UPPSALA UNIVERSITET

INTERNATIONAL SCIENCE PROGRAMME
ISP

International Science Programme (ISP)

A Success Story of Global Sustainable Development

www.isp.uu.se
https://www.facebook.com/isp.uu

Carla Puglia
carla.puglia@isp.uu.se

UPPSALA UNIVERSITET

Outline

- What International Science Programme (ISP) is
- What ISP does
- Where ISP operates
- How ISP works (ISP Model)
- ISP Results
- Research focus
- Gender Programme
- New partnerhips/projects: looking forward
- Conclusions



UPPSALA UNIVERSITET

What ISP is

A unit at Uppsala University, working with higher education and research capacity building in low and lower-middle income countries in the basic sciences: Physics, Chemistry and Mathematics.



WHAT IS ISP?

"ISP is a unique program that promotes strengthening of basic sciences and higher education in developing countries. Its approach is realistic and down to earth."

Dr Mohamed Gharib Bilal
Former Vice-President of Tanzania and former member of ISP board

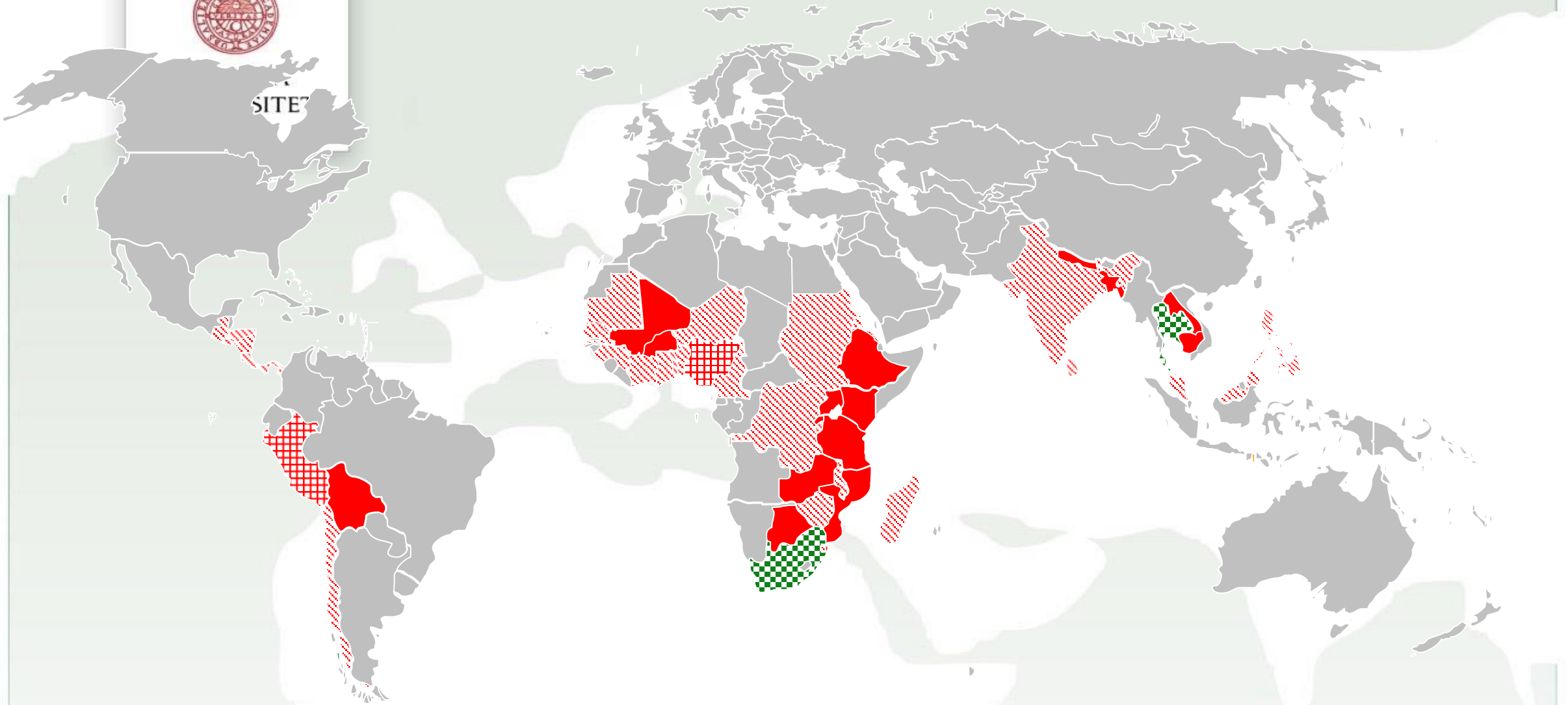
UPPSALA UNIVERSITET

What ISP does



- Started by the Nobel Laurate Prof Kai Siegbahn as a fellowship program in Physics at Uppsala University in 1961
- Swedish International Development Cooperation Agency (Sida) funded ISP since the 1960s
- Support research groups and networks in the basic sciences: Physics (1961), Chemistry (1970) and Mathematics (2002)
- Based at universities and research institutes in Africa, Asia and Latin America
- ISP provides funding – used for specific needs, improving local conditions for carrying out research and postgraduate training
- ISP started in 2016 a special program for promoting the participation of women to education and research activity

Where ISP operates



Where ISP operates



Research groups (34)

Africa: Burkina Faso, Ethiopia, Kenya, Mali, Rwanda, Tanzania, Uganda, Zambia and Zimbabwe

Asia: Bangladesh, Cambodia, Laos, Nepal and Myanmar

Networks (20)

- In Africa, Asia and in Latin America

Where ISP operates

UPPSALA UNIVERSITET

Coordination Assignments by Sida

Bolivia, Mozambique, Rwanda and Tanzania and probably Zambia

Other programs, e.g.

PhD Fellowship program with TRF/TICA Thailand

PhD fellowship with UNESCO-UNISA-ITLABS/NFR South Africa

UPPSALA UNIVERSITET

The ISP Model

Long Term

Local Ownership

Collaborative Links

Improved Conditions

Sandwich Model

UPPSALA UNIVERSITET

The ISP Model

Long Term

Local Ownership

Collaborative links

Improved conditions

Sandwich model

The ISP Model

- Takes time
- Support >20 to 30 years
- To groups and networks, not to individuals
- Starting from scratch
- Funding *potential to develop*



UPPSALA UNIVERSITET

The ISP Model

Long Term

Local Ownership

Collaborative links

Improved conditions

Sandwich

- Scientific and financial leadership/scientific novelty, feasibility
- Efficient use of funds
- Flexible use of funds
- Accountability

UPPSALA UNIVERSITET

The ISP Model

Long Term

Local Ownership

Collaborative links

Improved conditions

Sandwich

- GOAL - local capacity
- Equipping laboratories
- Facilitates a sustainable development of research activities

UPPSALA UNIVERSITET

The ISP Model

- GOAL - local capacity
- Scientific collaborators
- Establishment of postgraduate programs
- Research activities

Long Term

Local Ownership

Collaborative links

Improved conditions

Sandwich

The ISP Model

- PhD students' research training partly at home and partly at scientific host abroad when local training is not possible
- Efficient in many ways
- Facilitates start up of local research capability
- Limits brain-drain

Long Term

Local Ownership

Collaborative links

Improved conditions

Sandwich model

UPPSALA UNIVERSITET

The ISP Model



General benefits "in the South"

- Staff development
- Development of facilities
- Instruments, operation, maintenance and repair
- Introduction of a research culture
- Introduction of local MSc and PhD programs
- Scientific results and dissemination
- Scientific networking and cooperation
- International contacts and recognition

Contributing to a sustainable development of the supported institutions and of the countries

UPPSALA UNIVERSITET

The ISP Model



General benefits "in the North"

- Expanded views and understanding
- Increased scientific network
- Finding new approaches and research projects
- Obtaining new perspectives

Diversified and increased scientific collaborations/activities/results

UPPSALA UNIVERSITET

Results

Since 1960 ISP has:

- Cooperated with 84 countries in Africa, Asia and Latin America (supported groups and networks, procured equipment etc)
- More than 1,300 PhD graduates in physics, chemistry and mathematics (since 1972)
- Even more MSc graduates!
- In 2024 ISP support reached 563 (F 31%) PhD students and 611 (F 36%) MSc this means that ISP directly or indirectly supported 1174 (F 34%) students in 2024!

Results



Just to mention a few important outcomes testifying the impact of ISP in the world:

1990: First PhD graduate in Physics in Peru.
1990: First PhD graduate in Physics in Equador.
1990: First PhD graduate in Physics in Sri Lanka.
2015: 2nd and 3rd PhD graduates in Physics in Cambodia.
2017: First female PhD graduate in Physics in Mali.

UPPSALA UNIVERSITET

Results

ISP core program – OUTCOMES (2008-2024)

Outcomes	2008-2013	per year/ average	2014-2017	per year/ average	2018-2020	per year/ average	2021-2024	per year/ average
Supported groups	42-60	49	59-60	60 average	62-56	58 average	63-55	61 average
Funding	114 MSEK	19 MSEK	104 MSEK	26 MSEK	80 MSEK	27 MSEK	100 MSEK	25 MSEK
PhD Graduations	161	27	259	65	252	84	324	81
MSc Graduations	619	103	737	184	702	234	879	220
Published papers	917 (40% Index journals)	153 (45% index journals)	1093 (43% index journals)	273 (43% index journals)	1437 (46% index journals)	479 (46% index journal)	1578 (58% index journals)	505 58% index journal)
Conference contributions	1 371	229	1 340	335	1377	459	1426	357

UPPSALA UNIVERSITET

Results

Sustainable Developments Goals (SDG)



- 17 Goals Formulated by UN in 2030 Agenda to End Poverty, protect the Planet, make the vision that by 2030 all the people enjoy peace and prosperity a reality
- Call for action with guidelines to work to solve the most urgent problems – targets and indicators
- Focus on sustainability

UPPSALA UNIVERSITET

Results

Sustainable Developments Goals (SDG)



- ISP Supported groups target several SDG
- ISP objectives:

  – Support partners in using research results and acquired skills sustainably

  – Ensure a long-term, favourable impact on society through research application
- Efforts toward sustainability in energy sources and urban environment.

Results

Develop (SDG)



- SP Supported groups target several SDG
- SP objectives:
  - Support partners in usi and acquired skills sustainab
  - , fav society plica
- E inab ces and u

Results



















SP Supported groups target several SDG

SP objectives:

- Support partners in usi and
  acquired skills sustainab
- n, fav society
  t plica
- E inab ces and
  u

Results

Solar Energy

UPPSALA UNIVERSITET



Novel materials:
Burkina faso, Ethiopia, Kenya, Tanzania, Uganda, Zambia
MSSEESA Network

Applications: solar cookers
MSSEESA Network
Kenya, Tanzania, Uganda, Zambia

Solar energy “mapping”
Ethiopia

UPPSALA UNIVERSITET

Results

Solar Energy



7 AFFORDABLE AND CLEAN ENERGY

Novel materials for bifacial solar cells (TANZANIA)
Modeling and theoretical simulations
Tandem solar cell combining perovskite and a Si-solar cells **(KENYA)**
Fabrication of battery materials (UGANDA)
Optimizing photovoltaic (PV) system design for various scenarios **(ETHIOPIA)**
Testing of Commercial Solar Panels (ZAMBIA)
Development and test of new design for **cooking units (UGANDA, TANZANIA)**
Solar Academy for technicians and PV training
(KENYA, TANZANIA and UGANDA)



UPPSALA UNIVERSITET

Results

Sustainable cities



Micro particles Pollution and Environmental contamination
Kenya, Bangladesh, Cambodia, Laos

Soil Remediation and water quality
Burkina Faso, Uganda, Rwanda, Zimbabwe, Laos

Seismologic and Lightning Risks
Ethiopia, Uganda, Kenya, Malawi, Eritrea…
Nepal

UPPSALA UNIVERSITET

Results

Sustainable cities

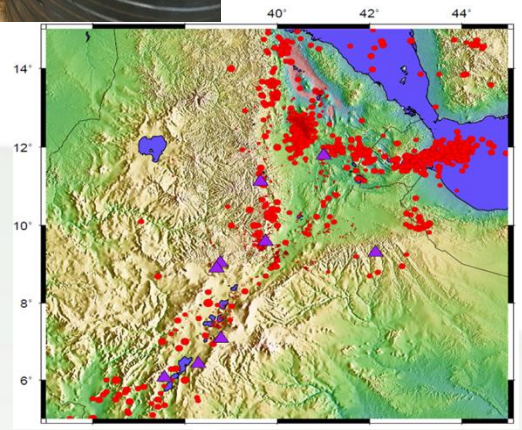


- Outdoor and indoor air quality monitoring (KENYA)

- Monitoring air pollution in Mali (MALI)

- Earthquake monitoring in the Rift Valley (ETHIOPIA, KENYA, ZIMBABWE…)
- Lightning (NEPAL)

- Mathematical Model on Leakage in Sewage Pipes (UGANDA)



UPPSALA UNIVERSITET

Results

Addressing Gender Balance



In the period 2017-2022 ISP implemented extra funds to supported groups and networks to promote gender equity in physics and mathematics.

These funds were earmarked for activities to promote a better gender balance, and to increase gender bias awareness.

UPPSALA UNIVERSITET

Results

Addressing Gender Balance



EANWoBAS: mathematicians and physicists from Uganda, Tanzania, Kenya, Rwanda and Zambia

- In 2022, 27 activities received such a grant
- These grants have been used for many different activities.
- From 2019 ISP also supports the

Eastern Africa Network for Women in Basic Sciences (EANWoBAS)

dealing with activities to improve gender equality and gender bias awareness at all the different education levels…

UPPSALA UNIVERSITET

Results

Addressing Gender Balance



EANWoBAS: mathematicians and physicists from Uganda, Tanzania, Kenya, Rwanda and Zambia

- In 2022, 27 activities received such a grant
- These grants have been used for many different activities.
- From 2019 ISP also supports the

Eastern Africa Network for Women in Basic Sciences (EANWoBAS)

dealing with activities to improve gender equality and gender bias awareness at all the different education levels…

UPPSALA UNIVERSITET

Results

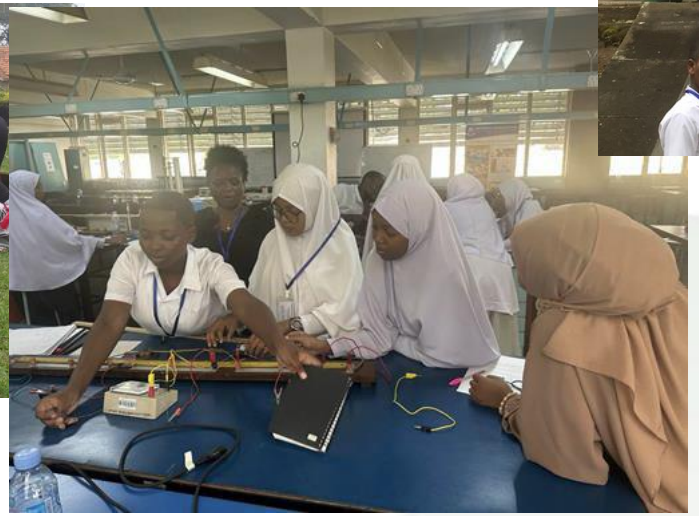
Addressing Gender Balance

- Tanzania: summer schools for girls in High school (Uganda and Ethiopia)









UPPSALA UNIVERSITET

Results

Addressing Gender Balance

- Tanzania summer schools for girls in High school
- Mentoring, networking and recruiting in Uganda and in the other countries included in EANWoBAS network





UPPSALA UNIVERSITET

Results

Addressing Gender Balance

- Tanzania: summer schools for girls in High school
- Mentoring, networking and recruiting in Uganda…..
- New PhD fellowship in Bangladesh







UPPSALA UNIVERSITET

Results

Addressing Gender Balance

These funds have already
resulted in measurable improvements



UPPSALA UNIVERSITET

Results

Addressing Gender Balance

All postgraduate female students (in %) during the period 2015-2023 in ISP supported activities by region

Students and regions	Chemistry (% female) 2015	2024	Mathematics (% female) 2015	2024	Physics (% female) 2015	2024	Total ISP (% female) 2015	2024
PhD students Africa	25	35	12	13	12	24	17	24
PhD students Asia	82	43	67		18	84	40	79
All PhD students	30	35	15	14	16	42	20	30
Master students Africa	36	44	23	21	21	33	28	33
Master students Asia	41	34		13	24	47	31	38
All Master students	38	43	23	20	22	39	29	36

UPPSALA UNIVERSITET

Results

Addressing Gender Balance

All postgraduate female students (in %) during the period 2015-2023 in ISP supported activities by region

Students and regions	Physics (IPPS) (% female) 2015/2016		Physics (IPPS) (% female) 2017/2018		Physics (IPPS) (% female) 2019/2020		Physics (IPPS) (% female) 2021/2023		Physics (IPPS) (% female) 2024/2025	
PhD students Africa	12	12	15	18	22	24	27	25	24	26
PhD students Asia	18	45	40	46	56	57	55	64	84	82
All PhD students	16	23	23	26	31	30	34	34	42	44
Master students Africa	21	22	26	26	30	41	32	35	33	47
Master students Asia	24	21	32	34	42	40	46	39	47	44
All Master students IPPS	22	22	29	29	34	40	36	36	39	45

How ISP works



- **ISP has been funded by**
- Sida:*35 MSEK per year*
- Uppsala University: *3,2 MSEK per year*
- Stockholm University: *1 MSEK per year*
- **Substantial** *"in-kind contributions"* (not financially accounted for)

Since 2023 ISP has been affected by a significant budget reduction by Sida, due to the new Swedish cooperation policy:

From 35 MSEK to 10 MSEK in 2024 and 2025 with a dramatic impact on the whole program…

How ISP works

Consequences…

ISP is thinking how to re-formulate its framework and use the competence and experience acquired during these 65 years to still contribute to global sustainable development…
Two important pillars for the renewal of ISP support:

- **Phase out groups as resources to the program**
- **European funds: capability building and more…**
- **New projects and collaborations with local universities…**

How ISP works

- European funds: capability building and more…

PEP: Professional English Programs in West Africa

1. EU CBHE-grant for improving the English proficiency in three francophone countries in Africa

- **UU**: ISP, UPE and the Division of Internationalisation,
- **EU**: University of Galway (Ireland)
- **Africa**: 6 universities in 3 countries
  - Burkina Faso (UKJZ, UNB)
  - Ivory Coast (USP)
  - Mali (USTTB, ULSHB)

https://www.pep-project.eu/w/pe/

UPPSALA UNIVERSITET

How ISP works

- European funds: capability building and more...

Special thanks to Christine Mackay Tircomnicu, and to Christer Larsson@UPE, UU

PEP
PROFESSIONAL ENGLISH IN WEST AFRICA





UPPSALA UNIVERSITET

How ISP works

- European funds: capability building and more...

Africa-Europe Cluster of Research Excellence in Mathematics (CoRE-Math)

Establishment of CoRE-Math (2024):
built on already established collaboration within the Mathematics program at ISP.

Focus Areas:

- Developing capacity for research and postgraduate training in African universities and significantly increasing postgraduate graduations
- Strengthening collaboration in research and postgraduate training between African and European universities
- Leveraging mathematics to address socio-economic challenges in Africa
- Promoting mathematical outreach and engagement to inspire and nurture talent across the continent.

Member Universities: Makerere (co-lead), Uppsala (co-lead), Addis Ababa, Amsterdam, Bergen, Dar es Salaam, Groningen, Lappeenranta-Lahti, Linköping, Nairobi, Oslo, Stockholm, Vienna, University of Rwanda, University of KwaZulu-Natal, University of Zambia

How ISP works

- European funds: capability building and more…

Co-funded by the Erasmus+ Programme of the European Union

TeaSTEM: Improving University teaching education in STEM in Laos nad Cambodia

(SEU CBHE - Submitted application….

UU: ISP, Dept. of Physics and Astronomy, and Div. for Quality Enhancement

EU: Univ. of Évora (Portugal) Dept. of Mathematics

LAOS: National University of Laos (NUOL) and Champasack University (CU)

CAMBODIA: Royal University of Phnom Pehn (RUPP) and Svay Rieng University RU)

UPPSALA UNIVERSITET

How ISP will work

- New projects and collaborations with local universities



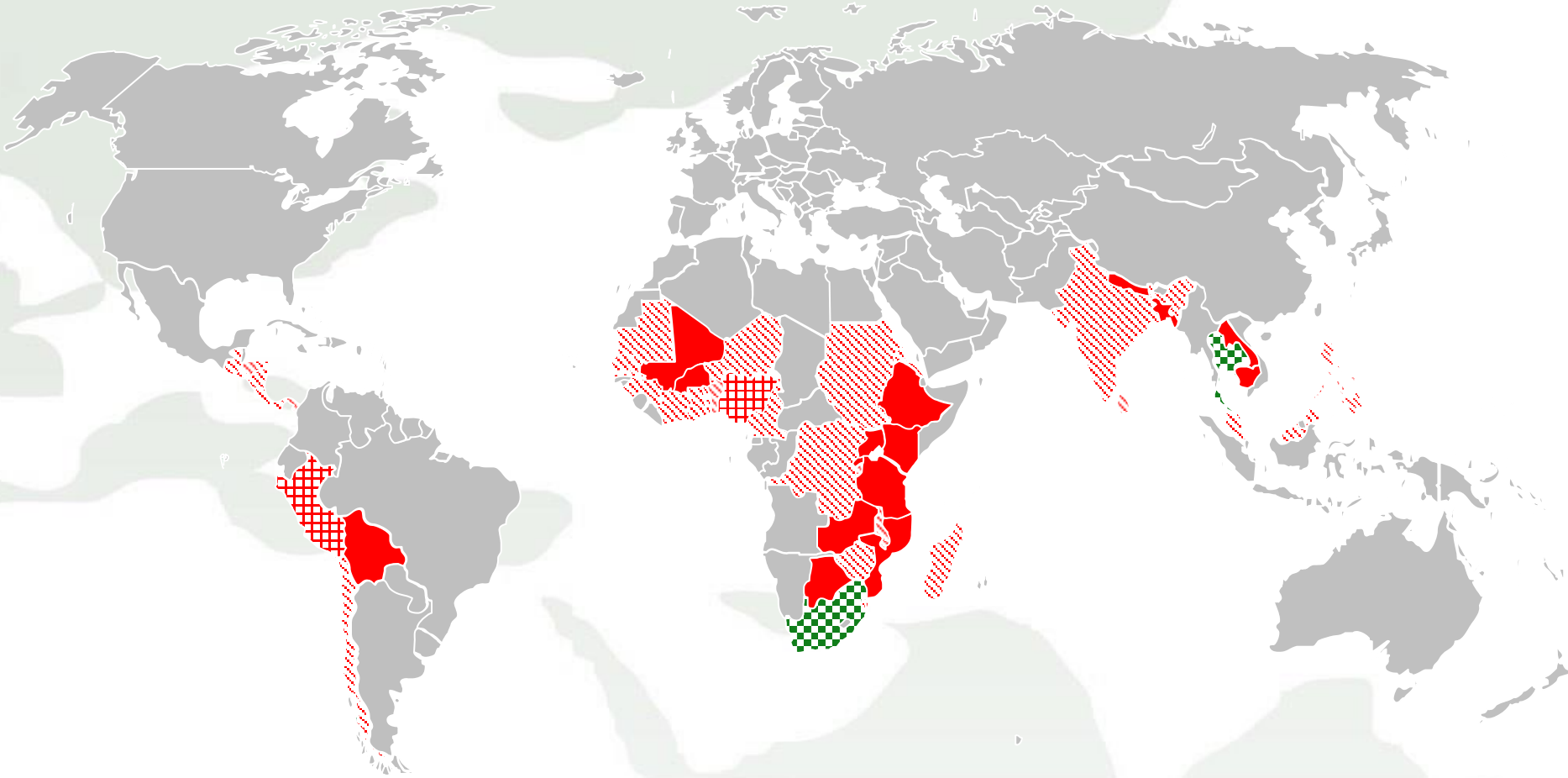
ISP-TICA agreement:
supporting exchange students from low income countries in Asia to Thailand and Sweden

ISP-Unisa agreement:
Supporting exchange of Masters and PhD students to Souht Africa (iThemba Lab)

Using phased-out groups as hosts for PhD students and staff from still supported groups

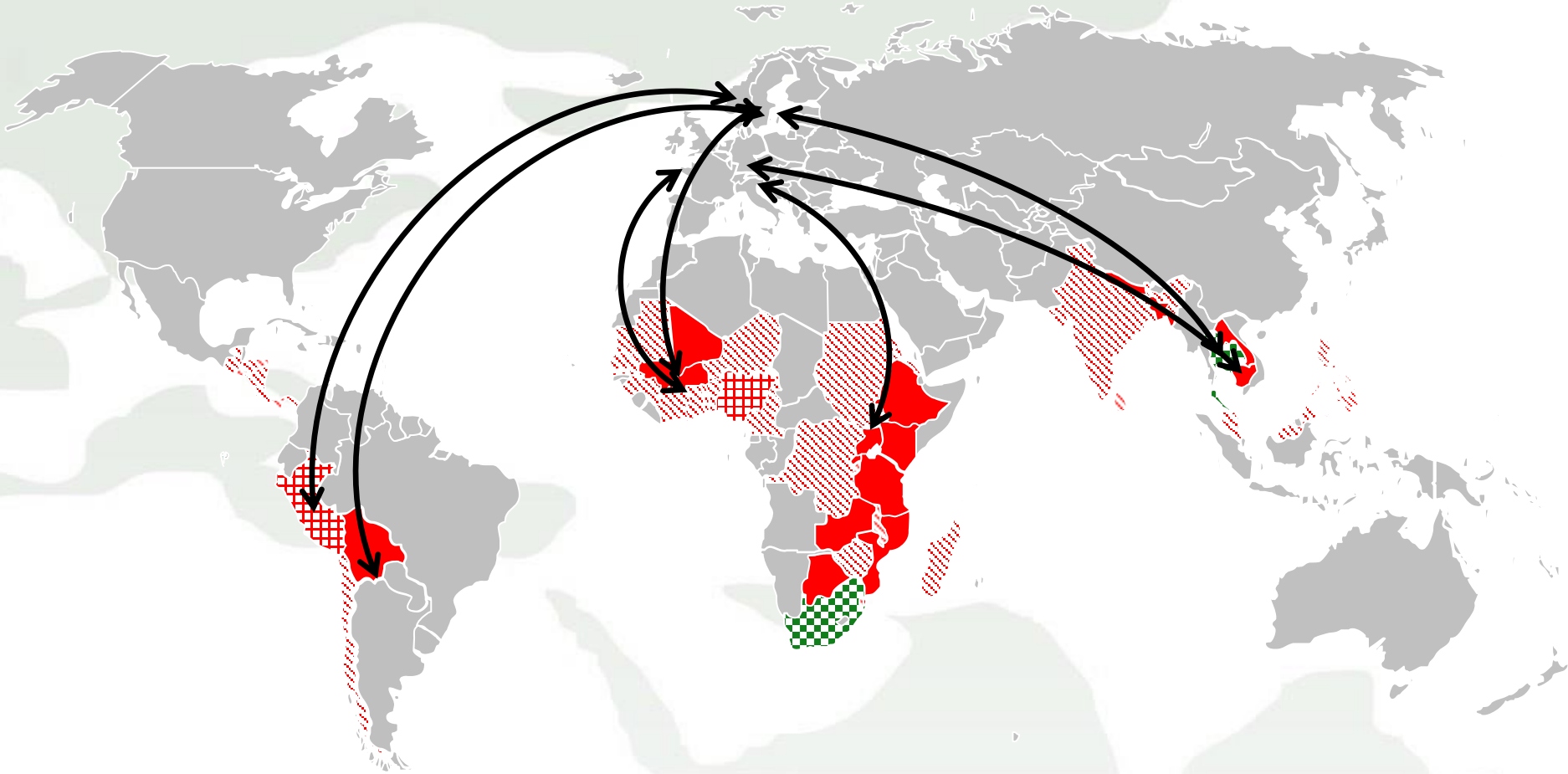
Promoting new collaborations within UU networks
(SANORD, SASUF, MIRAI, Enlight)

UPPSALA
UNIVERSITET



UPPSALA
UNIVERSITET

South- North

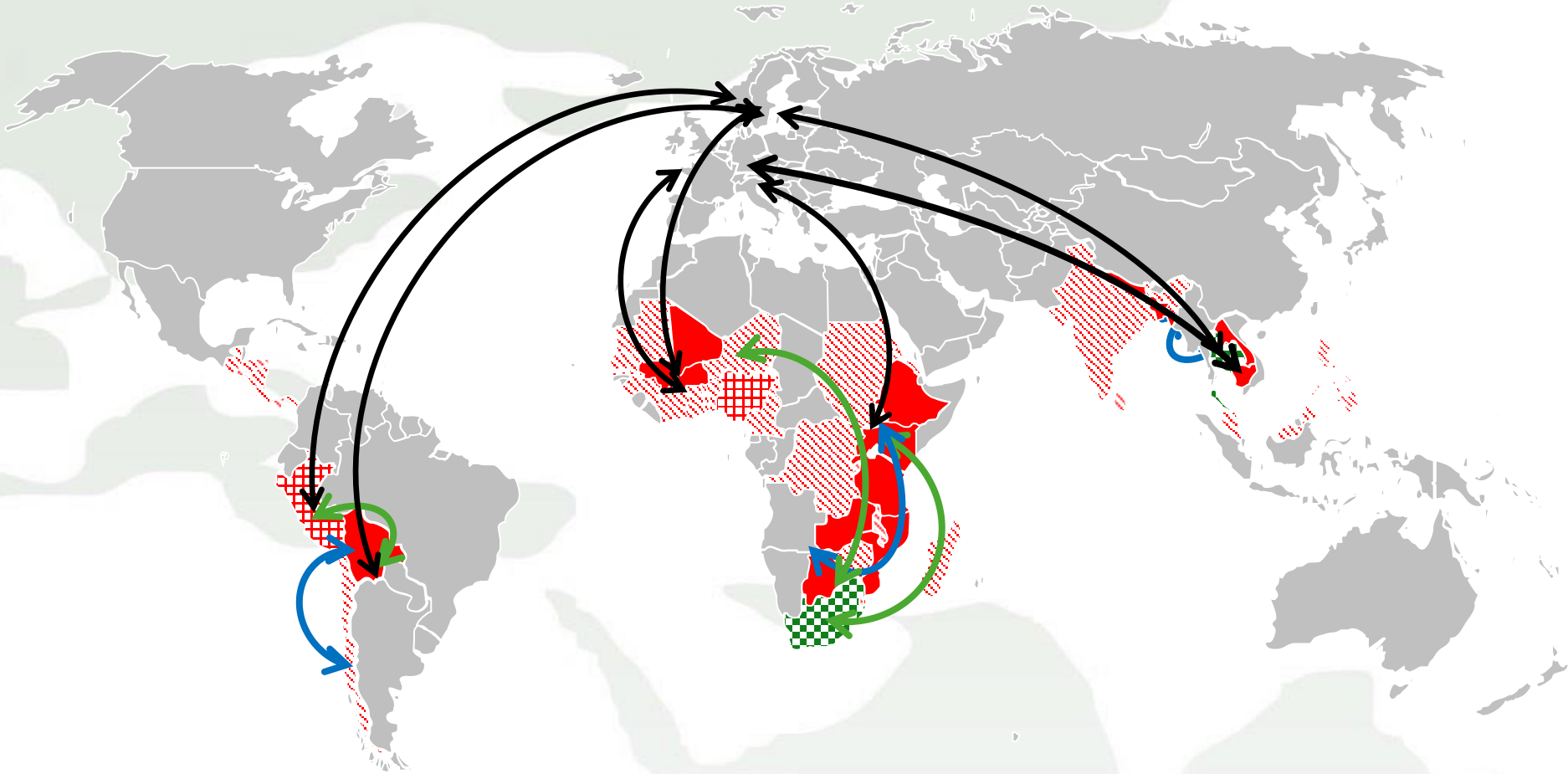


UPPSALA UNIVERSITET

South- North

and

South- South



UPPSALA UNIVERSITET

Conclusions

- ISP is a **unique program** (65 year old!) which supports capacity building in research and higher education in basic science **over the world**. The support results in economic growth, poverty alleviation, democracy and tolerance
- ISP presence and operation is untied, long-term…
- ISP support results in many PhD, MSc /MPhil graduations, development of local lab facilities, competence and experienced manpower - leading to a **local sustainable development**
- Support to activities for **promoting gender balance** with measurable results
- The new cooperation policy forces ISP to find new resources and activities…

Results of ISP work



Tracing ISP graduates

ISP managed to trace **404** of the **420** PhD graduated between

2008 and 2017.

ISP 60th Anniversary book

www.isp.uu.se

Acknowledgement

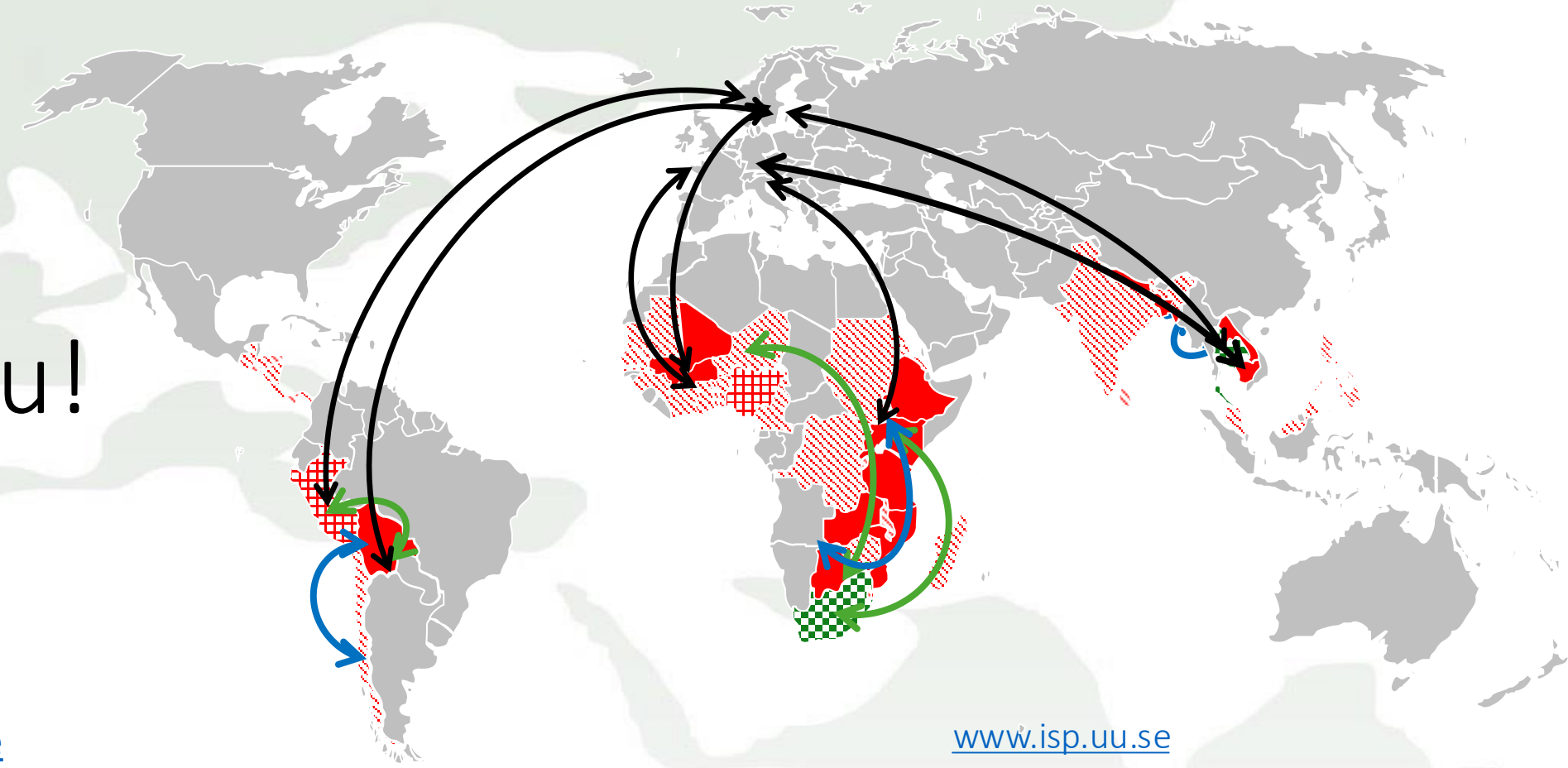
- Sida and Forsk
- Uppsala University
- Stockholm University
- All partners, colleagues and students

ISP staff



UPPSALA UNIVERSITET

Thank you!



carla.puglia@isp.uu.se

www.isp.uu.se

https://www.facebook.com/isp.uu



UPPSALA
UNIVERSITET