proposal is attached as Annex D. The scope of the evaluation and the theory of change of the project/programme shall be further elaborated by the evaluator in the inception report, as the evaluator shall describe and analyse ISP's RBM logical framework.

3. Evaluation purpose: Intended use and intended users

The primary purpose or intended use for this evaluation is to:

1) Provide Sida with recommendations to be considered in upcoming discussions concerning possible continued cooperation (starting 2019).

2) Provide ISP with recommendations on future directions and initiatives to be taken by ISP, within the scope of its vision, to increase its effectiveness.

The intended users of the evaluation is the Unit for Research Cooperation at Sida and ISP's management team. The evaluation is of a formative nature, so it aims to produce substantial ideas on how to improve, besides reviewing activities and programmes.

4. Evaluation objective and questions

The main objective of this evaluation is to evaluate the effectiveness, impact and potential sustainability of ISP 2014-2018.

More specifically, the evaluation should provide answers to the following questions:

Effectiveness

To which extent has the program contributed to intended outcomes, in particular as regards:

Postgraduate training

1. To what extent and how has ISP's activities led to increased human and scientific research capacity in supported groups and networks?

-

Research

2. What are the quantity and scientific quality of the research conducted and results obtained by supported groups and networks, in terms of publications in scientific journals and presentations at international conferences? The assessment and analysis should consider possible challenges in the context of an increasing number of electronic publication venues, including so called "predatory publishers".
3. How has the program increased the capacity to formulate research problems and proposals as well as designing research projects and attract external research funding?
4. What are the adequacy, functionality (use and maintenance) and results of ISP's efforts to contribute to the improvement of scientific research facilities and technical resources?
5. What effects does ISP support have on the development of research leadership among groups and networks?
6. To what extent and how has ISP impacted on academic quality and a scientific research culture in the supported groups and networks?

Impact

7. How have ISP supported groups and networks interacted with public institutions, industry and civil society, and with what impacts?
8. How have ISP supported groups and networks gained recognition for their research or achievements (awards, promotions, appointments to committees, patents etc.)?

9. How is ISP working to increase gender equlity in supported groups and networks? Could gender mainstreaming have been improved in planning, implementation or follow up?
10. Has the project had any negative effects on the environment? Could environment considerations have been improved in planning, implementation or follow up?
11. How has ISP worked with alumni to strengthen results and increase its impact?

Relevance

12. Assess the appropriateness of ISP's RBM logical framework and outcome indicators for measuring results and indicating the progress of the programme.

-

Sustainability

13. What is the potential sustainability of ISP and the supported groups and networks?
14. What complementary funding opportunities would be conceivable for the continued operation and development of ISP.
15. The evaluation shall further assess how ISP has approached and addressed the recommendations given in the latest (2011) evaluation of ISP, with special emphasis on ISP's Strategy Plan 2013-2017, and the yearly action plans for ISP's strategic work.

Questions are expected to be developed in the tender by the tenderer and further developed during the inception phase of the evaluation.

5. Methodology and methods for data collection and analysis

It is expected that the evaluators will visit ISP's partners in minimum two of the following countries: Ethiopia, Burkina Faso and Cambodia. It is also expected that the evaluators conduct interviews through telephone/Skype with ISP partners in Bangladesh and Uganda. It is also expected that the evaluators will conduct interviews with ISP's management and staff, with selected members (or former membes) of the ISP Board and Scientific Reference Groups, as well as representatives of Sida.

It is expected that the evaluator describes and justifies an appropriate methodology and methods for data collection in the tender. The evaluation design, methodology and methods for data collection and analysis are expected to be fully presented in the inception report.

Sida's approach to evaluation is utilization-focused which means the evaluator should facilitate the entire evaluation process with careful consideration of how everything that is done will affect the use of the evaluation. It is therefore expected that the evaluators, in their tender, present i) how intended users are to participate in and contribute to the evaluation process and ii) methodology and methods for data collection that create space for reflection, discussion and learning between the intended users of the evaluation.

Evaluators should take into consideration appropriate measures for collecting data in cases where sensitive or confidential issues are addressed, and avoid presenting information that may be harmful to some stakeholder groups.

Relevant documents and data will be made available to the evaluators by Sida and ISP. The evaluators are also expected to independently search for data and documents, when deemed suitable and necessary, for example in scientific databases.

Documents to be made available to the evaluators may include the following:
- Applications to Sida
- Agreements with Sida
- Minutes from Board meetings and meetings with the Executive Committee to the Board (the latter in Swedish)
- Minutes from Annual review meetings with Sida
- Annual narrative and financial reports
- ISP reports and publications
- Publications regarding ISP
- The Sida evaluation of ISP in 2011, including the management response
- The Swedish 'Strategy for Sida's support for development research cooperation 2010-2014'
- The Swedish 'Strategy for research cooperation and research in development cooperation 2015-2021

6. Organisation of evaluation management

The evaluation is commissioned by the Unit for Research Cooperation at Sida. ISP has contributed to the ToR and will be provided with an opportunity to comment on the draft inception report as well as the draft final report, but will not be involved in the management of the evaluation. Hence the commissioner will evaluate tenders, approve the inception report and the final report of the evaluation. ISP will be participating in the start-up meeting of the evaluation, inception meeting, debriefing workshop, as well as in the workshop where preliminary findings and conclusions are discussed, and in the conclusion seminar.

7. Evaluation quality

All Sida's evaluations shall conform to OECD/DAC's Quality Standards for Development Evaluation[30]. The evaluators shall use the Sida OECD/DAC Glossary of Key Terms in Evaluation[31]. The evaluators shall specify how quality assurance will be handled by them during the evaluation process.

8. Time schedule and deliverables

It is expected that a time and work plan is presented in the tender and further detailed in the inception report. The evaluation is expected to be carried out between February 5-9 and June

[30] DAC Quality Standards for development Evaluation, OECD, 2010.

[31] Glossary of Key Terms in Evaluation and Results Based Management, Sida in cooperation with OECD/DAC, 2014.

11-15, 2018. The timing of any field visits, surveys and interviews need to be settled by the evaluator in dialogue with the main stakeholders during the inception phase.

The table below lists key deliverables for the evaluation process. Please note that the below time line give an indication of Sida's tentative planning of the evaluation process and that tenderers are expected to propose their own time plan in the tender.

Deliverables	**Participants**	**Suggested deadlines**
1. Start-up meeting at Sida HQ in Stockholm/or virtually	Evaluators, Sida, ISP	Week 6 (February 5-9 2018)
2. Draft inception report		Week 6-8, February, 2018
3. Inception meeting at Sida HQ in Stockholm/or virtually	Evaluators, Sida, ISP	Week 8, February, 2018
4. Comments from intended users to evaluators		March 1, 2018
5. Final inception report		March 15, 2018.
6. Debriefing workshop	Evaluators, Sida, ISP	Week 15 (April 9-14), 2018
7. Draft evaluation report		April 30, 2018
8. Presentation of draft report, Sida, Stockholm	Evaluators, Sida, ISP	May 7, 2018
9. Comments from intended users to evaluators		May 14, 2018.
10. Final evaluation report		June 1, 2018
11. Evaluation brief	Sida, Swedish Embassies with Research Cooperation, Uppsala/Stockholm University, other Research Donors	Week 23, (June 4-8), 2018
12. Conclusion seminar, Sida HQ/virtually	Evaluators, Sida, ISP, key stakeholders	Week 24, (June 11-15), 2018

The inception report will form the basis for the continued evaluation process and shall be approved by Sida before the evaluation proceeds to implementation. The inception report should be written in English and cover evaluability issues and interpretations of evaluation questions, present the methodology, methods for data collection and analysis as well as the full evaluation design. A specific time and work plan for the remainder of the evaluation should be presented which also cater for the need to create space for reflection and learning between the intended users of the evaluation.

The final report shall be written in English and be professionally proof read. The final report should have clear structure and follow the report format in the Sida Decentralised Evaluation Report Template for decentralised evaluations (see Annex C). The methodology used shall be described and explained, and all limitations shall be made explicit and the consequences of these limitations discussed. Findings shall flow logically from the data, showing a clear line of evidence to support the conclusions. Conclusions should be substantiated by findings and analysis. Recommendations and lessons learned should flow logically from conclusions. Recommendations should be specific, directed to relevant stakeholders and categorised as a short-term, medium-term and long-term. The report should be no more than 35 pages excluding annexes.

The evaluator shall, upon approval of the final report, insert the report into the Sida Decentralised Evaluation Report for decentralised evaluations and submit it to Sitrus (in pdf-format) for publication and release in the Sida publication data base. The order is placed by sending the approved report to sida@sitrus.com, always with a copy to the Sida Programme Officer as well as Sida's evaluation unit (evaluation@sida.se). Write "Sida decentralised evaluations" in the email subject field and include the name of the consulting company as well as the full evaluation title in the email. For invoicing purposes, the evaluator needs to include the invoice reference "ZZ610601S," type of allocation "sakanslag" and type of order "digital publicering/publikationsdatabas.

9. Resources

The Program Officer/contact person at Sida is Fanny von Heland, Unit for Research Cooperation. The contact person should be consulted if any problems arise during the evaluation process.

Relevant Sida documentation will be provided by Fanny von Heland, Unit for Research Cooperation. Relevant ISP documentation will be provided by Peter Sundin, ISP.

Contact details to ISP supported groups and networks will be provided by Peter Sundin, ISP.

The evaluator will be required to arrange all logistics.

10. Annexes

Annex A: List of key documentation

Agreement and Application

- Grant Agreement Sida-Uppsala University
- Application for financial support for the International Science Programme for the period 2014-2018

Board meetings

- Minutes from Board meetings and meetings with the Executive Committee to the Board (the latter in Swedish)

Annual Narrative and Financial reports

- Annual Report 2014
- Annual Report 2015
- Annual Report 2016
- Minutes from Annual Review Meetings with Sida

Former evaluations

- Report on the Evaluation of the International Science Program, ISP, 2011, including the Sida Management Repsonse to the evaluation
- The International Science Programme in Sri Lanka and Thailand: Three decades of research cooperation. Rebecca Andersson och Marta Zdravkovic, 2017
- Evaluation Report of the Eastern Africa Universities Mathematics Programme Martin Singull, Balázs Szendrői and Antonella Zanna, 2017
- Tracing ISP graduates 2008-2013 Rebecca Andersson and Peter Sundin, 2016
- The International Science Programme in Bangladesh: A case of self-interest, interconnectedness or social empowerment? Tatjana Kuhn, 2012
- Sida and Uppsala University evaluation of ISP GHD, 2011
  Management Response
- International Science Programme, Uppsala University 1961-2001. Historical review and Participants Experiences. Editor: Torsten Lindqvist, 2001

Other relevant ISP publications

- The Sandwich Model – A Successful Case of Capacity Building". Rebecca Andersson, Internationalisation of Higher Education – A Handbook, 2017.
- Experiences and perceptions of South–South and North–South scientific collaboration of mathematicians, physicists and chemists from five southern African universities. Marta Zdravkovic, Linley Chiwona-Karltun, Eren Zink, Scientometrics, pp. 1-27, 2016.

Sida strategies

- Swedish strategy for research cooperation and research in development cooperation 2015 – 2021
- Policy for Research in Swedish Development Cooperation 2010-2014 and Strategy for Sida's support for Research Cooperation 2010-2014.

Annex B: Data sheet on the evaluation object

Information on the evaluation object (i.e. intervention, strategy, policy etc.)	
Title of the evaluation object	Internatinal Science Program, ISP, 2014-2018
ID no. in PLANIt	A5400630
Dox no./Archive case no.	14/000364
Activity period (if applicable)	2014-01-01 – 2018-12-31

Agreed budget (if applicable)	160 000 000 SEK
Main sector	Research
Name and type of implementing organisation	International Science Program (Uppsala University)
Aid type	Project type intervention
Swedish strategy	Forskningssamarbete

Information on the evaluation assignment	
Commissioning unit/Swedish Embassy	Unit for Research Cooperation, Sida
Contact person at unit/Swedish Embassy	Fanny von Heland, Unit for Research Cooperation, Sida
Timing of evaluation (mid-term review, end-of-programme, ex-post or other)	End-of-program evaluation
ID no. in PLANIt (if other than above).	

Annex 2 – Itineraries and people met

Country & Team Member	
ISP Secretariat: Adam Pain and Trish Silkin, March 27-29th 2018	
ISP Staff	
Leif Abrahamsson	Director, IPMS
Rebecca Andersson	Project Coordinator (interviewed by Skype,
Carla Puglia	Deputy Program Director, IPPS
Peter Sundin	Director, IPICS and Head of ISP
Ernst van Groningen	Director IPPS
Cecilia Oman	Deputy Program Director (interviewed by skype)
ISP Executive Committee	
Professor Kersti Hermansson	(Chairperson), Department of Chemistry, Uppsala University
Professor Lars Österlund	Department of Engineering Science, Solid State Physics
Professor Maciej Klimek	Department of Mathematics
Reference Group Members	
Professor Charlotta Turner	(IPICS) Lund University (by phone)
Professor Iqbal Parker	(IPICS) International Centre for Genetic Engineering and Biotechnology, Cape Town, South Africa (by phone)
Professor Christer Kiselman	(IPMS) Department of Information Technology, Uppsala University
Professor Krishna Garg	(IPPS) University of Rajasthan, Jaipur, India (by skype)
Professor Magnus WIllander	University of Linkoping
Professor Roland Roberts	Uppsala University
Supervisors / Collaborators	(Various Departments)
Boschloo Gerrit (Physical Chemistry) Ingemar Kaj (Maths), Roland Roberts (Geophysics), Bjorn Lund (Geophysics), Christer Kiselman (Mathematics), Mate Erdely (Chemistry) Patrice Godonou (Engineering)	
Alexander Sellerholm	Program Manager Research and Humanitarian Affairs Embassy of Sweden, Ethiopia
Dr Adil Zakaria	Department of Civil and Environmental Engineering, Addis Ababa Institute of Science and Technology

Dr Atalay Ayele	Associate Professor, Director of the Institute of Geophysics, Space Science and Astronomy (IGSSA), Addis Ababa University (AAU)
Dr Ermias Dagne	Emeritus Professor of Chemistry Department of Chemistry, College of Natural and Computational Sciences, AAU
Dr Ketsela Hailu	Vice President for Administrative Affairs, Addis Ababa University of Science and Technology Chair of the Department of Mathematics
Dr Lemi Demiyu	Assistant Professor of Physics, Department of Physics, College of Natural and Computational Sciences, AAU
Dr Mariamawit Yonathan	Department Head, Department of Pharmacognosy, College of Health Sciences, AAU
Dr Mekonnen Ababayehu Desta	Department of Chemistry, College of Natural and Computational Sciences, AAU
Dr Mulugeta Bekele	Associate Professor of Physics, Department of Physics, College of Natural and Computational Sciences, AAU
Dr Negussie Megersa	Professor of Chemistry, Department of Chemistry, College of Natural and Computational Sciences, AAU
Dr Tadesse Abdi	Head, Department of Mathematics, College of Natural and Computational Sciences, AAU
Dr Tilahun Abebaw	Mathematics Research Group Leader, College of Natural and Computational Sciences, AAU
Dr Wendimagegn Mammo	Professor of Organic Chemistry, Department of Chemistry, College of Natural and Computational Sciences, AAU
Dr Zewdneh Genene Wolkeba	Department of Chemistry, College of Natural and Computational Sciences, AAU
Tamirat Bekele Jimma	MSc in Computational Physics, IGSSA
Ambachew Bizuneh	BSc in Electronic Technology, IGSSA
Birhan Al Kadir Abdulahi	PhD Candidate, Department of Chemistry, College of Natural and Computational Sciences, AAU
Birhanu Abera	MSc in Seismology Geophysics, IGSSA
Daniel Mamo	MSc in Geophysics, IGSSA
Royal University of Phnom Penh, Cambodia; Adam Pain, April 30 – May 4th, 2018	
Dr Chan Oeurn Chey	Physics Department
Dr Sou Kalyan (F)	Physics Department
Dr Khun Kimleang	Physics Department
Meng Long Seng (F)	Physics Masters Student, Batch 6 MSc, not graduated
Ngok Sreymean	Physics Masters Student, Batch 6 MSc, not graduated
Yann Rem	Lecturer, Physics Department, Batch 1 MSc
Ty Bunly	Physics Masters Student, Batch 7
Dr Sorya Proum (F)	Lecturer, Chemistry Department

Mr Chey Thavy	Head of Chemistry Department
Ngon Putheary (F)	Lecturer, Chemistry Department
Touch Hun	Lecturer, Mathematics,
Ham Karim	Lecturer, Mathematics,
Ngov Simrong	Deputy Head, Mathematics
Magnus Saemundsson	First Secretary, Education, Swedish Embassy
Dr Chhem Rethy	Director, Cambodian Development Resource Institute
Simeth Beng	Senior Education Specialist, World Bank
Santosh Khatri	Chief, Education Programme, Unesco
Bangladesh	**Gonçalo Carneiro, 18-30 April 2018**
Dr Mohammad Shoeb	Dep Chemistry, University of Dhaka, IPICS BAN:04 group leader
Prof Nilufar Nahar	Dep Chemistry, University of Dhaka, former IPICS BAN:04 group leader
Dr Md Rausan Zamir	Daffodil International University, IPICS BAN:05 group leader
Prof Begum Rokeya	Bangladesh University of Health Sciences, IPICS ANRAP coordinator
Prof Altaf Hussain	Dep Chemistry, University of Dhaka, IPICS NITUB coordinator
Prof Md Feroz Alam	Dep Physics, Bangladesh University of Engineering and Technology, IPPS BAN:02 group leader
Prof K Siddique-e-Rabbani	Dep Biomedical Physics and Technology, University of Dhaka, IPPS BAN:04 group leader
Dr K Sadaat Hossain	Dep Physics, University of Dhaka, IPPS BAN:05 group leader
Burkina Faso	**Gonçalo Carneiro, 25 April – 3 May 2018**
Prof Yvonne Bonzi-Coulibaly	Dep Chemistry, University of Ouagadougou, IPICS BUF:01 group leader
Dr Boubié Guel	Dep Chemistry, University of Ouagadougou, IPICS BUF:02 group leaders
Dr Issa Tapsoba	Dep Chemistry, University of Ouagadougou, IPICS ANEC coordinator
Prof Alfred Traoré	Centre de Recherche en Sicneces Biologiquest, Alimentaires et Nutricionelles, University of Ouagadougou, IPICS RABiotech coordinator
Uganda	**Gonçalo Carneiro, 18 April – 2 May 2018**
Dr John Wasswa	Dep Chemistry, Makerere University, IPICS UGA:01 group leader
Dr Emmanuel Tebandeke	Dep Chemistry, Makerere University, IPICS UGA:02 group leader

Dr Simon Anguma	Muni University, IPPS EAARN coordinator
Prof Tom Otiti	Dep Physics, Makerere University, IPPS MSSEESA coordinator and IPPS UGA:01/1 group leader
Dr Edward Jurua	Dep Physics, Mbarara University of Science and Technology, IPPS UGA:01 group leader
Dr David Sseviiri	Dep Mathematics, Makerere University, IPMS EAUMP coordinator in Uganda
Dr Fred Tugume	Uganda Geological Survey, IPPS ESARSWG coordinator

Annex 3 – Primary case studies: Ethiopia and Cambodia

UNIVERSITY OF ADDIS ABABA, ETHIOPIA CASE STUDY

Context

Ethiopia has the second largest population in Africa at 102 million (2016). Its recent annual growth rates at above 10 percent are well above regional averages, based mainly on agriculture, construction and services. Though declining, the poverty rate is still above 30 percent and it has a per capita income of US$783. Recent years have seen improvements in child mortality and access to clean water, and primary school enrolment has quadrupled. For the period under review, Ethiopia's development has been guided by the Growth and Transformation Plan I (GTPI) (2010/11-2014/15) and by its successor GTPII (2015/16-2019/20), which give priority to investment in infrastructure, agriculture, industry and renewable energy. Support to the development of traditional medicine is included in the national strategy for the pharmaceutical industry. The Ethiopian government aims for the country to reach middle income status by 2025.

Since 2000, Ethiopia has embarked on a major programme of expansion in higher education. The number of universities has risen from two at the beginning of the century to more than 33 (public and private) in 2016 with 11 more planned under GTPII. In 2013, undergraduate enrolment was above 500,000 of whom 30 percent were female, Masters' enrolment was above 28,000 of whom 20 percent were female, and PhD enrolment was 3,165, of whom just over 11 percent were female. For Ethiopia to reach the government's middle income status target, it will need to significantly increase enrolment at undergraduate and postgraduate levels but concerns have already been raised that the recent expansion in numbers has led to a significant decline in standards. There is also concern about the marked gender disparity, particularly among postgraduates.

Addis Ababa University (AAU) is the oldest and largest tertiary education institute in Ethiopia, founded as a university college in 1950. With Ethiopia's major expansion of higher education, there is a commensurate demand for increased numbers of Masters and PhD graduates for both academic and administrative posts. AAU, described as the Ethiopian 'mother university', is the main source of postgraduates for the rest of the country. AAU is implementing a gender policy with strategies that include

strengthening female scholarship programmes and allowing women extra time to complete their studies.

Sweden has provided a block grant to AAU since 2009 for the development of graduate programmes with a focus on addressing national development needs, supporting the expansion of higher education and remedying the gender disparity in higher education. Independent assessments of AAU have criticised the quality of its PhD programmes and ISP-supported Research Groups also express concern at the poor quality of the recent cohorts of students which, together with difficulties in procurement of essential materials, is believed to have a negative impact on the quality of research.

According to http://www.webometrics.info/en/Africa in January 2018 Addis Ababa University was ranked 25th out of just under 1500 universities in Africa, down from 18th in 2015[32]. AAU also went from first to second place in Ethiopia, overtaken by Jimma University.

Overview

Support to Research Groups (RG) and networks at AAU are among the ISP's longest-term commitments to the development of research capacity, with support to the Natural Products Research Network for East and Central Africa (NAPRECA), initially located in Ethiopia, dating from 1988 and support to the physics RG IPPSETH01 dating from 1990. During the period under review (2014-2018) the ISP supported 6 RGs and one network at AAU. These were:

CHEMISTRY

IPICS ALNAP: The African Laboratory for Natural Products (ALNAP) is a network based in universities in Burundi, DRC, Ethiopia, Rwanda and Uganda Most network coordination has taken place from AAU. ISP funded the network between 1996 and 2015, with the last funding round in 2013-2015. ALNAP's objectives are to promote research and training, to engage in collaborative research in the sub-region, to provide analytical services and to develop health care products based on natural products. There were diverging views in the Reference Group on the application for funding for 2013-2015, one referee holding that ALNAP was performing well in its core activities but another considering that it tended to repeat its activities year on year without showing tangible progress towards objectives. This divergence appears to be the basis for providing a final 3 years funding up to 2015.

[32] The first five places in this ranking were taken by South African universities.

IPICS ETH:01: This RG is concerned with the synthesis and characterization of conjugated polymers and biomaterials for solar energy conversion, storage and sensors. The ISP has funded this RG since 2002, with a gap in funding during 2009-2011 when Sida's block grant to AAU through the bilateral programme was initiated. The RG does not appear to have benefited directly from Sida's block grant, leaving a hiatus in funding for research during this period. IPICS ETH:01 made two applications covering the period under review, for the periods 2014-2016 and 2017-2019. The Reference Group has rated the activities of this RG highly from both fundamental and applied science perspectives. They considered it to offer excellent training and international exposure for students, and to have a good track record in terms of publications and MSc and PhD graduations. The RG was awarded funding for 2017-2019 but was warned that funding beyond this could not be guaranteed and that the RG should seek alternative and complementary funding, particularly as the ISP was unable to meet the full budget request of just under SEK 2.1 million.

IPICS ETH:02: This RG is located in the Department of Pharmaceutical Chemistry and Pharmacognosy in the College of Health Sciences (Black Lion Hospital). The ISP has funded the RG since 2012 (coinciding with the return to Ethiopia of the RG leader, an alumnus of the Sida bilateral programme graduating from Uppsala University). The RG's main objective is to carry out broad and long-term research on plants used in traditional Ethiopian medicine. For the period under review the RG made successful applications to the ISP for 2014-2016 and for 2017-2019. The Reference Group considered that research plans demonstrated potential and innovation, with good opportunities for training. In response to the second application, however, the Reference Group judged progress to have been slower than expected and considered that the RG should begin to demonstrate greater autonomy from the RG leader's PhD supervisor in Sweden. ISP facilitated a productive collaboration between IPICS ETH:02 and IPICS ETH:01.

IPICS ETH:04: The ISP has funded this RG since 2013. The RG is concerned with creating capacity in Ethiopia for chemical analysis of organic and inorganic environmental pollutants (from agrochemical, industrial and municipal waste discharges) by the use of modern instrumental methods. The research has potentially relevant applications in agriculture and industry, and the RG has related objectives in terms of advising and influencing users of chemicals (e.g. farmers using pesticides) and policy makers. The RG made two successful applications for funding covering the period under review: for 2013-2015 and for 2015-2017, with a no-cost extension awarded for 2018 (due to the RG leader's health problems which prevented an application being made). The Reference Group considered that the scientific quality and degree of innovation in research proposals were good. While recommending continued funding for 2015-2017, however, the Reference Group noted that the scientific approach needed stronger justification and that the RG needed to provide more evidence of outreach to Ethiopian authorities, given the high relevance of the research to problems of development in different sectors.

MATHEMATICS

IPMS ETH:01: This RG has been funded since 2005, with a gap in funding from 2009-2011 as with IPICS ETH:01. The current RG leader was one of the first two PhD students whose postgraduate studies in Uganda were funded by ISP. The emphasis in the RG's activities has been on support to postgraduate education with its objectives specified as being to increase the contribution of research and postgraduate education in Mathematical Sciences at national and global levels. This involved both building the capacity of the Department of Mathematics at Addis Ababa University and also training Masters and PhD students who would go on to staff mathematics departments in the new universities in Ethiopia. During the period under review the RG has made two successful applications for the periods 2014-2016 and 2017-2019.

PHYSICS

IPPS ETH:01: This RG has been funded since 1990 with a gap in funding between 2009 and 2011 as with IPICSETH01 and IPMSETH01. The RG's objectives are to carry out basic and applied research on modelling, computer simulation, and device characterization, with specific reference to the electrical and optical properties of conjugated organic polymers. The RG made successful funding applications for 2012-2014, 2015-2017 and 2018-2020. The Reference Group considered that the RG had a good track record in the number of qualified postgraduates it had produced, as well as in publications and in regional collaboration. The Reference Group also noted that progress in experimental physics had lagged theoretical physics, mainly because of personnel problems and weak collaboration within AAU. Specifically, the experimental physics side has suffered from a lack of qualified technicians to maintain lab equipment, contributing to difficulties of retention of academic staff and a loss of experimental physicists to other countries. In 2014, the Reference Group recommended lower funding for experimental than for theoretical physics because of these issues. Reference Group comments on the 2018-2020 application were positive, with full support recommended.

IPPS ETH:02: This RG has been funded since 2005, with the same break from 2009-2011 as for other RGs. The RG's overall objective is to build an active seismic network in Ethiopia (connected to stations in neighbouring countries), that will provide the human resources and equipment to enable monitoring of earthquake and volcanic activities in the country and the wider region (of the Rift Valley). The RG aims to provide information on seismic activity to decision makers and stakeholders in order to prevent and mitigate risks to property and human life. During the period under review, the RG submitted two successful applications for funding: for the periods 2014-2016 and 2017-2019. The Reference Group considered the focus of research to be highly relevant and noted that in this area of work it was of particular importance to organise outreach to policy makers and politicians. The Reference Group further noted that the RG had strong international collaborations but was weakly supported within AAU and that this went some way to explain the RG's lack

of students. However, they felt that the project offered good potential as a regional training centre in seismology. The centre has provided training for the ESARSWG network, which is coordinated from Zimbabwe.

Assessment

Relevance

Alignment with Swedish policies

The ISP's support to the development of research capacity in Ethiopia in the basic sciences is broadly relevant to and aligned with the two Swedish policies for research in development cooperation that span the period under review[33]. Swedish policies and strategies focus on building scientific research capacity in developing countries and regions and on promoting the production of high quality research that is relevant to addressing poverty reduction and developing countries' priorities and problems. In Ethiopia, there is some alignment between Sida's bilateral support to AAU, which includes supporting the expansion of PhD programmes and strengthening research capacity, and ISP's support to the six RGs and one network in the basic sciences. The similarity in objectives between the bilateral and ISP programmes and the fact that they offer complementary forms of support to AAU suggest that there are good opportunities for mutual learning that could usefully be developed further. Greater coordination between ISP and the Sida bilateral programme would facilitate learning about how institutional constraints impact on the activities of university researchers which should in turn generate thinking on how those constraints might be mitigated.

Relevance to scientific capacity development

In designing its programmes of support in Ethiopia, the ISP did not systematically analyse the strengths, weaknesses and challenges in the research environment at AAU nor assess existing levels of research capacity. The lack of a systematic approach, however, does not mean that the ISP's support was inappropriate. To the contrary: in interviews for this evaluation, members of RGs and SNs provided consistent and credible examples of the relevance of ISP support and compared it favourably in this regard with support received from some other sources. Scientists at AAU work in a resource-poor environment, lacking easy access to the equipment and materials that are prerequisites for implementing scientific research activities. At the most fundamental level, therefore, the equipment and materials provided by the ISP enabled experimental work to proceed on a much more continuous basis than would otherwise have been the case. Similarly, in facilitating opportunities (e.g. for international engagement by funding fellowships, attendance at conferences etc.) the

[33] Government Offices of Sweden: 'Policy for research in Swedish development cooperation 2010-2014 and strategy for Sida's support for research cooperation 2010-2014' and 'Strategy for research cooperation and research in development cooperation 2015-2021'.

ISP helped to mitigate the sense of isolation engendered by a difficult working environment, not least in the fact of Ethiopia's frequent power and internet outages.

Relevance to national development

Applicants for ISP funding are required to explain or justify their proposed research focus and activities under the heading of relevance, understood as relevance to the Ethiopian context. Applications during the period under review justified relevance in different ways – some RGs showed how research results could be directly applied to national development problems (e.g. industrial pollution, earthquake risk) while others made the case for building centres of academic excellence. It is clear from the written assessments of applications that Reference Group members were concerned to see that funded research should be relevant to Ethiopia's development problems and/or to the realities and challenges of the Ethiopian research environment. The picture is uneven, however, as this concern is not reflected consistently across all assessments and nor does there appear to have been much in the way of follow-up where doubts about relevance were raised. Certainly, the question of relevance did not emerge as a major theme during interviews for the evaluation when RG leaders were asked to reflect on the Reference Groups' comments on their applications. For some RGs, one of ISP's strengths is that – unlike some other donors – it is willing to finance fundamental research that cannot be shown to have immediate application to national development problems but, rather, that facilitates engagement with an international science community.

Effectiveness

Contribution to facilities and resources

As indicated under Relevance, the ISP's provision of equipment and materials was identified as an exceptionally useful aspect of its support, without which it would be difficult for RGs, particularly those working in experimental fields, to carry out any research at all. There is a particularly acute problem at AAU because procurement procedures are cumbersome and slow, supplies need to be procured overseas, and researchers have little or no access to the foreign exchange required for these purchases. A PhD graduate who had completed his studies in Taiwan[34] observed that in that country a researcher could order supplies in the morning and receive them in the afternoon whereas at AAU a researcher might put in an order for supplies and have to wait for months or even years before they arrived. The ISP's role in identifying good suppliers and then managing the whole procurement and payment process is therefore seen by RGs as a core strength of its support.

Specific examples of this include funding for the seven stations that have expanded the national seismic data collection network (IPPS ETH:02) and funding of the

[34] This student had received a scholarship from Taiwan and had not been supported by the ISP.