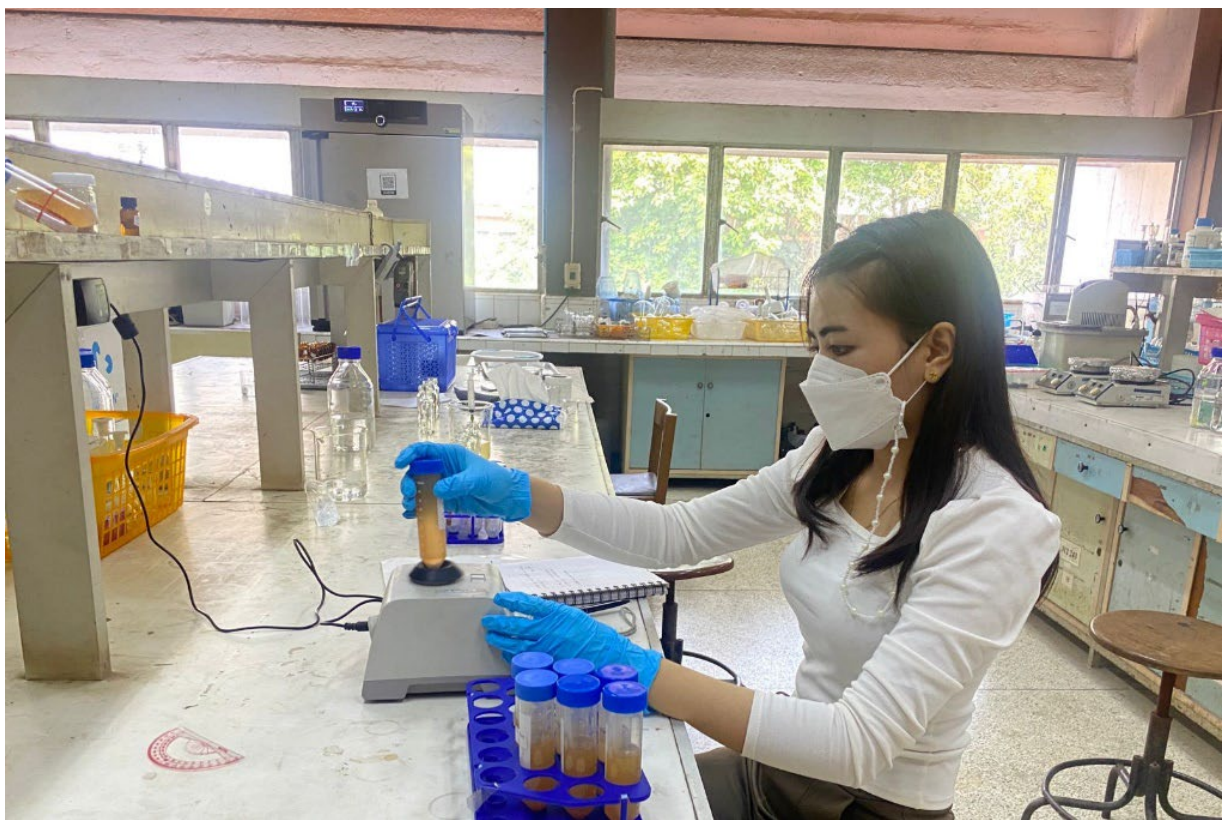


International Science Programme (ISP) Annual report 2024



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Cover photo: Research activities focusing on the developing analytical methods for pesticides and paraquat. (IPICS LAO:01)

1. Executive summary

In 2024, the International Science Programme (ISP) at Uppsala University has continued to build research capacity and postgraduate education in low and lower-middle income countries **despite the cut in Sida funding. ISP has made considerable efforts to elaborate strategies to raise money from different donors, agencies and the EU.**

During 2024, ISP has fulfilled most of the objectives and strategies outlined in ISP's [Strategic Plan 2019-2024](#).

ISP success stories

In 2024, the ISP-supported group and network AAU and EAUMP (*Eastern Africa Universities Mathematics Programme*) obtained the classification label *Africa-Europe Cluster of Research Excellence (CoRE)*.

In 2022, ISP was awarded an Erasmus+ CBHE (Capacity Building in Higher Education) grant for the project PEP, directed towards French-speaking West Africa. This sort of funding was new to ISP, and can be seen as a successful attempt to secure funding outside Sweden. In 2024, the second meeting occurred at the two partner universities in Ivory Coast, and the third meeting (teacher training) at Uppsala University. ISP was co-organiser together with the Uppsala University Division for Internationalisation. The planned pilot courses in Professional English oral communication were held for 92 students at all six West African partners, and can be seen as very successful.

The digitalisation of conferences and meetings in the wake of the Covid-19 pandemic made it possible to arrange meetings, workshops, seminars and international conferences without any costs for travel, hotels and per-diem. This new kind of global interaction has continued during 2024.

The ISP-supported groups have increased the share of females on staff level. Also the share of female postgraduate students has increased.

In 2024, ISP has continued worked hard to make ISP and ISP's activities more visible, and has almost 6,200 followers on Facebook and 630 on LinkedIn.¹

Research findings and the SDGs

There are many examples of research findings by the ISP-supported research groups and networks linked to the Sustainable Development Goals (SDGs). Such findings can be found in the fields of (in alphabetical order) Agricultural chemistry, Algebraic topology, Analytical chemistry, Astrophysics, Atmospheric physics, Biomaterials, Biophysics, Chemical physics, Climate science, Computational physics, Cosmology, Ecological chemistry, Electric engineering, Electric physics, Electrochemical sensors, Environmental chemistry, Environmental physics, Experimental nuclear physics, Financial mathematics, Food chemistry, Geophysics, Machine learning, Materials physics, Mathematical biophysics, Mathematical epidemiology, Mathematical modelling, Materials chemistry, Medicinal chemistry, Medical physics, Mineralogy, Natural products chemistry, Number theory, Partial differential equations, Pesticides and health, Pharmaceutical residues, Physical chemistry, Plasma physics, Polymer chemistry, Quantum physics, Seismology, Solid state physics, Space physics, Statistical mechanics, Theoretical algebra, Theoretical nuclear physics, and Water chemistry.

¹ Numbers from 2025-03-12.

Most research results are connected to *SDG 3 – Good Health and Well-Being* and *SDG 9 – Industry Innovation and Infrastructure*.

Because many of the ISP-supported networks include researchers from more than one university and country, the results are connected to and shared among a large number of higher education institutions (HEIs).

Use of research results

Researchers from the supported groups and networks have used their research results and skills as consultants for governments, UNHCR, NGOs and companies (Burkina Faso, Mali, Tanzania, Uganda, Zambia) and facilitators for solar street lights (Zambia). In Bangladesh, the telemedicine programme of a physics group continued at centres established by local entrepreneurs in many rural areas of Bangladesh, providing health consultation to the public.

The ISP-supported research groups and networks have also contributed to technical development and services in their home countries and beyond. Examples are, performing tests and analyses for public and private organisations (Bangladesh), and investigating the levels of mercury in water and soil samples (Zimbabwe).

Outreach and policy influence

The outreach activities performed by the ISP-supported research groups and networks were directed toward governmental bodies, organisations, student associations, hospitals, the general public, students, universities/schools, industries and other similar stakeholders. The groups and networks have worked in different ways to popularise their research results:

- Through media (newspapers, online media).
- Through events (competitions, conferences, workshops, meetings with local community).
- Through education (training programs, postgraduate courses, and demonstrations).

ISP-supported groups and networks have had considerable policy influence, mainly on a national level when members act as consultants to national governments, e.g., giving insight on topics such as green hydrogen, nuclear energy, solar thermal and applications to the national Energy Council and the Ministry of Energy (Burkina Faso), being engaged by the Ministry of Education and visiting the worst performing schools in mathematics to train in situ the mathematics teachers (Zambia), evaluating ground collapse at potash mining sites (Laos), and advising the government on better use of excess energy from solar milling plants (Zambia).

Gender

During 2024, ISP groups and networks have continued to address the gender gap in science. Due to the financial crisis for ISP, they have not been able to apply for the ISP Gender Equality Grants, which was possible between 2017-2022.

The variety of gender equality promoting activities carried out has addressed different and essential tasks, as required for a serious and sustainable gender work. Similar to previous years, there are different “tracks” for the activities that were carried out:

1. To encourage female undergraduate students to continue to Master’s studies and/or PhD studies in chemistry, mathematics and physics through

- Financial support to female MSc and PhD students (Bangladesh, Ethiopia, Uganda, Zambia).
 - Launching awareness campaigns directed to female students (Burkina Faso, Ethiopia, Mali, East Africa, Zimbabwe).
 - Giving material support to female students for their study, e.g. laptops, USB drives, internet connection, colour printing facilities (West Africa).
2. Affirmative actions directed to female students, e.g., preference to female PhD students during PhD admissions, practising a flexible attitude towards female students, e.g. working from home during pregnancy (Bangladesh, Burkina Faso).
 3. To inspire female students through role-model sessions/activities, (Bangladesh, Burkina Faso, Ethiopia, Kenya, Rwanda, Tanzania, Uganda).
 4. To inspire female primary and secondary school students, e.g., by motivating school visits, by science camps, competitions, and mathematics run (Rwanda, Tanzania, Zambia, Uganda).

Supported groups and networks

In total, 35 research groups and 20 networks were supported by ISP in 2024.

Eight groups were phased out in 2024, four physics groups in Kenya, and four chemistry groups in Bangladesh, Tanzania, Zambia and Zimbabwe.

Staff

In 2024, in total 918 staff members were involved in ISP-supported activities, and 29% of them were women. That is an decrease of actual staff members, but an increase of the share of women staff.

Students

In 2024, a total of 1,177 postgraduate students were reported to be active in research groups and networks. ISP had 566 PhD students in 2024. The yearly number of MSc students usually exceeds 600. That is also the case for 2024, with 611 MSc students.

Since last year there has been a decrease in the number of PhDs and MSc students, but the share of female PhD students has increased from 29% in 2023 to 31% in 2024. The share of female MSc students has increased, from 32% in 2023 to 34% in 2024.

As in 2023, there are more PhD and MSc students in physics than in chemistry. Chemistry has until 2023 been "more popular" than physics .

At the PhD level the share of women students has increased remarkably in physics. On the MSc level, the share of women students has increased in chemistry and physics, but decreased in mathematics.

In 2023, there was a pronounced decrease in the number of women PhD graduates. This is not the case in 2024 which is gladdening since the share of women PhD graduates has increased yearly since 2008, when the data collection started.

The average time PhD students take to graduation essentially has remained the same over the years (close to 5 years), but in 2023 and 2024 it has been lower for sandwich (4,8 years) and higher for local students (5,8 years).

Publications

The total number of publications reported by the supported groups and networks (including book chapters, etc, reported in Tables 8, 9 and 10 in Appendices) has decreased to 441 in 2024 (513 in 2023). However, the number of papers published in quality journals has increased to 88% in 2024 (66% in 2023). 48 (11%) publications are in journals by “predatory publishers” (5,8% in 2023). The decreased number of publications can be related to the phasing out of quite many productive groups.

The rate of acknowledgements of ISP in published articles has ranged between 27% and 33% since monitoring started in 2016, but in 2024 it is much higher (44%).

Conference contributions

For 2024, 261 contributions at scientific conferences were reported by groups and networks, 75% (the highest share ever) of them at international conferences. The high number might be an effect of the Covid-19 pandemic, since many conferences turned into a hybrid mode, making online participation easy.

Arranged meetings

A total of 47 scientific meetings with in total 2,442 participants were arranged by ISP-supported groups and networks in 2024. These are a decrease from last year, but still impressive numbers.

Expenditures

In 2024, the total expenditures of research groups and networks amounted to 84% of the funding provided by ISP, which was SEK 11,5 million (including the balances brought forward from 2023).

The research funding from other sources than ISP has decreased to SEK 8 million during 2024 (26 million SEK in 2023). The institutional co-funding reported by the groups, in the form of in-kind contributions, amounted to 55.6 MSEK in 2024.

Challenges

ISP funds were cut by more than 50% in 2023 and continued to be so in 2024, so many activities were hampered or simply cancelled.

In addition to considerable successes for ISP research capacity building, ISP encounters several challenges and obstacles in its work at partner institutions. These may, for instance, be related to the partners’ research infrastructure, e.g., expertise, instruments, funding, and institutional environment, such as procurement, import clearance, and financial administration.

There are still considerably fewer women than men who are active researchers, so ISP needs to continue its gender activities.

ISP works in many fragile states. Political turmoil may affect supported groups and networks if Sida asks ISP to withdraw or suspend support because of violent political development. This is the case for the three supported groups and networks in Myanmar. The two physics groups are still active, with yearly allocations but no local funds availability. This allows the groups to acquire experimental instrumentation and support travel and exchange of students and staff but not direct support to students for example.

In 2024, predatory publishers continued to claim victims among ISP-supported groups and networks.

ISP still needs to improve previous partners' engagement, so that it can help strengthen more recently supported groups and networks.

Lessons learnt

The reduced Sida contribution to ISP has continued to dominate much of ISP's work in 2024. ISP has made considerable efforts to raise funding from different donors, agencies and the EU. The efforts show that fundraising is hard and takes time. ISP was not successful in obtaining any new external funding in 2024.

The massive budget cut has forced ISP to heavily reduced travels, so it's now more or less non-existent. However, IRL meetings constitute a crucial part of ISP's operational method because on-site observation of opportunities and challenges concerning people, laboratories, working strategies, institutional environment, and other conditions is generally the fastest and most efficient route towards making the best use of the ISP support. Financial constraints or post Covid-19 pandemic require an important analysis to discuss which parts of the work teffectively can be performed online, and what need exists for traveling and meetings in real life (IRL).

ISP will continue to promote gender equality, by encouraging and reminding groups and networks about the gender gap in science.

There is still a need to continue arranging seminars and workshops (both online and IRL) about predatory publishers and how to avoid them. Such seminars and workshops have attracted great interest among our supported groups and networks and will be arranged by ISP in the future.

ISP will continue to increase the visibility of the programme and of supported groups and networks, by engaging in international conferences, social media and newsletters.

Other ISP cooperation

In 2024, ISP continued the cooperation with Stockholm University, TICA (Thailand International Cooperation Agency), Thailand Center of Excellence in Physics (ThEPCenter) and Unisa-iThemba in South Africa. Within the TICA collaboration one student visited Sweden during 2024, however ISP did not get any information about new calls experiencing a challenging communication with the partners in Thailand. Within the Unisa-iThemba there were many African students from ISP physics groups visiting South African laboratories.

ISP has also continued to cooperate with UPE (Unit for Professional English) and the Division for Internationalisation at Uppsala University (through the PEP project).

ISP has continued to coordinate the Sida bilateral programs for research cooperation, on the Swedish side, in Bolivia, Cambodia, Ethiopia, Mozambique, Rwanda and Tanzania. ISP has also administrated the payments of subsistence allowance to students in all bilateral programmes while in Sweden.

2. What is ISP?

ISP is short for the International Science Programme and refers to a centre at Uppsala University in Sweden.

ISP assists low and lower-middle income countries in Africa, Asia and Latin America to build and strengthen research capacity and higher education in the basic sciences chemistry, mathematics and physics, where such capacity is non-existing or weak, by support to institutionally based research groups and scientific networks. The work is carried out in close cooperation with researchers at better equipped host institutions. Although the programme is hosted by Uppsala University, ISP is a truly international program. Host institutions for research collaboration and for sandwich students may be located at other Swedish universities, in other Nordic and European countries, or in the regions of supported partners.

ISP is also coordinator on the Swedish side for the Sida bilateral research cooperation in Bolivia, Cambodia, Ethiopia, Mozambique, Rwanda and Tanzania.

[For more details about ISP, please see Appendix 4]

3. What does ISP do?

ISP's ultimate goal is to increase research capabilities in the target countries, and to promote the use of results in the fight against poverty, for example through innovations and increased employability. From a long-term perspective, the results and acquired skills are expected to favorably impact society by promoting social and economic growth and by developing human resources useful for addressing development challenges. Once groups and networks have reached sufficient strength, ISP may redirect its resources to environments with greater need for support.

In the following sections, each of the ISP objectives and strategies² will be reviewed. In the Appendices, all objectives and strategies are listed, indicating which section in the report they are linked. *[Please see Appendix 4.5]*

In short, ISP promotes:

1. Better planning of and improved conditions for carrying out scientific research and postgraduate training.
2. Better-qualified postgraduate students (Master's and PhD levels).
3. Increased production of high-quality research results.
4. Increased use of research results by society and of graduates in development.
5. Improved gender balance in the basic sciences.
6. An expanded global perspective through increased collaboration between scientists in the global South and the global North.

Below we will see how and where ISP's support has succeeded in fulfilling ISP's objectives and strategies.

²ISP's Strategic Plan 2019-2024: https://isp.uu.se/digitalAssets/504/c_504322-l_1-k_isp_strategic_plan_2019-2024_final-paged.pdf

4. ISP success stories 2024

In 2024, there is an increase in the share of female postgraduate students and staff members. These hard facts showed that the ISP *modus operandi* worked very well and should be continued. One reason for the success was that ISP throughout the years had continued developing and adapting its operational methods, taking advice from evaluations, in close collaboration with its partners, and had safeguarded a strong local ownership. The support has kept the needs of each partner in mind and has been managed on a collegial scientist-to-scientist basis.

In ISP physics, a closer collaboration between different supported groups in Asia was established in 2024 with a postdoc and a PhD students from Nepal, visiting Bangladesh. This exchange was so successful that the collaboration will continue. Also, many physics studentes from different African countries utilised the agreement between ISP and Unisa (South Africa) and could conduct research work in more advance laboratories than their home facilities.

The sandwich model

In 2024, 62 PhD and 43 MSc students are so-called sandwich students. The sandwich model has continued to work very well. The sandwich student alternates between the home institution and a better equipped scientific host institution.³ The model gives students access and exposure to more advanced training facilities, new cultures (both academic and non-academic) and international research collaboration. This is done without detaching students from their home institution (and families) for several years. ISP has previously shown⁴ that the “brain-drain” of students is very low in the ISP programmes. Almost 90% of the PhD graduates work in their home country after their graduation. A large majority is working at universities or research institutes, many holding positions as lecturers or associate professors. The results confirm that the sandwich model is an excellent way to build capacity at a partner institution at a relatively low cost.

Gender balance

The ISP-supported groups and networks have continued to address the gender imbalance in science. Even though there were no call for the ISP Gender Equality Grants in 2023 and 2024, supported groups and networks have shown an enormous inventiveness when using their allocations for outreach activities. *[For more details, please see 5.4 Gender equality]*

Projects

In 2022, ISP was awarded an Erasmus+ grant for the project PEP (Capacity Building for Professional English Programs), directed towards French-speaking West Africa. This funding is new to ISP, and can be seen as a successful attempt to obtain funding outside Sweden. In 2024, the project succeed in developing and implementing the pilot course for oral communication at all six West African partner universities. In total, 92 students took the much appreciated course.

For CoRE-Math, please see below.

Digitalisation

The digitalisation of meetings and conference, starting during the Covid-19 pandemic, has continued to make it possible to arrange international conferences, seminars and meetings without any costs

³ www.handbook-internationalisation.com/de/handbuch/gliederung/#/Beitragsdetailansicht/174/654/The-Sandwich-Model---A-Successful-Case-of-Capacity-Building

⁴ Rebecca Andersson, [Tracing ISP Graduates 2014-2017](#), 2018.

for travel, accommodation and per-diem. In the beginning of the pandemic, ISP helped groups and networks to acquire Zoom licenses and internet access. It is quite remarkable that the conversion from IRL (in real life) meetings to digital ones occurred so rapidly and painlessly. On the negative side, the digital meetings lack closer and longer discussion, informal “in-between” talks during coffee breaks and lunches, and closer interactions with students at the supported institutions. Obviously, in an online meeting, it is also impossible to observe and evaluate the local experimental and scientific context and development at the supported sites.

One example of successful online events is the digital research workshops on the necessity of academic planning and a well-established research culture that Dr Cecilia Öman, assistant director for ISP chemistry, has held with supported partners, institutional leadership and interested staff and students.

Visibility

During 2024, ISP has continued its efforts to further increase its visibility, internally at Uppsala University (UU) and externally outside UU (through e.g. conference participation).

To make the results of ISP’s work more visible and easily accessible, the ISP webpage, a vital communication tool, has been edited and the posts on ISP’s Facebook (FB) account have continued to be long and explanatory. This might be the reason that the ISP has almost 6,200 followers on Facebook and 630 on LinkedIn thus creating a professional network in Sweden and the Global South.⁵

A success story for ISP chemistry

In 2024, the ISP-supported network Cambodian Chemical Society (IPICS CCS) launched its new project “Mobile Lab” which aims to provide high school students with skills in practising experimental work in chemistry. To run the project, CCS developed micro-equipment kits that use micro-materials/ micro-chemical tools with small amounts of chemicals. Mobile Lab project aims to provide high school students with opportunities to learn by themselves by conducting chemistry experiments following the curriculum for grades 10 to 12. Most of the students do not have the chance to do practical/laboratory tasks after their chemistry lessons and the project was highly appreciated by students and teachers.



Photo 1-2. Mobile lab for high school students in Cambodia. (IPICS CCS)

⁵ Numbers from 2025-03-12. ISP’s LinkedIn account started in 2022.

A success story for ISP physics:

Ms Moh Moh Aung from Myanmar successfully defended her PhD thesis in nuclear physics in April 2024 at Suranaree University of Technology in Thailand. She was sponsored by ISP and TICA (Thailand International Cooperation Agency). Moh Moh Aung spent most of her PhD studies in Thailand, but also spent one year at Uppsala University, Sweden. [For more information on TICA, please see chapter 9.2]

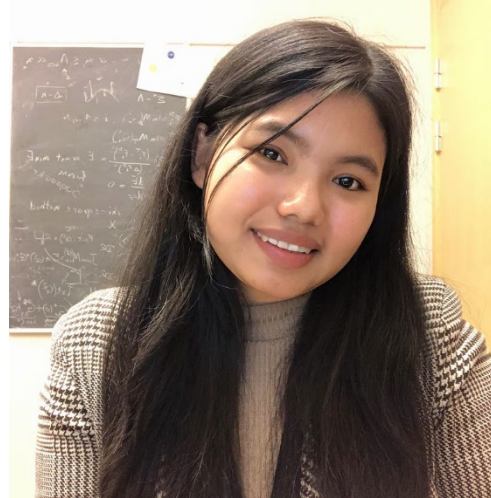


Photo 3-4. Moe Moe Aung's PhD defence, Thailand.

A success story for ISP mathematics

In 2024, the ISP-supported group and network AAU and EAUMP (*Eastern Africa Universities Mathematics Programme*) obtained the classification label *Africa-Europe Cluster of Research Excellence (CoRE)*. ARUA (African Research Universities Alliance) and The Guild (The Guild of European Research-Intensive Universities) launched the Africa-Europe CoRE initiative to address societal and scientific challenges framed by the AU-EU Innovation Agenda. [For more information on CoRE Math, please see chapter 9.8]

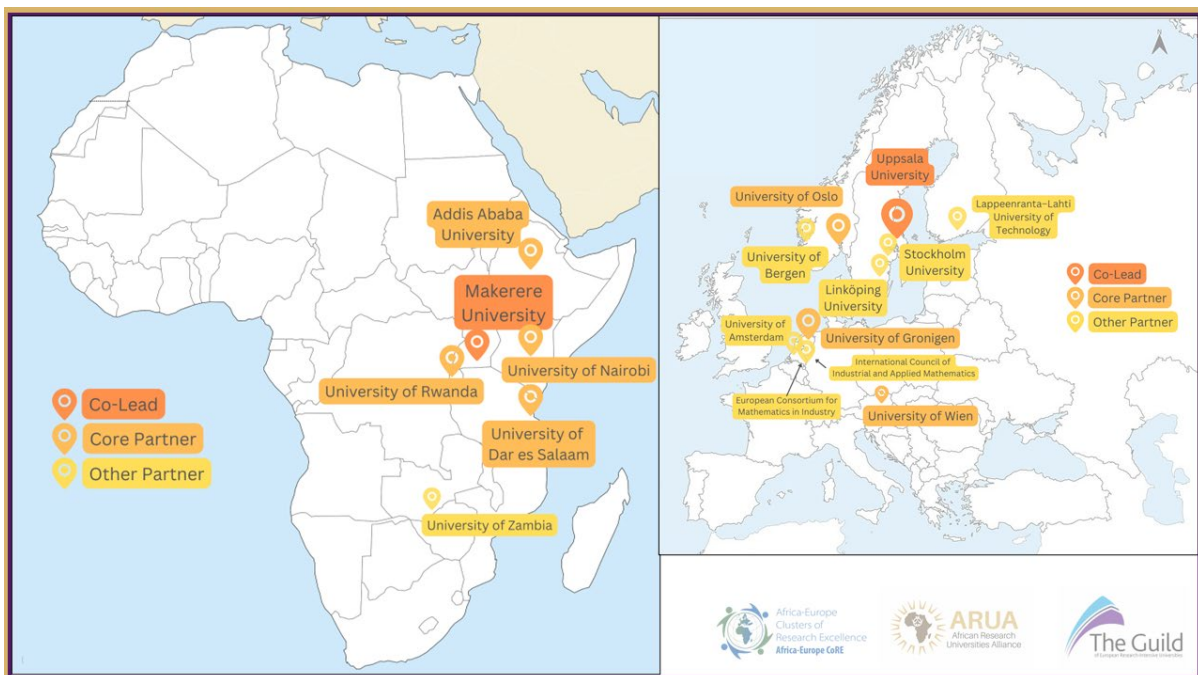


Photo 5-6. Map of partner universities in CoRE Math

5. What is ISP's impact on development?

5.1 Research findings and the SDGs

One of ISP's specific objectives is *to improve supported partners' ability to on a longer term use research results and acquired skills (...) having a favorable impact on society.*

Examples of this can be found in the contribution by ISP-supported groups and networks to create a more sustainable world. Below are some of the research findings and their relation to the [UN Sustainable Development Goals - SDGs](#) presented. The most common SDG is presented first, followed by the others in descending order.

Most of the research results reported to ISP align with *SDG 3 – Good Health and Well-Being*. In Bangladesh, a physics group conducted studies on the development of artificially engineered nanoparticles that could be used in biomedical applications as antimicrobial agents, mediators for the thermotherapy of cancer. Another physics group in Bangladesh, used Artificial Intelligence (AI) in healthcare (cancer detection).

In Myanmar, a physics group studied heavy metal contamination in farmland in the Mandalay region. In Laos, a chemistry group investigated the presence of heavy metals in vegetables. They also analysed water from public drainage locations.

In Rwanda, a physics group investigated on Land Use/Land Cover (LULC) changes, Land Surface Temperature (LST), and air pollution-related health effects. Also in Rwanda, a network node in mathematics developed and analysed a malaria transmission model that included age and gender structures, contributing to existing efforts to eradicate malaria in Rwanda.

In Bolivia, a chemistry group analysed pollen composition, and the physicochemical properties of honey produced by three species of stingless bees in order to determine the quality of the honey.



Photo 7. Interview of local agriculturists in Muyupampa when mapping meliponaries (IPICS BOL:01).

There are also many connections to *SDG 9 – Industry, Innovation and Infrastructure* through the many activities aiming to enhance scientific research. For example, in Ethiopia, a chemistry group in explored *Oxytenanthera abyssinica* as a sustainable alternative for pulp and paper production, and a

physics group developed a new method on how to reduce the open-circuit voltage losses in perovskite solar cells. Also in Ethiopia, another chemistry group studied how to make super-capacitors more effective to accelerate redox reactions for e.g. battery manufacturing.

A physics group in Uganda analysed the scintillation⁶ characteristics on different satellite links from GPS observations and SCINDA. A chemistry group, also in Uganda, has used CO² to synthesise a biodegradable polymer that can be used in manufacturing of packaging, medicine, electronics, chemical binders. A physics group in Tanzania developed thermochromic coatings that can be used in commercial window applications.

Quite many research findings are connected to *SDG 11 – Sustainable Cities and Communities*. In Ethiopia, a physics group monitored the Fentale-Dofen volcano outbreak which started in September, 2024 and is still active in 2025. The group managed to locate and characterise the volcanic activity and provided advises to the government and the public at large. The same group also monitored earthquakes (Massawa coastal area of Eritrea). The group had a lot of media briefings to calm down and reassure the population, which is the simplest form of disaster risk management.

Some ISP-supported activities are connected to *SDG 6 – Clean Water and Sanitation*. A physics group in Laos performed hydrogeophysical investigations for reliable water supply for domestic use. In Mali, a physics group developed spectral based techniques to assess water stress and nutrient requirements in three major crops: maize, groundnut, and cotton. This technique can be implemented directly on farms to monitor crop needs in real time, enabling more efficient irrigation management and optimized fertiliser use, ultimately improving crop yield.

In Myanmar, a physics group collected and cultured electroactive bacteria for water desalination. A chemistry group in Burkina Faso used local clay to eliminate chromium pollution in water.

Further, there are some contributions to *SDG 7 – Affordable and Clean Energy*. In Zambia, a physics group explored energy transfer in organic excitons, focusing on entanglement and molecular interactions. Energy transfer dynamics in organic excitons is significant because it deepens our understanding of how energy moves within molecular systems, a process critical to technologies like organic solar cells, LEDs, and photosynthesis-inspired energy systems. In Zimbabwe, a physics group explored hot springs as potential geothermal energy sources. In Bangladesh, a group successfully produced biodiesel from castor oil. Castor oil is a vegetable oil extracted from *Ricinus communis* (castor bean plant) and its components make it very interesting for several applications as an eco-friendly alternative to petroleum-based products. A physics group in Uganda constructed and tested a single tank energy storage system integrated with funnel and a cooking unit for household cooking in areas with plenty of sun. The results were promising and the energy stored was used to prepare meals sufficient for a five-person family.

Physics groups have developed low-temperature processed carbon-based perovskite solar cells (Myanmar) and continued to improve the parabolic solar cookers so that cooking can be done for 50 persons (Tanzania).

⁶ Scintillation refers to rapid fluctuations in the amplitude and phase of radio signals caused by irregularities in the ionosphere, which can degrade the performance of satellite-based navigation and communication systems.

A few research findings are connected to *SDG 2 – Zero Hunger*. A mathematics node in Rwanda, evaluated machine learning models for rice yield prediction to enhance agricultural productivity. A chemistry group in Zimbabwe studied and evaluated the organoleptic properties of a sorghum-based gluten-free pasta. Another chemistry group in Zimbabwe, investigated the antibiotics residues in goat milk in a local municipality.

Please also see the activities described in section 5.1, where ISP-supported groups and networks work with gender equality is described (*SDG 5 – Gender Equality*).



Photo 8-13. First row: On-site water sampling at public drainage locations in Vientiane, Laos. Second row: Preparing water samples for analysis in the laboratory. (IPICS LAO:01)

Some research findings are linked to *SDG 13 – Climate Action*. In Bangladesh, a physics group grew Boro rice (a dry-season irrigated rice variety in Bangladesh) in pots under controlled conditions. In the experimental conditions, it was shown that the Boro rice can grow effectively with about 50% reduction of conventional urea, bearing a promise of environmental protection from the vast use of chemical fertilisers in Bangladesh.

A physics group analysed patterns of seasonal rainfalls in Rwanda. The study concluded that Rwanda's rainfall patterns are potentially influenced by El Niño and the Indian Ocean Dipole. Their findings provide valuable insights for farmers, policymakers, and decision-makers to develop effective adaptation and mitigation strategies.

Physics groups have been mapping of Earth ionosphere in Uganda and analysing photovoltaic solar-based pumped hydro energy storage in Zambia. For more activities targeting the *SDG 13* please also see section 5.4 *Outreach and policy influence*.

An essential part of ISP's overall goal is strengthening higher education at partner institutions. Target 4B in *SDG 4 – Quality Education*, calls for expanding the enrolment in higher education and scientific

programs through fellowships, one of ISP's main activities through supported groups and networks. [Please see section 6.3 Students in supported activities].

Finally, there is a general alignment of ISP's work with *SDG 17 – Partnerships to achieve the SDGs*, more specifically Target 17.9 aiming to “*enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the sustainable development goals, including through North-South, South-South and triangular cooperation*”.

[For a full list of activities, please see Appendix 1.2]

5.2 Use of research results

One of ISP's specific objectives is *to improve supported partners' ability to, on a longer term, use research results and acquired skills (...) having a favorable impact on society.*

This section presents the use of research findings and reported skills. Researchers from ISP-supported groups and networks have used their research results and skills as consultants for governments, UNHCR, NGOs and companies (Burkina Faso, Mali, Tanzania, Uganda, West Africa, Zambia).

The telemedicine programme of a physics group continued at centres established by local entrepreneurs in many rural areas of Bangladesh, providing health consultation to the public. The same physics group also continued the 'Tele-Apa' scheme, in which female telemedicine operators provide healthcare services directly to marginalised groups such as disabled persons, women, children, and the elderly in their homes. This initiative has significantly increased healthcare accessibility for those unable to travel to Telemedicine Centers.

In Burkina Faso, the mathematics research work on Dengue fever was used by the National Academy of Sciences of Burkina Faso for a report advising the Government how to combat this disease effectively.

In West Africa, the chemistry network is represented in various regional and national organisations working with nutrition and food safety, e.g. [SUN, Platforms for Nutrition](#), FAO (Food and Agriculture Organization), WFP (World Food Program), and the Ministries of Agriculture and Environment.

The ISP-supported research groups and networks have also used their research results and skills in technical development and services. Some examples are presented below.

- The earthquake catalogue of Ethiopia and the African rift region is improved through the seismic station network of the physics group in seismology, and is used for improving the building code of the country, applied in the construction industry (high-rise buildings, dams). At present, the 4th generation of the building code of Ethiopia is in progress, where more contributions from the group are expected.
- In Mali, the renewable energy component of the laboratory held by the group is the reference of the Malian Alliance for Clean Cooking (M-ACC)⁷ to perform the efficiency test of

⁷ M-ACC is an association of private cooking technology producers and civil society organisations (NGOs, associations) incorporated under Malian law. M-ACC works for clean cooking sector in Mali, leading to a reduction of wood as fuel, and a reduction in household pollution and diseases.

cookstove for granting the quality label GWA+, a certification aimed at promoting clean, efficient cooking technologies that benefit the environment and public health, particularly in regions where traditional cooking methods are still in use.

- In Zambia, the Lusaka City Council has for several years engaged the physics group to look at the street lighting in the city of Lusaka which are mostly solar lights. 2024 was the final year. The results will influence policy on the quality, orientation, tilt and overall management of solar street lights in Lusaka.
- In Bangladesh, a physics group provided a service by performing measurements with their own equipment for other actors in society. In total, 881 samples were analysed with the group's equipment.
- In Ethiopia, the physics group investigated the influence of site location, tilt angle, and solar orientation on Ethiopia's photovoltaic (PV) module performance, providing valuable insights for optimising Ethiopia's PV system design and installation, aiding in accurate energy assessment and forecasting for the National Framework for Climate Service.
- In Burkina Faso, the chemistry network proposed technological patterns to the industrial sector (especially food enterprises) to guarantee the quality of their products and develop new products based on endogenous local resources. The network also, contributed to the creation of semi-industrial incubator "Technopole at DTA/IRSAT/CNSRT".
- The chemistry laboratories in Burkina Faso and other West African countries carried out different tests and consultation work (food inspection - assessment of the health and nutritional quality and risk to human health) for the public and private sector. About 25 tests are carried out per year.
- In Zimbabwe, a chemistry group conducted antimicrobial test for other universities. The group also carried out antifungal, antibacterial, antimycobacterial, and anti-proliferative assays and developed invention disclosure forms (IDF) for herbal creams, disinfectants, preservatives and eye ointments based on extracts from Zimbabwean plants.
- Another Zimbabwean chemistry group conducted multiple analyses for individuals and institutions, e.g.
 - Measuring mercury levels in water and soil samples.
 - Analysing nutrient content in stock feed, food and beverage samples.
 - Detecting contaminants in pharmaceutical products.
- In Bolivia, the chemistry group continued the cooperation with the NGO PASOS to strength the associativity of the meliponiculturists (women breeding stingless bees). The group shared their results in short presentation and organised different workshops to improve breeding techniques and honey product transformation.
- In Uganda, a chemistry group continued to offer consultancy services to an NGO operating a sewage treatment plant and water treatment plant in Kampala. The group periodically monitors the quality of the treated effluent and also the quality of the treated water.

[A detailed list of all reported activities can be found in Appendix 1.3]

5.3 Outreach and policy influence

This section describes how supported groups and networks have *increased the visibility of the program* (one of ISP's specific strategies) and how they have *improved supported partners' ability to, on a longer term, (...) engage in outreach activities having a favorable impact on society* (one of ISP's specific objectives).

The outreach activities and policy influence activities of ISP-supported groups and networks are directed towards governmental bodies, organisations, student organisations, hospitals, the general public, undergraduate students, universities/schools, industry and other stakeholders. The activities aim to describe the research results and their relevance to a broader audience, as well as to impact decision-making on different levels in society.

Groups and networks worked in different ways to popularise science:

Through media:

- In Mali, the research results obtained by the physics group from using biogas-based cookstoves as an alternative to wood and charcoal stoves, were advertised across Bamako through various TV channels.
- In Rwanda, the mathematics competitions organised by the network node in mathematics have been featured in the nation-wide newspapers *The New Times* and online media house *IGIHE*.⁸
- In Bangladesh, a chemistry group member gave a live interview on Asian TV to celebrate World Food Safety Day.



Photo 14. Prof Mohammad Shoeb is on live media to celebrate World Food Safety Day, Bangladesh (IPICS BAN:05).

- In Bolivia, the chemistry group's research findings were shared with local authorities, published in local social media, and featured on television and USFX's official social media

⁸ Article: *Rwandan students win big in mathematics competitions*, <https://www.newtimes.co.rw/article/17492/news/education/rwandan-students-win-big-in-mathematics-competitions>, and article in <https://mobile.igihe.com/amakuru/u-rwanda/article/hari-ababonye-buruse-muri-mit-na-cambridge-amarushanwa-y-imibare-ya-ur-akomeje>, 2025-04-04

platforms. Moreover, the podcast launched has become an important outreach tool, presenting research topics in an accessible and engaging format. Its impact has been significant, with the first episode already reaching 2.6K views.

- The chemistry network in East and Central Africa has established a NAPRECA YouTube channel in 2024, which will document all the activities such as symposia, summer/winter schools, webinars, invited lectures etc., that are taking place in the network.
<https://www.youtube.com/@NAPRECA-Network>.
- In DR Congo, the chemistry network had media exposure during organisation of the first national symposium of the NAPRECA-DR Congo (DRC) chapter. The organisation of this local symposium and the media announcement have assisted in disseminating NAPRECA activities among the natural products researchers in DRC.

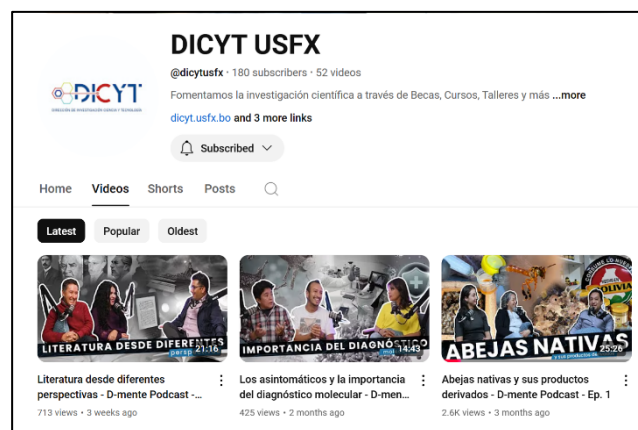


Photo 15. Podcast setup IPICS BOL:01. All chapters are found at <https://www.youtube.com/@dicytusfx>.

Through events:

- In Rwanda, the network node in mathematics organised and participated in the Rwanda Mathematics Competition for secondary school students. The winners were awarded prizes during the Pi-day celebration (7 May, 2024). The network node also took the opportunity to award prizes to the six Rwandan winners of the East African Mathematical Olympiad (EAMO 2024) that was held in Nairobi earlier in 2024. This kind of competition aims to detect talented high school students and to encourage young high school students to study mathematics.
- In Tanzania, a physics group was invited to showcase activities for improving gender balance addressing the existing pipeline in STEM in the country. The conference was organised by the Ministry of Education Science and Technology. Prominent female scientists, entrepreneurs and students were among the participants at the Arusha International Conference Centre, owned by the Government of Tanzania.
- A physics group in Tanzania was invited to the *Women Conference in Clean Cooking Technology* in Dodoma to exhibit and demonstrate solar cooking devices.
- In Nepal, physics group member Dr Shriram Sharma gave a keynote speech at the International Lightning Safety Day (ILSD 2024). He also facilitated a seminar in coordination with Disaster Preparedness Network (DPNet), Nepal, to raise awareness among the public and humanitarian organisations.
- In Ethiopia, a math network organised the 2nd Ethiopian Mathematics Olympiad for high school students.

- In Burkina Faso, the mathematics network participated in several conferences organised by student associations as speakers on the possible applications of mathematics to the development of their countries.



Photo 16-17. *Women Conference in Clean Cooking Technology* in Dodoma, Tanzania. The group was invited to exhibit and demonstrate solar cooking devices (IPPS TAN:01/2).

Through education:

- In Bangladesh, a physics group organised two training programmes for local telemedicine entrepreneurs. These sessions focused on improving service delivery, enhancing technical skills, and ensuring better patient outcomes.
- Also in Bangladesh, a chemistry network performed their technical training programmes for other universities as well as chemicals and pharmaceuticals industries.
- In Bolivia, the chemistry group developed educational materials, including guidebook booklets for teachers and students in the El Palmar municipality, as well as flip charts, designed to enhance science education and knowledge transfer.
- In Laos, the physics group served as trainers for using geophysical equipment and data processing at the Laos Ministry of Energy and Mines.
- In Ethiopia, the physics group organised a short summer training program for promising high school students promoted to the 12th grade from a various public and private schools. In its current format, the activity consists of a six-week training (five days a week and 3 hours a day) offered to students to familiarise them with the scientific research environment.
- In Kenya, a physics group member was engaged by the Kenya Nuclear Regulatory Authority (KNRA) as a Trainer in a postgraduate educational course in Radiation Protection and Safety of Radiation Sources (PGEC) for English-speaking countries in Nairobi, Kenya (EVT2301526). This provided capacity building for this critical and sensitive area.
- In Mali, the physics group did short-term training for professionals and technicians in photovoltaic systems installation and 60 participants from various private companies attended the course.

- In Nepal, physics group member Dr Shriram Sharma facilitated several trainings/workshops about safety measures against lightning and electrical hazards. The trainings were held for NGOs, the Kathmandu Metropolitan city's security personnel and the Disaster Management Division of the Nepal police force.
- In Rwanda, the chemistry group organised a workshop with farmers as a follow-up on the outcomes of the previous training to diminish self-intoxication and minimise environmental pollution.
- In Uganda, the mathematics network collaborated with the Uganda Mathematical Society to reach out to Mathematics teachers and learners across Uganda.
- In Uganda, the physics group visited schools located in refugee camps to give career guidance to students as well as practical demonstrations of scientific equipment.
- In Zambia, a mathematics group member, took part in the Zambia Education Enhancement Project (ZEEP). He visited the worst-performing schools in mathematics to train in situ the mathematics teachers. This has led to an improvement in the general performance of students at the selected schools.
- In Bangladesh, physics group members served as the examiner of postgraduate theses in different public universities.
- In Rwanda, a chemistry group member participated in various meetings of the National Commission for UNESCO as a board member. At the same time, another member acted as an expert at the Rwanda Environmental Management Agency by delivering lectures to their trainees.

The policy influence by the groups and networks is considerable, mainly on a national level when partners act as consultants to national governments. For example:

- In Bangladesh, a group member serves as a member of the World Health Organisation (WHO) Strategic and Technical Advisory Group for Medical Devices (STAG-MEDEV). The STAG-MEDEV functions as an advisory body to the WHO on global policies and strategies related to medical devices and health technologies. It provides guidance to WHO on global priorities and emerging issues in the field.
- In Laos, the physics group is part of the Ministry of Energy and Mines Committee responsible for evaluating ground collapse at potash mining sites.
- In Burkina Faso, members of the physics group provided more insight on topics such as green hydrogen, nuclear energy, solar thermal and applications to the Burkina Faso Energy Council and the Ministry of Energy. The group has also participated in many government committees.
- In Zambia, two network members in the mathematics network EAUMP are part of the Committee of Experts at the Higher Education Authority, involved in accrediting learning programmes in higher learning institutions in Zambia. One member is part of the team of experts engaged by the Ministry of Education under the Zambia Education Enhancement Project (ZEEP).
- Also in Zambia, chemistry group members chaired various committees at the Zambia Environmental Management Agency (ZEMA), the Zambia Bureau of Standards (ZABS), Chemical Observatories (ChemObs), and PlanetGold Initiative (aimed at reducing mercury use among small-scale artisanal gold miners).
- In Bangladesh, one physics group member served as the Reviewer of the projects of the Bangladesh Bureau of Educational Information and Statistics (BANBEIS), Ministry of Education, and another physics group member is a member of the Medical Device

Evaluation Committee of the Directorate General of Drug Administration (DGDA), Government of Bangladesh.

- In Kenya, a physics group member has, since 2019, been a member of the Kenyan Research Reactor Project Team, co-ordinated by the Nuclear Power and Energy Agency (NuPEA).
- In Ethiopia, a physics group member is involved as chairperson of a committee that is undertaking an initiative to reforest Galema Mountain located in Arsi area of Oromia Regional State.
- Also in Kenya, three members of another physics group, continued to be members of the Kenya Bureau of Standards (KEBs) in three different committees: Renewable Energy and Energy Management, Solar and Wind Technologies, and dosimetry, Radiotracer and Non-Destructive Testing. The committees are meant to contribute to the International Organization for Standards and standards policy in Kenya.
- In Tanzania, chemistry network member, was awarded the Commission of Science and Technology's *Certificate of Recognition for Outstanding Contribution to Addressing Societal Challenges Societal Challenges*. The certificate was given for the first time and was officiated by the Deputy Prime Minister in charge of Coordination of Government Affairs and the Minister for Energy and the Minister of Education, on behalf of the President of Tanzania, Honourable Samia Suluhu Hassan.
- In Uganda, the chemistry group was tasked to review and update of the national implementation plan for the Stockholm Convention under the project, "The review and update of the national implementation plans (NIPS)". The team is headed by the chemistry group leader. The group has also participated in developing of air quality standards and hazardous chemicals regulations for Uganda, under the National Environment Management Authority (NEMA) and the Ministry of Water and Environment.
- In Zambia, the physics group has advised the Government on better use of excess energy from solar milling plants.
- Members in the African chemistry network served as consultants to e.g. the Egyptian Drug Authority and the Cameroon National Ethics Committee for Research in Human Subjects.

[A full list of reported activities can be found in Appendix 1.4]



Photo 18-19. Co-trainer for training on water quality and pollution load for local technical staff in the Nam Tha River Basin area, Laos (IPICS LAO:01).

5.4 Gender equality

This section describes ISP's objective to improve gender equality in supported research groups and scientific networks, and ISP specific strategy to continue promoting gender equality among supported partners.

As in 2023 ISP could not allocate any Gender Equality Grants in 2024. However, several groups and networks have continued to organise gender-focused initiatives.

The Gender Equality Grants were ear-marked extra funds for activities designed to promote gender balance in science at the supported institutions and were introduced by ISP in 2017, for a maximum amount of 30,000 SEK/year over three years. Until and including 2022, groups and networks in physics and mathematics could apply for these grants, while groups and networks in chemistry could use their regular ISP allocations for gender-related activities. Following the inception of the Gender Equality Grants, an increased awareness of gender issues was observed, with the majority of supported groups and networks applying for the Gender Equality Grant. Importantly, ISP had noted a positive trend, after a while, with an increased number of female students in MSc and PhD programmes in the supported groups and networks. As mentioned in some of the activity reports, the ISP Gender Grants had a significant impact in supporting female students in many countries. These funds allowed many female students to continue their university education despite the common lack of financial support from their families.

ISP every year allocates funds to the network Eastern Africa Network for Women in Basic Science (EANWoBAS) whose mission is to improve gender balance and gender bias awareness in basic science. Founded by female mathematicians and physicists from Kenya, Rwanda, Tanzania, Uganda and Zambia, the network is coordinated from Uganda. Today it is also joined by researchers in chemistry. EANWoBAS often co-organises workshops and school visits via its branches in several countries, with other ISP-supported groups, as well as with different university departments.

As of 2024, the total budget for activities promoting gender balance has been limited to the allocation of SEK 200,000 to the EANWoBAS network and some sponsoring of female students and staff members for attending meetings, paying tuition at the university, or contributing with new computer or equipment,. Many groups, also, continued to perform a large number of activities promoting gender equality in science and STEM (science, technology, engineering and mathematics) studies despite they did not received any ear-marked funds from ISP.

Several educational needs were addressed through outreach activities and school visits with the aim of increasing female recruitment into science, as well as training and internships for undergraduate students, financial support for female students, and mentorship activities to encourage student retention.

The low number of females choosing a career in STEM is a severe problem worldwide and is a waste of talent and resources. As a very positive development, however, Dr Ange Cynthia Umuhire was the first woman to complete her PhD in the field of space Science in Rwanda, and thanks to ISP funding, within four years, two other women completed the MSc level, one in Astrophysics and one in Cosmology. In the EAARN network, Ms Beatrice Nyiransengiyumva is working on her PhD at Mbarara University of Science and Technology (Uganda).

At the University of Yangon in Myanmar, the gender balance is reversed, with a higher number of female students. This trend is primarily attributed to male students choosing institutions such as the Defence Services Academy, Medical universities, Technological universities, and Maritime universities, which can offer better employment opportunities and salaries after graduation.

Different types of initiatives took place in 2024, targeting dire local needs, identified by local researchers and teachers.

Many groups highlighted the need to engage female students in primary and secondary schools, via school visits, science camps, or other types of events, to elicit their interest in STEM disciplines and to encourage their access to university programs in science and technology. Most activities included motivational talks, presentations of the possible careers in STEM disciplines, meetings with female researchers, and university teachers serving as role models. The school students had often for the first time, the possibility of carrying out experiments with portable experiment kits, as generally the experimental equipment is absent in most schools.

The activities can be grouped into four main tracks:

1. **Activities to encourage female undergraduate students to continue to Master's studies and/or PhD studies in chemistry, mathematics and physics**
 - Launching awareness campaigns and targeted conversations aimed at inspiring the pursuit of science for female students at various departments and scientific gathering (Burkina Faso, Ethiopia, Mali, East Africa, Zimbabwe).
 - Providing specific support to female undergraduate/Master's students, e.g. in lab-based research as well as fieldwork activities (Ethiopia, Kenya, Zimbabwe).
 - Giving financial support to female postgraduate students to participate in a summer school (Tanzania) or specific seminars/symposiums (Bangladesh, Cambodia, Laos, West Africa).
 - Giving material support for their study, laptops, USB drives, internet connection, color printing facilities (West Africa)
2. **Affirmative actions directed at female students**
 - Giving preference to female PhD students during PhD admissions and is practising a flexible attitude towards female students, e.g. working from home during pregnancy (Bangladesh, Burkina Faso).
 - Awarding financial support to students in science to increase the number of females at the Master's and PhD levels (Bangladesh, Burkina Faso, Ethiopia, Uganda, Zambia).
3. **Inspirate female students through role-models**
 - Talks and sensitisation activities by accomplished women scientists. (East Africa)
 - Female mathematicians shared personal stories and motivational talks during International Day of Mathematics. (Uganda)
 - The more women MSc or PhD students in the group/network, the more women are attracted to continue their studies after undergraduate level (Bangladesh, Burkina Faso, Ethiopia, Rwanda, Tanzania).

- Female researchers or leaders in the group. These women will be able to serve as scientific ambassadors to arouse the interest of more females in the disciplines of science (Burkina Faso, Kenya, Tanzania, Uganda)
- Training directed to women at bachelor's level to give them self-confidence and guide them to pursuing a career in physical science (Mali).
- Mentorship programmes to increase the retention of female students at PhD level (Zimbabwe).

4. Activities to inspire primary and secondary school female students.

School visits

- A mathematics node visited secondary schools in Kigali city and on the countryside to encourage them to learn mathematics. They also invited schools to the university to meet department staff and/or for career guidance (Rwanda).
- A chemistry network visited high school students to motivate potential science students (West Africa).
- A team from a physics group performed several visits to rural schools in north Uganda. They performed career guidance, motivation to pursue education despite the students being in hard-to-reach areas, and demonstration with equipment (mobile laboratory). These activities are planned to get the pupils interested in science and to motivate them to choose a future career in science. The response of the students was very positive, as for example they were crowding around the various training sets (Uganda).
- A physics group at University of Dar es Salaam visited two girls' secondary schools and a total of 10 secondary schools, to break barriers and to ignite a passion for science and innovation through hands-on experiments and motivational talks (Tanzania).
- Visits to 23 high school to create awareness about science, focusing on physics (Ethiopia).

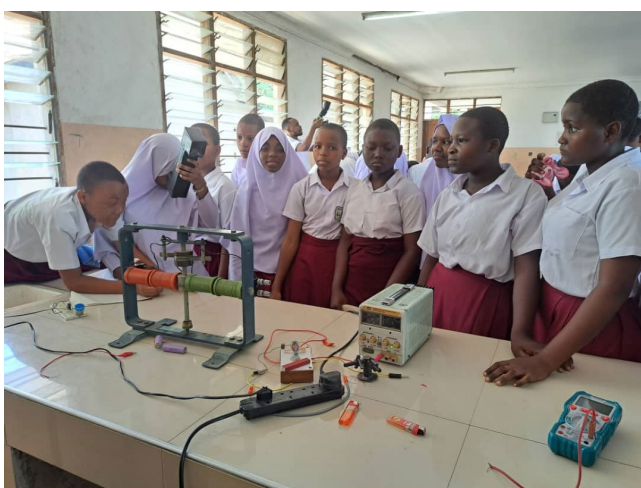


Photo 20-21. School visit to Mugabe Secondary School in Dar es Salaam, Sept 2024. This was part of a 10 schools visit, involving hands-on activities for students and inspirational talks to promote science learning to students, particularly those from disadvantaged groups (IPPS TAN:01/2).

- EANWoBAS visited a school in the Rufunsa district of Lusaka Province to raise awareness of and interest in science. (Zambia)

- The Uganda node of the EANWoBAS organised the International Day of Mathematics (IDM) Celebration at Buddo Junior School. (Uganda)

Science Camps

- A physics group and a mathematics network joined forces with the Tanzanian branch of EANWoBAS. They organised a 5-day Female Science Camp for advanced-level secondary school girls from seven secondary schools in Dar es Salaam in January 2024. The training focused on physics and mathematics and aimed to prepare students for university-level education. About 60 girls participated. (Tanzania)
- During a Math Camp at a secondary school, the session “Empowering Youth Through Robotics” was conducted by NextGen Innovators Uganda Limited in partnership with Coderina Foundation. Students aged 6–19 years, both boys and girls, participated in LEGO-based robotics programming and creative problem-solving workshops. (Uganda)

Competitions and Mathematics run

- When the mathematics node in Rwanda organised Rwanda Mathematics Competition, they particularly encouraged girls to participate.
- The EANWoBAS network took part in the 8th Run4Math events at five different schools/universities in Uganda.



Photo 22. Rwanda Mathematics Competition (RMC) for secondary school students (IPMS EUAMP-UR).

[For a full list of gender activities, please see Appendix 1.1]

6. ISP in numbers

In the following section it is described in numbers how ISP-supported groups and networks fulfil ISP's objectives and strategies;

In Supported groups and networks:

- To plan, manage and carry out high-quality scientific research (ISP specific objective).
- To facilitate partners' collaboration with better resourced host institutions. (ISP general objective).
- To build on local, needs-based ownership of research activities and training, applying a collegial approach to collaboration, and with a focus of improving the local conditions for developing scientific activities. (ISP general strategy)

In Students in supported activities:

- To support scientific research groups and scientific networks in partner countries to develop their research activities and postgraduate training (ISP general objective).
- To improve supported partners' ability to train high-quality postgraduates at the Master and PhD levels (ISP specific objective).

In Publications, Conference contributions, Arranged meetings:

- To improve supported partners' ability to disseminate research results at high-quality venues (ISP specific objective).
- To continue increasing the visibility of the program (ISP specific strategy).
- To continue contributing to the enhancement of quality at all levels with supported partners, including establishment of a well-developed academic and scientific research culture (ISP specific strategy).

In Expenditures:

- To increase supported partners' financial independence of ISP, with the ultimate goal of becoming self-sufficient and sustaining on grants awarded in open competition (ISP specific objectives).
- To continue increasing supported partner's skills with regard to financial management (ISP specific strategy).

6.1 Supported groups and networks

In 2024, in total **35 research groups** were supported in 14 countries [Table 1]. There were 15 research groups in chemistry, one in mathematics, and 19 in physics. [For a list of all research groups and what they do, please see Appendix 2.1]

Five of the countries are classified as low-income economies and nine as lower-middle income economies, while nine are denoted as least developed countries (LDC). All countries were classified as fragile, six on the "red alert" level, and eight on the "orange warning" level. Regarding the nine LDCs, five were also low-income economies, and six belonged to the most fragile category.

Table 1. Number of research groups supported in listed countries 2024, and the situation in the countries with regard to income level (World Bank fiscal year 2025),⁹ developmental state (2025),¹⁰ and fragility (2025).¹¹ Countries that score between 60.0 and 89.9 are classified in the orange “Warning” category; those scoring between 90.0 and 120.0 in the red “Alert” category. LDC = Least Developed Country.

Country	Chemistry (IPICS)	Mathematics (IPMS)	Physics (IPPS)	World Bank income level	UN Developmental State	Fragile State Index Rating (0-120)
Bangladesh ¹²	BAN:05		BAN:02/2 BAN:04 BAN:05	Lower-middle	LDC	85.9
Bolivia	BOL:01			Lower-middle	Not a LDC	69.4
Burkina Faso	BUF:01 BUF:02		BUF:01	Low	LDC	94.2
Ethiopia	ETH:01 ETH:02 ETH:05	AAU	ETH:01 ETH:02 ETH:03	Low	LDC	98.1
Kenya			KEN:01/2	Lower-middle	Not a LDC	86.5
Laos ¹³	LAO:01 LAO:04		LAO:01	Lower-middle	LDC	73.8
Mali			MAL:01	Low	LDC	97.3
Myanmar			MYA:01 MYA:02	Lower-middle	LDC	100
Nepal ¹⁴			NEP:01	Lower-middle	LDC	78.8
Rwanda	RWA:01		RWA:01	Low	LDC	81.8
Tanzania			TAN:01/2	Lower-middle	Not a LDC	75.7
Uganda	UGA:01 UGA:02		UGA:01 UGA:02	Low	LDC	91.1
Zambia	ZAM:01		ZAM:01	Lower-middle	LDC	81.2
Zimbabwe	ZIM:01 ZIM:02		ZIM:01	Lower-middle	Not a LDC	95.7
Total number	15	1	19			

One of ISP’s specific strategies is to continue supporting research groups in complementarity with Sida’s bilateral programs and facilitate regional cooperation. ISP supports research groups and networks in complementarity with Sida’s bilateral programs in Bolivia, Cambodia, Ethiopia, Rwanda and Tanzania.¹⁵

⁹ <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups> 2025-03-10.

¹⁰ <https://unctad.org/topic/least-developed-countries/list> 2025-03-10.

¹¹ <https://fragilestatesindex.org/> 2025-03-10.

¹² UN General Assembly resolution A/RES/76/8 adopted on 24 November 2021, decided that Bangladesh, Laos and Nepal will graduate five years after the adoption of the resolution, i.e. on 24 November 2026.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ For example, two chemistry groups in Uganda applied for continued funding through the Sida bilateral research program in Uganda, but they were denied support. ISP then continued to support them through the ISP core program. The same thing happened to a Rwandan group and ISP started to support it.

Another of ISP's general strategy is to *facilitate partners' collaboration with better resourced host institutions*. ISP facilitates regional cooperation since the early 1980's, when it was decided to start supporting **scientific networks**. ISP believes that regional and interregional cooperation is a fruitful approach to overcome many constraints, adding value to participating scientists and their institutions by generating complementary scientific activities, giving access to advanced equipment, and increasing the human capital needed for good standard postgraduate education.

In addition to the research groups, totally **20 scientific networks** with nodes in 38 countries were supported in 2024 [Table 2]: eight in chemistry, seven in mathematics, and four in physics. In addition, a network formed to promote the participation of women in basic sciences was supported.

[Please see the list of all networks and what they do in Appendix 2.2]

Table 2. Scientific networks supported by ISP, by region and by ISP program.

Region	Chemistry	Mathematics	Physics	Gender	Total
Africa	ANCAP ANEC NAPRECA RABiotech	BURK:01 APREA CoRS EAALG PDEAPP EAUMP	AFSIN EAARN ESARSWAG MSSEESA	EANWoBAS	15
Asia	ANFEC ANRAP CAB-CCS NITUB	SEAMaN			5
Total	8	7	4	1	20

One of ISP's specific strategies says that ISP should *focus on supporting physics, chemistry and mathematics in present partner countries (...)*. In 2024, no **new support** was initiated.

In total eight groups were **phased-out** in 2024:

- Four physics groups in Kenya were phased-out after many years of funding (IPPS KEN:02, KEN:03, KEN:04 and KEN:05)¹⁶. These groups had already reached a very good scientific level but the process of phasing them out was accelerated due to the reduced budget of ISP.
- Four chemistry groups were phased-out:
 - One group in Bangladesh (IPICS BAN:04)¹⁷ had received support from ISP for many years and had reached a stage where it can stand independently and apply for funding from other sources.
 - The application for a grant for 2023-2025 for one group in Zambia (IPICS ZAM:01)¹⁸ was weak and did not get support from ISP, based on the recommendation from the IPICS scientific reference group.

¹⁶ IPPS KEN:02 and KEN:03 received ISP-support for 25 years each, KEN:04 for 18 years and KEN:05 for 13 years.

¹⁷ IPICS ZAM:01, focused on research in the field of conducting polymers, received ISP-support 2011-2023

¹⁸ IPICS BAN:04 received ISP-support 2003-2023.

- The chemistry group in Tanzania (IPICS TAN:02)¹⁹ and one chemistry group in Zimbabwe (IPICS ZIM:03)²⁰ were phased-out because of inactivity towards ISP.

In all, ISP supported 35 research groups and 20 scientific networks in 2024 [Table 3].

Table 3. Number of research groups and scientific networks supported in 2020, 2021, 2022, 2023 and 2024, and the yearly averages 2008-2013 and 2014-2019.

Supported activities	Average 2008-2013	Average 2014-2019	2020	2021	2022	2023	2024
Number of groups and networks supported each year.	49	59	56	63	63	63	55

6.2 Staff in supported activities

In 2024, in total 918 staff members (983 in 2023) were involved in ISP-supported activities, 29% (23% in 2023) of them were women.

Since 2013, there has been an increase of the share of women staff members in physics and mathematics, from 12% to 16% (physics) and from 12% to 15% (mathematics) in 2024. In chemistry the share of women staff members has remained around 30% (35% in 2024).

In all, 21% (19% in 2023) of the group leaders and network coordinators and 24% (27% in 2023) of the deputies, were women.

The distribution according to discipline and gender was:

- Chemistry: 22% women leaders and 41% deputies.
- Mathematics: 10% women leaders and 0% deputies.
- Physics: 20% women leaders and 16% women deputies.

[For a table of the gender proportion of staff, please see Appendix 2.3]

6.3 Students in supported activities

The students reported to ISP enjoy ISP support to various degree. Some may even be supported by other sources. Still, the ISP groups and networks make up the platform for the students' training, and therefore all reported students are accounted for here.

PhD and MSc students

In 2024, in total 1,177 postgraduate students (Master, Licentiate and PhD level) were active in ISP-supported research groups and networks (1,329 in 2023).

The exact number of the **PhD students** in 2024 was 566 (584 in 2023). The average share of woman PhD students has increased from 23% in 2008 to 31% in 2024. 62 (42% women) were PhD sandwich

¹⁹ Support to IPICS TAN:02 was revived in 2021. The group received ISP funding from 2004 to 2008, when it was interrupted because of the conditions in the agreement with Sida settled in 2008. In 2019, the ANCAP affiliated group was again invited to submit an application for funding in 2019. The group only received support one year, but had balances left 2022.

²⁰ IPICS ZIM:03 received ISP-support 2020-2022.

students and 501 (29% women) were local students. The distribution according to discipline and gender was:

- Chemistry: 182 PhD students, 36% women (202, 35% in 2023)
- Mathematics: 186 PhD students, 14% women (167, 17% in 2023)
- Physics: 195 PhD students, 42% women (214, 34% in 2023).

When it comes to **MSc students** in 2024, there were 611 MSc students (745 in 2023), 36% are women (32% in 2023). 43 of them (65% women) were sandwich MSc students. The distribution according to discipline and gender was:

- Chemistry: 220 MSc students, 45% women (38% in 2023)
- Mathematics: 148 MSc students, 20% women (36% in 2023)
- Physics: 243 MSc students, 39% women (36% in 2023).

Since last year there is a decrease in the number of PhDs and MSc students. This is partly due to the reduced funding from ISP and that the groups/networks cannot admit and support new students, but it is also partly due to the phase-out of eight groups in 2024.

The share of woman PhD and MSc students fluctuate between the programmes:

- At PhD level the share has increased remarkably in physics.
- At MSc level, the share has increased in chemistry and physics, but decreased in mathematics.

MSc and PhD graduations

Today, most postgraduate graduates are local students, only 18% study on a sandwich basis. This is what to expect considering the reduced budget allocated to the groups and networks in 2024.

PhD graduations

In 2024, the number of graduates in physics is the same as in 2023, but for mathematics there is a decrease of the share of women graduates. However, for chemistry there is an increase both regarding number of graduates and share of women graduates.

In 2023 there was a pronounced decrease of women PhD graduations. This is not the case in 2024 which is gladdening since the share of woman PhD graduates usually has increased yearly since 2008, when the data collection started.

Actual numbers for PhD graduates in 2024:

- Totally 84 PhD students graduated, 27% were women (in 2023: 75, 19% were women).
- Of these 84 PhD graduates, 26 were PhD sandwich students, 46% women (in 2023: 13, 15% women) and 53 were local students, 21% women (in 2023: 62, 19% women).

The numbers for each ISP programme are:

- Chemistry: 35 PhD graduates, 42% women (27, 15% in 2023).
- Mathematics: 21 PhD graduates, 10% women (21% in 2023).
- Physics: 28 PhD graduates, 21% women (the same numbers as in 2023).

The average time PhD students take to graduation has remained the same over the years (close to 5 years), but in 2024 it is lower for sandwich (4,8 years) and higher for local students (5,8 years). It is the same times as last reporting year. The prolonged time for local students might be an effect of the

Covid-10 pandemic 2020-2022, with closed universities, bad internet connection and travel restrictions.

The share of woman PhD graduates in chemistry is, as previous year, higher than in mathematics and physics. However, the number of PhD students in physics is higher than in chemistry.

MSc graduations

For MSc graduations in 2024, the number of MSc students in mathematics has increased, but the percentage of women has decreased. For chemistry it is the opposite situation, and for physics the number and share of women have decreased.

For each ISP programme the numbers were:

- Chemistry: 78 MSc graduates, 51% women (102, 38% in 2023)
- Mathematics: 63 MSc graduates, 14% women (22, 23% in 2023)
- Physics: 81 MSc graduates, 34% women (90, 38% in 2023).

Actual numbers for MSc, MPhil and Licenciante graduates in 2024:

- 220 MSc students graduated (35% women). Of these 220, 18 were MSc sandwich students (50% women) and 202 were local students (34% women).²¹

[For tables and lists, please see Appendix 2.4]

²¹ In 2023: 214 MSc students graduated (36% women). Of these 51 were MSc sandwich students (33% women) and 163 were local students (37% women).

6.4 Publications

One of ISP's specific strategies is *to continue contributing to the enhancement of quality at all levels with supported partners, including establishment of a well-developed academic and scientific research culture*. This is measured by the number of articles in quality journals and contributions to high-level conferences. ISP also keeps track of the number of seminar series the research groups and networks arrange.

In 2024, the ISP-supported research groups and networks published 441 articles (517 in 2023). Compared with last year this is a decrease. The decreased number of publications can be related to the phasing out of quite many productive groups:

- In chemistry, 241 publications in 2024 (197 in 2023).
- In mathematics, 129 publications in 2024 (139 in 2023).
- In physics, 205 publications in 2024 (181 in 2023).

Since 2010, ISP has distinguished between "quality publications" and publications in journals of unknown quality. From 2018, articles also in journals by "predatory" publishers have been recorded.

The quality publications are defined as those appearing:

- With Clarivate Analytics Impact Factors (IF)²² in Web of Science (WoS)²³ and/or in the [Norwegian Register for Scientific Journals, Series and Publishers](#). The latter is operated jointly between the National Board of Scholarly Publishing (NPU) and Norwegian Directorate for Higher Education and Skills on behalf of the Norwegian Ministry of Education and Research.

The publications in journals of unknown quality are those not listed in the two above databases but not published by predatory publishers.

Journals by predatory publishers are considered to be those appearing in:

- [Cabell's Predatory Report](#).

In 2024, 361 (82%) (in 2023: 329 - 64%) publications reported were in quality journals, whereas 48, 11% (in 2023: 27 - 5,2%) were in journals by predatory publishers. ISP will continue to make particular efforts to inform about the risk of wasting scientific research results in predatory journals.²⁴

In 2024, as in the years before that, networks and groups in Africa are overrepresented in the predatory statistics.

²² http://en.wikipedia.org/wiki/Impact_factor 2023-05-17

²³ <https://www.webofscience.com/wos/woscc/basic-search/> 2023-05-20

²⁴ https://awandahl.github.io/isp_60_choosing_journal/ 2024-05-17

Table 4. Summary of publication data for 2024, by category and program. The number of publications (Publ.) in scientific journals is specified to those with and without Thomson Reuters (TR) impact factors (IF) or/and NCDR ranking, and whether ISP funding was acknowledged (yes) or not (no).

Publication category	Africa		Asia		Latin America		Total	
	yes	no	yes	no	yes	no	yes	no
Publ. in Scientif. Quality J. (TR or/and NCDR ranked)	99	196	24	40	1	1	124	237
Publ. in Other Scientific Journals (“unranked”)	29	87	23	13	5	0	57	100
Publ. in Journals by “predatory publishers”	15	33	0	0	0	0	15	33
Books, Chapters, Popular Publ., Technical Reports, etc.	6	3	0	0	0	0	6	3
Total number of publications (yes/no)	146	188	47	53	6	1	199	242
Grand total	334		100		7		441	

One of ISP’s specific strategies says that ISP should *continue increasing the visibility of the program*. That’s one of the reasons ISP requires that groups and networks to give credit to ISP/Sida when they publish or present at a conference.

The rate of **acknowledgements** of ISP in published articles has ranged between 27% and 33% since monitoring started in 2016, and in 2022 it was even lower (26%). But in 2024 the acknowledgement rate for ISP is 45%. Observing the past low figures, one should however consider the nature of ISP support, which is intended to strengthen the research capacity and is directed to institutionally affiliated research groups and scientific networks. As research capacity increases, attraction of additional research funding in openly competitive calls will increase, resulting in research activities that do not acknowledge ISP support when published. Nevertheless, the supported ISP partner will continue to report all publications to ISP, because they reflect of the overall research capacity and not only of ISP funding as such.

As in the years before, mathematics has the lowest acknowledgment rate:

- Chemistry: 32%
- Mathematics: 13%
- Physics: 53%

Why is the rate of acknowledgement in the mathematics programme consistently lower than the other programmes? The following issues may contribute to the differences:

- In the mathematical sciences, there is less of a tradition to acknowledge financial support in publications, possibly manifested in the fact that many journals in mathematical sciences do not feature any acknowledgement section at all, which may impair the possibilities to express acknowledgement of ISP support.
- The ISP mathematics consists primarily of networks and publications reported by scientific networks which appear to lack acknowledgement of ISP support to a larger degree than publications reported by research groups. The explanation may be that in many networks, ISP supports networking more than research activities. Still, research activities carried out by network members are reported when published, as an expression of the development of

research capacity that is partially a result of the networking supported by ISP. But ISP is not acknowledged because the research itself was supported by other sources.

[See the full list of publications in Appendix 2.5]

6.5 Conferences contributions

For 2024, in total 261 (349 in 2023) contributions at scientific conferences were reported by groups and networks, 75% of them at international meetings (54% in 2023). The number of international contributions continues to be high (in 2019 it was only 24%). The high number might be an effect of the Covid-19 pandemic, since many conferences afterwards turned into a hybrid mode, making online participation easy. [Table 5]

Table 5. Yearly number of conference contributions, and share at international conferences, in previous Sida agreement periods and in 2020, 2021, 2022, 2023 and 2024.

Indicator	2008-13*	2014-19	2020	2021	2022	2023	2024
o) Total number of yearly conference contributions and proportion international.	235	392	317	339	473	349	265
	39%	36%	47%	36%	58%	54%	75%

Usually, there is a significant variation over the years in the distribution of contributions between international, regional and national meetings. In 2024, the national contributions were in minority (11%), followed by regional (14%) and then international contributions (75%).

Besides the share of contributions at international conferences, the share of oral communications is also seen as a quality indicator. This measure oscillates around 70%, and in 2024, the percentage was 77% for oral contributions (78% in 2023).

[Please see the full list of conference contributions in Appendix 2.6]



Photo 23. ANFEC members with other guests in the UNICEF Food Fortification Workshop in Nepal (IPICS ANFEC).

6.6 Arranged scientific meetings

A total of 47 scientific meetings with in total 2,442 participants were arranged by ISP-supported groups and networks in 2024 (85 meetings, 5,708 participants in 2023).

In Africa, 37 meetings were arranged in 14 countries:

- 23 (49 in 2023) by chemistry partners
- 10 (14 in 2023) by mathematics partners
- 4 (10 in 2023) by physics partners.

In Asia, 10 meetings were arranged in four countries:

- 3 (14 in 2023) by chemistry partners
- 0 (0 in 2023) by mathematics partners
- 7 (7 in 2023) by physics partners.

[Please see the full list of Arranged meetings in Appendix 2.7]

6.7 Expenditures

In 2024, the **total available budget** from ISP for research groups and networks amounted to 11,5 MSEK, calculated as the sum of the total allocations for 2024 plus the balances brought forward from 2023 – the latter amounted to 0,7 MSEK, about 7% of the total available budget.

The total expenditures for research groups and networks in 2024 amounted to 9.7 MSEK, representing approximately 84% of the total available budget (compared to 93% in 2022 and 92% in 2023).

The reported **research funding from other sources than ISP** in 2024 amounted to 8.6 MSEK, which is lower than in previous years (see indicator **e** in Table 6).²⁵ This accounted for 43% of the total available budget at the aggregated level (i.e., ISP funding plus research funding from other sources than ISP; see indicator **e.a** in Table 6).

The **institutional co-funding** reported by the groups, in the form of **in-kind contributions**, amounted to 55.6 MSEK in 2024.

The **total available resources** to the supported research groups and networks, calculated as the sum of in-kind contributions, research funding from other sources, and the ISP total available budget, amounted to 75.7 MSEK.

ISP's total available budget contributed 15% of the total available resources. Overall, institutional co-funding accounted for 74% of the total available resources, substantially higher than the corresponding figure of 45% in 2023.

The research funding from other sources plus the in-kind contributions, amounted to 85% of the total available resources, slightly higher than in 2023 (see indicator **e.b** in Table 6).

²⁵ The exact values of the reported research funding from other sources than ISP in 2024 is 8 596 619,6 sek, and the reported in-kind contributions for 2024 is SEK 55 595 896. For a list of all other funding, please see *Appendices Expenditures 2.8*.

Table 6. ISP indicators of the outcome d and e. Total values for previous Sida agreements periods, and the figures for 2020, 2021, 2022, 2023 and 2024.

Indicator	2008-2013	2014-2019	2020	2021	2022	2023	2024
d) Expenditures (MSEK) in relation to ISP available budget (allocations plus balances brought forward)*	85% (113/132)	87% (156/180)	72% (19/26)	79% (27/34)	93% (20/22)	92% (13,6/14,9)	84% (9,7/11,5)
e) Yearly amount of funding granted from other sources than ISP (OS). **	11,5 MSEK	34,7 MSEK	53,9 MSEK	22 MSEK	44 MSEK	26 MSEK	8,6MSEK
e.a. Percent of OS in respect to the sum of OS+ISP total funding	34%	50%	67%	64%	60%	64%	43%
e.b. Percent of OS + In kind contributions with respect to the total resources available (OS+ In kind contributions + ISP total funding)	n/a	73%	81%	70%	78%	82%	85%

*Expenditures include transfers to groups/networks for payments from local accounts, which may not have been fully used locally in the same year.

**Share of funding from other sources than ISP.

Management of Expenditures

Each group and network is granted a yearly allocation, decided by the ISP board after an application and assessment procedure involving the programs' scientific reference groups. The use of the allocated funding is distinguished between:

- expenditures carried out locally, after the transfer of funds to a local account;
- expenditures by payments to third parties carried out by ISP.

In both cases, the transactions are formally requested by the accountable group leader or network coordinator. They should follow the budget for the year in question.

Funds transferred to groups/networks for payments from local accounts may not always be spent directly, and are to be accounted for each year. The feasibility of managing funds locally depends on the local financial management system and the administrative competence of the local staff. ISP has the ambition to increasingly transfer the responsibility for the management of the funding to the supported activities and has monitored this since 2015.

- In total, 56% of the expenditures by research groups and networks were managed locally (54% in 2023).

When it comes to the ability to manage the funds locally, ISP operates in countries (except for Rwanda) which have a low position on Transparency International's²⁶ Corruption Perceptions Index. It might be so that supported research groups and networks want ISP to manage the transfers simply because there might otherwise be a risk that the funds get partly lost on the way. *[For table of Corruption Perception Index, please see Appendix 2.8].*

[For full details, please see Appendix 2.8]

²⁶ <https://www.transparency.org/en/cpi/2023> 2024-05-28.

7. ISP challenges

Needless to say, ISP's most significant challenge for 2024 has been to secure funding for its activities. ISP has not succeeded in its endeavours.

In previous sections of the Annual report, ISP's gender work has been described [*see sections 4. ISP Success stories and 5.1 Gender equality*]. Even though much has been achieved, there are still more men than women researchers in science, especially in mathematics and physics. Here, there is a need for continued work to raise consciousness about the importance of gender equality, mainstreaming and equal opportunities among supported partners.

Many of the ISP-supported groups and networks work in politically vulnerable states. This is in itself a risk since ISP support is linked to the Swedish government's foreign aid policy, and Swedish aid can be withdrawn or paused, like in Myanmar. The military coup d'état in Myanmar (February 2020) has continued to impinge the Burmese supported research groups and networks; many staff members have been fired for criticising the military and students have been expelled for the same reason. One of the ISP-supported mathematics network nodes at University of Mandalay have been badly affected, and activities have more or less been put on hold. The two physics groups (one at University of Mandalay and one at University of Yangon) have continued with activities.

In some cases, the policy of universities in low and lower-middle income countries still focuses on the number of publications, rather than on the quality of the publication, when it comes to career promotion. Therefore, researchers and students might publish their papers in journals without checking the quality of the impact factor. Unfortunately, some articles end up in journals by predatory publishers. Even though publications in predatory journals was less compared to 2022, ISP will continue to raise the awareness and knowledge of this phenomenon among supported groups and networks.

Strategies completely fulfilled

In 2019, ISP developed a retrospective data document, based on the theory of change. This document serves as an instrument for systematic baseline assessment and chronology of capacity development stages with supported partners (ISP specific strategy). In 2022, this approach was fully implemented in all three ISP programs and it is from 2023 used as a background document particularly in the meetings of the Scientific Reference Groups.

Strategies partly fulfilled in 2024

In 2020, ISP refined the monitoring and evaluation of ISP's performance to better show the results and the efficiency of the program (ISP specific strategy) by updating data retrieval forms in the Activity report requests. In 2024 (as in 2023), some groups did not provide the Activity reports in a satisfactory way. This might be due to the cut funding and that the groups/networks give ISP-reporting less of their time.

In 2019, ISP started the work to develop and implement guideline criteria for the phase out of ISP support (ISP specific strategy). Typically, ISP begins the phase-out process six years in advance to adequately prepare the group/network in question, informing them that they are entering their penultimate and final grant periods. However, in 2024 the process was accelerated due to the financial constraints. Although the physics groups in Kenya had been previously notified, it may have been more appropriate to extend a final three-year contract to ensure a smoother transition. Based

on the practical experiences of phasing-out groups and also by using the above-mentioned retrospective data documents, guideline criteria are intended to be developed.

The retrospective data document can also be used *to develop an instrument for periodical planning of progress expectations with supported partners at a time course over a number of support agreement cycles* (ISP specific strategy). ISP plans to implement the document in this sense when new support is initiated. Today, no new support is planned.

Strategies failed in 2024

Since no new groups/networks are planned to be initiated, ISP did not *further increase the transparency in the “application by invitation” modality* (ISP specific strategy). If ISP’s financial crisis is solved, information about the procedure will be published on the ISP website, www.isp.uu.se.

Moreover, ISP did not improve on the fulfillment of the specific objective *to make better use of previously supported partners in the development of new support*. This has for a long time been ISP’s ambition, but it has not been widely and systematically implemented. Today some previous partners contribute as hosts for sandwich students, for MFS (Minor Field Studies) students, and as scientific collaborators and mentors. In the future, ISP aims to put a stronger focus on attaining this specific objective.

8. Lessons learnt 2024

The reduced Sida funding to ISP, has continued to dominate much of the financial considerations, and has implied less funds available for the activities budgeted by groups and networks: their allocations had to be drastically decreased. **ISP has made considerable efforts to elaborate strategies to raise money from different donors, agencies and the EU:**

- Hultmans Foundation (*Support for increased gender equality in basic sciences in developing countries*)
- The Guild-ARUA (*CoRE-Math – the only successful application*), Mastercard Foundation (*The EAUMP Graduate School in Mathematics*)
- EU Global Gateway window 2 – Call Innovative Solutions for Teacher Education in Sub-Saharan Africa (*Science Teaching Training for Schoolteachers in Tanzania*)
- Erasmus+ Capacity Building in Higher Education (*please see TeaSTEM below*)
- Akelius Foundation
- Gates Fundation

ISP has had regular meetings with the UU fundraising unit to learn more about fundraising.

During 2024, ISP finalised an application for an Erasmus+ CBHE (Capacity Building in Higher Education) project. The project, TeaSTEM, addresses the poor university education in STEM at universities in Cambodia and Laos, and is developed in close contact with ISP’s trusted partners at Royal University of Phnom Penh and National University of Laos. Other partners in Asia are Champasak University in Laos, Svay Rieng University in Cambodia, and the Ministry of Education and Sports in Laos. The EU-partner is University of Amsterdam. The application was sent to EU in February 2025. The results will be announced in late July 2025.

What ISP has learnt is that fundraising is very hard and takes time. ISP was not successful in obtaining any external funding in 2024.

The Covid-19 pandemic taught ISP that many meetings, seminars etc. can be arranged digitally. This has improved the contact between the partners and ISP, for example between two physical visits. Compared to the IRL meetings, digital meetings are cheaper, more inclusive (as more people can interact without the need to travel long distances) and much more environmental-friendly. Important to remember, though, is that digital interaction never fully can replace physical ones. ISP will continue to elaborate on hybrid meetings and how to travel less frequently.

The physical meetings, seminars and conferences give better opportunities to comment, discuss, share experience and knowledge (as well as having informal chats in-between the meetings) than the digital meetings. It is essential to interact with people and, to really see the working environment of supported partners, to meet and discuss with students, and to follow up the implementation of new instruments and activities, i.e. to maintain a good understanding of context, challenges and progress of the supported groups and networks.

ISP would like to continue to support gender pursuits in supported groups and networks, e.g. through the ISP Gender Equality Grants. This is, unfortunately, impossible with the scarce funding. However, an increased awareness of gender issues is clearly seen in the majority of ISP-supported groups and networks. Surely, the women scientific ISP staff (Carla Puglia and Barbara Brena in physics and Cecilia Öman in chemistry) serve as role-models for groups and networks.

The problem with predatory publishing must be taken seriously, and ISP will continue to encourage group and network members to choose journals wisely.

ISP will continue to make the program better known within and outside Uppsala University. Hopefully the information about the success of ISP's work can attract funding from supplementary sources. The ISP model can serve as best practice for scientific capacity building in low and lower-middle income countries.

9. Other ISP cooperation

ISP's specific objectives say that ISP should *continue cooperation with other organisations to the benefit of the program*.

Besides the ISP core program, reported in the previous sections, ISP carries out assignments by Sida and collaborates with other bodies.

In short, the cooperation with Stockholm University, Sweden, with TheEPCenter and with Unisa-iThemba continued.

In 2022, ISP was granted an three-year Erasmus+ CBHE (Capacity Building in Higher Education) project, PEP, together with UPE, the Unit for Professional English and the Division of Internationalisation at Uppsala University, University of Galway in Ireland and six West African partner universities.

9.1 Stockholm University

The agreement with the Faculty of Science, Stockholm University (SU), continued. SU contributes with SEK 1 million per year (2021-2025).

The SU funding for 2024 has been used for:

- Continued support to research groups in chemistry and physics at the Faculty of Science, National University of Laos, Vientiane, Laos.
- To send books to one university in Bolivia and one in Zimbabwe. Thanks to the previous agreement with the American Institute of Physics (AIP), ISP received about 200 university physics textbooks for free almost every year over a long period. ISP covered the costs of delivering these books to universities in low and lower-middle income countries. In 2024, the available books were sent to Universidad Mayor de San Simón (UMSS) in Cochabamba, Bolivia, and to National University of Science and Technology (NUST) in Zimbabwe. This was the last book delivery, as AIP adopted a digital system for textbook evaluations starting in 2024.
- Support for the Rwanda mathematics competition.
- Costs related to the ISP mathematics Reference group meeting in October 2024.

9.2 Thailand International Cooperation Agency (TICA)

In 2015, ISP partnered with [the Thailand International Cooperation Agency \(TICA\)](#) and the Thailand Research Fund (TRF).

The partnership offers scholarships to PhD students in Bangladesh, Cambodia, Laos, Myanmar, Nepal and Vietnam, in 2019 extended to Bhutan and Sri Lanka. Students are registered at Thai universities, where they spend two years of their PhD training, with one intermittent year in Sweden.

In 2019, the responsibilities of TRF were transferred to the Thailand Science Research and Innovation (TSRI) at the National Research Council of Thailand (NRCT) under the Thai Ministry of Education, Science, Research and Innovation.

The first admitted student in the Joint Thailand-Sweden PhD Scholarship Programme, Ms Thiri Yadanar Htun, graduated in 2022 after studies at Suranaree University of Technology, Thailand and Chalmers University of Technology, Gothenburg, Sweden. She now works as a lecturer at University of Mandalay, Myanmar.

The second and third admitted PhD students, Ms Moh Moh Aung (nuclear physics) and Mr Soe Ko Ko Aung (physical chemistry) studied in Uppsala in 2021. It became a prolonged stay due to the Covid-19 pandemic). Mr Soe Ko Ko Aung returned to the University of Mandalay after he successfully defended his PhD thesis at Sakon Nakhon Rajabhat University in Thailand, in September 2021. He is now an associate professor and works as a lecturer and leader of the supported group physics group at Mandalay University (IPPS MYA:01). Between 9 October, 2023 and 30 April, 2024 he was permitted to stay in Sweden to work as a postdoc at the Department of Chemistry, Uppsala University. On April 3, 2024, Moe Moe Aung successfully defended her PhD thesis at Suranaree University of Technology, Thailand. She is now working as postdoc at the same university in Thailand.

The fourth admitted student, Ms Ei Ei Phyo Myint, Myanmar graduated in 2022, at Tropical and Parasitic Research Unit, Faculty of Medicine, Mahasarakham University, Thailand. She was expected as a guest student at Umeå University in Sweden in 2021, but the Swedish embassy in Bangkok declined her visa application.

The fifth admitted student, Ms Su Yee Win, Myanmar, continued her PhD program at the Laboratory of Biopolymers and Nanoengineering for Drug Delivery and Molecular Imaging, Faculty of Biomedical Engineering, Mahidol University, Thailand. As planned, she stayed in Sweden for 12 months, starting

from March 2024, to work with her research project at the Department of Chemistry, Uppsala University with Professor Oommen Varghese as Swedish supervisor.

During 2024 the contacts with TICA were more or less non-existent. ISP staff visited the Swedish Embassy in Thailand (Bangkok) in 2023 and met with some of the staff of TICA: the communication was very challenging but ISP finally understood that a new call for PhD positions was open. TICA had announced it without telling ISP or the Swedish Embassy in Bangkok. ISP encouraged its PhD students in the country covered by the agreement to apply, even though the application was about to close very soon.

It is unclear if the cooperation between ISP/Sida-TICA will continue, since TICA has recently only approved Myanmar PhD students, and ISP can not support students from Myanmar, because of the Swedish government's rules.

9.3 Thailand Center of Excellence in Physics (ThEPCenter)

ISP has had a long-lasting cooperation in physics with University of Chang Mai, Thailand²⁷. In 2019, Professor Thiraphat Vilaithong, Executive Director of ThEPCenter, visited ISP and requested a formalised cooperation based on previous relations. In January 2021, a Memorandum of Understanding (MoU) was signed between ISP and ThEPCenter.

The MoU allows short-term research training for the duration of maximum one year in Thailand for ISP-associated physics PhD students or postdoctoral fellows in a facility where ThEPCenter has affiliated academic and technical resources, including ThEPCenter member institutions. ThEPCenter will accept up to five such fellows annually from ISP partner institutions in Asia and Africa. *The travel and living expenses, including health insurance, will be financed by ISP, whereas ThEPCenter will provide an in-cost and/or in-kind contribution according to Thai standards.*

The same MoU will also facilitate postdoctoral research visits for the duration of maximum one year in Sweden for Thai PhD physics graduates in various areas of physics, where ISP has the competence to propose host institutions. *ISP commits to introduce and arrange accommodation in Sweden to successful candidates, if necessary, but accommodation costs are in all cases to be paid by the visiting postdoctoral researcher.*

During 2024 no student exchange occurred within this agreement. Actually, the MoU needs to be revised since the ISP budget no longer allow to sustain students for their visit to Sweden.

²⁷ Between 1982 and 2005. More information in [The International Science Programme in Sri Lanka and Thailand: Three decades of research cooperation](#) by Rebecca Andersson and Marta Zdravkovic, 2017.

9.4 Unisa-iThemba

The agreement between ISP and Unisa-iThemba lab in South Africa, signed in June 2021, allows Master's and PhD students from ISP-supported groups in Africa and Asia to spend a research visit at the iThemba lab for up to one year. The costs for the students' exchange is usually covered by the supported group's allocation. The agreement has generated a large number of exchanges of students from the ISP-supported groups in Kenya, Uganda and Tanzania. Due to the very reduced budget of the ISP physics groups the expenses in 2024 were also covered by funds from iThemba lab.

In December 2024, in connection with the SANORD Conference, Programme director for ISP Physics, Professor Carla Puglia, and Deputy programme director Dr Barbara Brena visited Professor Malik Maaza, UNESCO-Unisa Africa Chair in Nanosciences and Nanotechnology, and all students at iThemba lab in Cape Town.



Photo 24. Visit to iThemba lab.

9.5 Erasmus+ CBHE project PEP

In the long collaboration between ISP and the francophone part of Africa, the low English language proficiency has posed a challenge when communicating with supported researchers/students and when organising research seminars and workshops. This gave rise to the idea to develop the English language proficiency at the partner universities. In 2021, ISP worked together with the Unit for Professional English (UPE) of Uppsala University to deliver two online English courses for Master's students and researchers in Mali, Burkina Faso and Ivory Coast. The courses received excellent feedback and the African partner universities suggested a larger project that would build more institutional capacity.

To secure funding for this initiative, ISP together with Uppsala University's Division of Internationalisation and UPE, submitted an Erasmus+ CBHE application which was approved, in tough competition, in 2022.

The lack of advanced English skills at ISP's West African partners, means that students and researchers alike are limited in their ability to share their knowledge and expertise with the international scientific community. To address this, the main objective of PEP is to train French-speaking university staff in English, and to establish Units for English proficiency in the participating universities.

Partners in PEP are:

- ISP, UPE, and Division of Internationalisation, Uppsala University, Sweden
- University of Galway, Ireland
- University Joseph Ki-Zerbo (UJKZ), Burkina Faso
- University Nazi Boni (UNB), Burkina Faso
- University of Sciences, Techniques and Technologies of Bamako (USTTB), Mali

- University of Arts and Humanities of Bamako (ULSHB), Mali
- University San Pedro (USP), Ivory Coast
- Institut National Polytechnique Félix Houphouët-Boigny (INPHB), Ivory Coast

During spring and autumn semester 2023, much time was spent on coaching the African partners how to deal with EU administration and the EU funding and tender portal. In addition to learning the EU funding landscape, ISP considers this time valuable for supported groups and networks to build their capacity when applying independently for EU funding.

In November 2023, the kick-off meeting for PEP was held at Uppsala University, and all partner finally met in person. During the kick-off, a steering committee, teacher team and a communication team were formed. ISP is responsible for the communication deliverables, e.g. the website, communication plan and dissemination. ISP's communication officer had through AI created several suggestions for PEP logos. All PEP participants voted for their favourite and the winner can be seen to the right.



In 2024, the second meeting took place at the two partner universities in Ivory Coast, and the third meeting (teacher training) took place at Uppsala University. ISP was co-organisers together with the Uppsala University Division for Internationalisation. The planned pilot courses in Professional English oral communication were held at all six West African partners.

With this project, ISP continues to address the need for French-speaking West Africa to develop their English language proficiency, in order to fully participate in the international science community whereas English is the lingua franca.

9.6 Pan-African Centre for Mathematics (PACM)

The Pan-African Centre for Mathematics (PACM) is a joint initiative between ISP, University of Rwanda (UR), Stockholm University (SU) and the International Centre for Theoretical Physics (ICTP). The project aims at starting a Master's program in fundamental mathematics under the centre EAFIR (East African Institute for Fundamental Research), which is an ICTP-affiliated regional centre in Kigali, Rwanda. The program will have Pan-African recruitment and provide full funding to the students. No progress was made during 2024 due to staff changes at the ICTP-affiliated institute [EAFIR](#) (East African Institute of Fundamental Research).

9.7 African Network for Women in Astronomy

The African Network for Women in Astronomy (AfNWA) was set up in 2019 to connect and support women in astronomy across the African continent. Every year the network assigns awards to women astronomers in recognition of their scientific achievements and contributions to society. ISP alumna Priscilla Muheki is one of the founders of the network.²⁸

ISP sponsors the Women in Astronomy in Africa Award that in 2024, were assigned to Dr Jamila Chouqar in recognition of her outstanding PhD research in exoplanetary science. Dr Chouqar is an assistant professor at Cadi Ayyad University in Marrakech, Morocco. She earned her PhD in astrophysics from Cadi Ayyad University, focusing on the characterisation of exoplanetary atmospheres. She later joined the ExoTIC Research Group at Liège University, Belgium, as a

²⁸ AfNWA is part of the African Astronomical Society (AfAS). AfNWA website: <https://afnwa.org/>

postdoctoral fellow, where she contributed to comparative atmospheric studies of Super-Earths orbiting M-dwarfs. Dr Chouqar has been a research fellow at the Harvard-Smithsonian Center for Astrophysics on multiple occasions, collaborating with experts on exoplanetary atmospheres.

9.8 CoRE-Math

In 2024, CoRE-Math (Africa-Europe Cluster of Research Excellence in Mathematics) was selected as the 21st CoRE (Cluster of Research Excellence) to join the initiative led by ARUA²⁹ and The Guild³⁰.

CoRE–Math aims to promote research collaboration between African and European universities with the intention of contributing to achieving the goals of the AU-EU Innovation agenda. Specifically, the cluster seeks to:

- To develop capacity for research and postgraduate training in African universities
- To substantially increase the research outputs from research involving African and European partners
- To substantially increase high-quality collaborative postgraduate training in African universities
- To substantially increase the participation of women in postgraduate training and research in African universities
- To leverage mathematics to address socio-economic challenges, especially in Africa

The CoRE builds on ISP’s math programme EAUMP (Eastern Africa Universities Mathematics Programme), which was established in 2002 to provide collaborative postgraduate training. In this new phase, the programme will become part of the CoRE-Math collaborative activities with the new title **Europe Africa Universities Mathematics Programme (EAUMP)**, signalling their expanding ambition to operate in all parts of Europe and Africa, welcoming excellent collaborators and addressing a wider spread of demands from societies in all parts of Europe and Africa.

Main contacts are Bengt Ove Turesson at ISP and John Mango at Makerere University, Uganda.

Partner universities are:

- Uppsala University, Sweden (co-lead)
- Makerere University, Uganda (co-lead)
- Addis Ababa University, Ethiopia
- University of Dar es Salaam, Tanzania
- University of Nairobi, Kenya
- University of Rwanda, Rwanda
- University of Zambia, Zambia
- Groningen University, Netherlands
- Lappeenranta–Lahti University of Technology, Finland
- Linköping University, Sweden
- Stockholm University, Sweden
- University of Amsterdam, Netherlands
- University of Bergen, Norway
- University of Oslo, Norway
- University of Vienna

²⁹ ARUA = The African Research Universities Alliance.

³⁰ The Guild = The Guild of European Research-Intensive Universities.

Uppsala University has committed 0.3FTE for the administration of CoRE-Math, EUR 50,000/year for research visits to Uppsala, EUR 50,000/year for travel, and support from the central offices at the university to CoRE-Math. Stockholm University supports CoRE-Math through ISP, and University of Amsterdam will contribute in-kind.

9.9 Sida bilateral research cooperation

By assignment by Sida, ISP is managing a number of activities related to the Sida bilateral programs for research cooperation. In 2024, these assignments comprised the coordination on the Swedish side of the programs with:

- Bolivia
- Cambodia
- Ethiopia
- Mozambique
- Rwanda
- Tanzania

ISP is also administrating the payments of subsistence allowance to participants (PhD students and postdocs) in all bilateral programmes while in Sweden.

[For more details, please see Appendix 3.1]

10. More about ISP

10.1 ISP's participation in conferences and meetings

To increase the visibility of ISP's work and to attract possible funders, ISP staff participate in international conferences and meetings.

The Guild – ARUA

On 29 September-2 October 2024 the director of ISP, Dr Bengt Ove Turesson, was invited to Stellenbosch University, South Africa, together with UU Vice-Chancellor for the inauguration of The Guild – ARUA (African Research Universities Alliance) Africa-Europe Clusters of Research Excellence (CoRE). 250 academics and researchers from over 49 institutions across more than 27 countries in Africa, Europe and beyond participated in the meeting.

UNESCO – AU Continental Conference

In November, Carla Puglia was invited by the Italian Embassy in Addis Ababa to the UNESCO-AU Continental Conference: Transforming Science, Technology, Engineering and Mathematics in Africa, in Addis Ababa, Ethiopia. Carla was part of the panel discussion "Sustainable Innovation Ecosystem and gave a short presentation about "Sweden - An Innovative Country" .

The SANORD Conference

ISP staff gave two presentations at the SANORD (Southern African-Nordic Centre) at the University of the Western Cape, South Africa, December 4-6, 2024.

- *The International Science Programme (ISP), Science and the Sustainable Development Goals* by Barbara Brena
- *Empowering Women in Science* by Ulrica Ouline

10.2 Other ISP activities

EMS-CDC

European Mathematics Society - Committee for Developing Countries (EMS-CDC) assists mathematicians in the Global South, e.g. developing mathematics curricula, libraries and sources of support funds. The ISP director, Dr Bengt Ove Turesson, chaired this committee in 2023–2024.

SweDev

Swedish Development Research Network (SweDev) aims to connect Swedish development researchers across to strengthen collaboration and to increase interaction between development researchers and practitioners. ISP is a member of the Steering Committee as well as the Executive Steering Committee.

The Africa network at UU

ISP is part of the Africa Network at Uppsala University. This network meets three times per semester to share news on Africa-related research at the university. Members come from Forum for Africa Studies, Department of Anthropology, ISP, Department of Women's and Children's Health, Division for Internationalisation and Division for Research and Partnership Support.

Forum for Africa Studies

Forum for Africa Studies at Uppsala University is a strategic centre for research and higher education in, on and with Africa for the whole university. ISP, represented by the Director and Deputy Director, is a member of the Board of Forum for Africa Studies together with the representative of the UU different faculties.

Student activities

ISP arranged one student activity outside ISP office on June 11 for ISP students and staff in Sweden. Besides all ISP staff, 41 staff and students from Bolivia, Ethiopia, Kenya, Myanmar and Mozambique participated.

Research Management Programme

ISP launched the Research Management (RM) initiative in 2016 to strengthen research environments in Sub-Saharan Africa (SSA). By 2024, it supports 150 researchers across 15 institutions, led by a Stakeholder Committee from 10 SSA countries³¹. The programme helps researchers and laboratory technicians conduct research, publish findings, and implement results.

The key activities are:

- Training and Coaching: 40 annual online sessions per year with 30 participants, daily *WhatsApp* support, and a *Notion IT collaboration platform*.
- Implementation: Developing Standard Operating Procedures (SOP), Good Management Practices (GMP) frameworks, and measurable Progress Markers (Expected, Wished for, and Dreamed of).
- Team and Logistics Management: Committee member evaluation, skills assessment, and performance tracking.
- Financial Management: Transparent accounting and external audits.
- Partnership Development: Collaboration with investors, researchers, and entrepreneurs, ensuring fair resource distribution.

³¹ Burkina Faso, Egypt, Kenya, Niger, Rwanda, Senegal, Tanzania, Uganda, Zambia and Zimbabwe.

The programme identifies local research challenges and designs targeted activities with measurable milestones. Successful initiatives become SOPs implemented through GMPs. For challenges beyond local capacity, balanced partnerships ensure that local stakeholders retain control over ideas and outcomes.

The initiative aims to strengthen institutional infrastructure, benefiting researchers, technicians, and librarians while enhancing research capacity. The goal is for postdoctoral researchers to publish two papers and apply for two grants annually, PhD candidates to publish one paper and submit one grant application per year, and MSc students to graduate on time.

In 2024, the programme had focus on shifting from aid/support mindset to self-reliance, engaging with the private sector to attract funding and partnerships for research, and to writing compelling grant applications.

When it comes to laboratory management, the programme has worked with local regulations around tenders, procurement procedures, transport and clearance, service and maintenance, warranties, insurance, accreditation, technician development and care, disposal of hazardous waste and disposal of obsolete equipment.

10.3 ISP organisation

The operation of ISP is regulated in an ordinance established by the Swedish government in 1988³² through the then Office of Universities and Higher Education (Universitets- och högskoleämbetet, UHÄ). [For details, please see Appendix 4.2]

ISP Board

The ordinance requires the Uppsala University Board to establish additional directions needed for the operation of the program. These are established in the Instruction, latest revised and decided by the Vice-Chancellor 22 March 2016.³³

The ISP Board, appointed for 1 April 2024 to 31 December 2027, had the following composition (deputies included):

- 57% Female
- 43% Male

In 2024 there was one new board member, and two new deputies.

In 2024, the Board had no votes *per capsulam*. Two meetings were arranged in hybrid format (29 May and 18 December).

ISP Executive Committee

The ISP Executive Committee (EC) is a standing working committee to the Board, regulated by the Rules of Procedure,³⁴ established by the Board in June 2019. It met four times in 2024, and took one *per capsulam* decision. All meetings were hybrid meetings.

The members are all Uppsala University staff and the composition was:

³² UHÄ-FS 1988:18; SFS 1992:815.

³³ The ordinance and a translation to English can be found at www.isp.uu.se/about-isp/board/ 2020-06-01.

³⁴ The Rules of Procedure can be found at https://www.isp.uu.se/digitalAssets/502/c_502308-l_1-k_160613-isp-rules-of-procedure.pdf 2022-05-20.

- 50% Female
- 50% Male

The ISP Scientific Reference Groups

The ISP Scientific Reference Groups has among its tasks to evaluate the applications from invited research groups and networks. The reference groups are composed by renowned senior scientists; half of the members are from the regions where ISP operates, and half are from Nordic countries.³⁵

ISP Chemistry (IPICS)

The IPICS scientific reference group had its annual meeting online, October 16-17, 21, 28-29, 2024. It was held over 5 time zones (from Ecuador to Laos) so time was a challenge. It had the following composition: 50% F and 50% M (3 women and 3 men).

ISP Mathematics (IPMS)

The IPMS scientific reference group had its reference group meeting online 10–11 October, 2024. The group had the following composition: 50% female and 50% male (2 women and 2 men).

ISP Physics (IPPS)

The IPPS scientific reference group had its annual meeting online on 24-25 and October 1-2, 2024. It had the following composition: 16% female and 84% male (1 woman and 6 men).

ISP Staff

In 2024, ISP had 14 staff members, 64% female and 57% male.



Photo 25. ISP staff from left: Najat Tahboub, Ulrika Kolsmyr, Solomon Tesfalidet, Anna Wallin, Carla Puglia, Bengt Ove Turesson, Ulrica Ouline, Monica Lindström, Olle Terenius, Barbara Brena, Cecilia Öman and Hossein Aminaey.

³⁵ Terms of Reference for the Scientific Reference Groups https://www.isp.uu.se/digitalAssets/496/c_496672-1-k_tor-for-isp-ref-groups-v2.pdf 2022-05-20