

# **Research and collection based taxonomic capacity building in SE Asia – lessons drawn and future perspectives**

**Thomas von Rintelen, Rosichon Ubaidillah, Vu Van Lien, Hendrik Freitag**

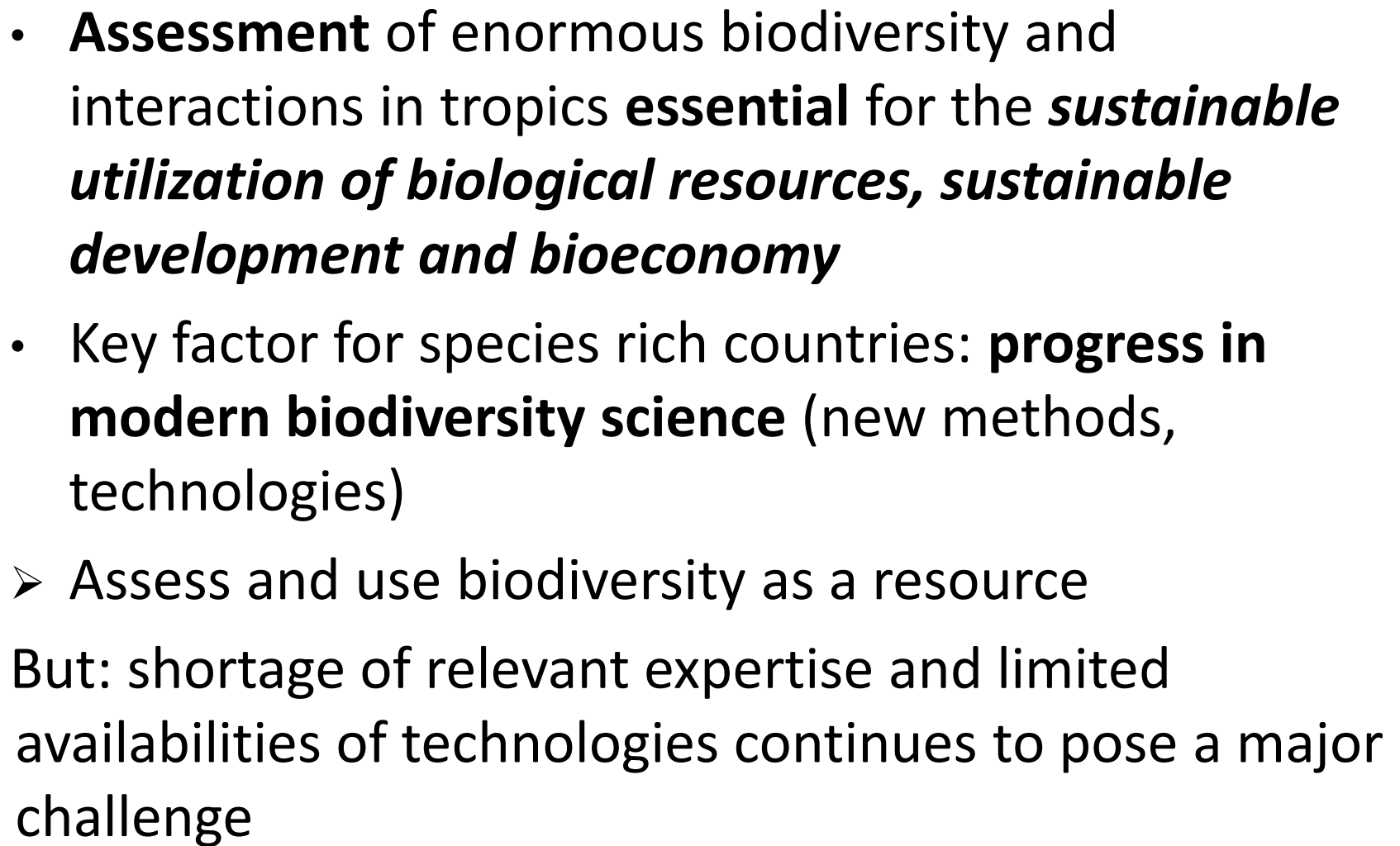




Described  
species  
1.9 M

Mora et al. 2012: 8.7+1.3 M Arten



- 
- **Assessment** of enormous biodiversity and interactions in tropics **essential** for the ***sustainable utilization of biological resources, sustainable development and bioeconomy***
  - Key factor for species rich countries: **progress in modern biodiversity science** (new methods, technologies)
    - Assess and use biodiversity as a resource
- But: shortage of relevant expertise and limited availabilities of technologies continues to pose a major challenge

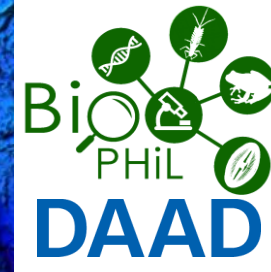


**VIETBIO**

GEFÖRDERT VOM



Bundesministerium  
für Bildung  
und Forschung



**FRESHBIO**



GEFÖRDERT VOM



Bundesministerium  
für Bildung  
und Forschung

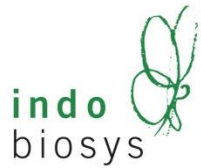
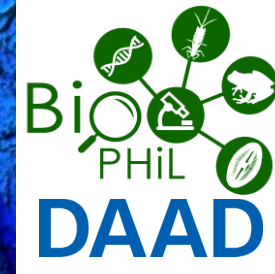


**VIETBIO**

GEFÖRDERT VOM



Bundesministerium  
für Bildung  
und Forschung



GEFÖRDERT VOM



Bundesministerium  
für Bildung  
und Forschung



Training

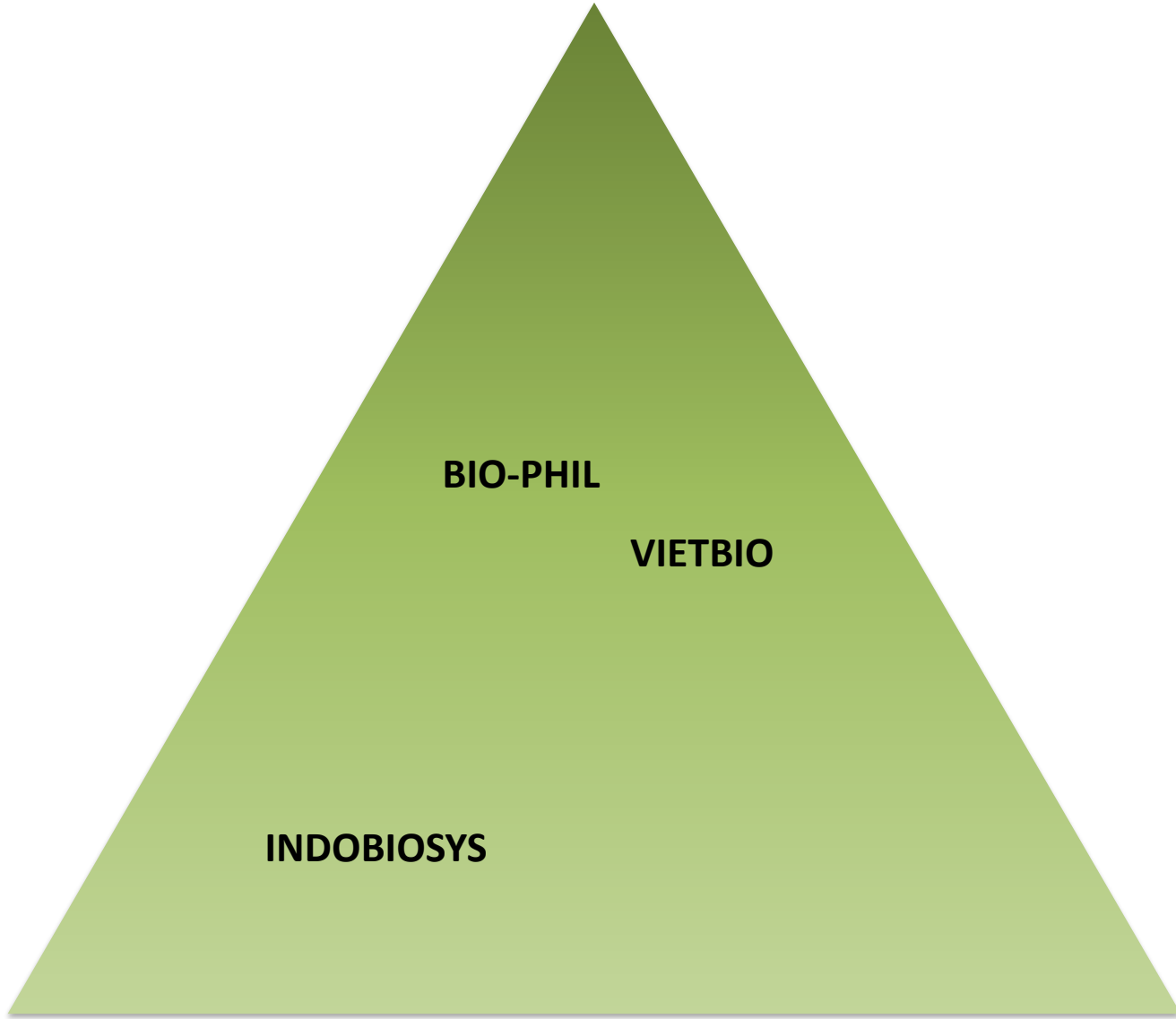
**BIO-PHIL**

**VIETBIO**

**INDOBIOSYS**

Research

Infrastructure



# Indonesian Biodiversity Discovery and Information System (IndoBioSys)

2015-2018





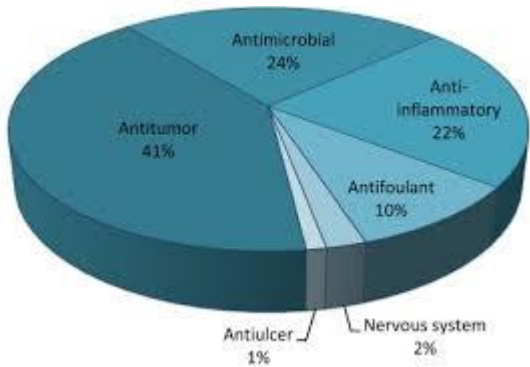
# Biodiversity



# Health



Myriapods: soil-dwellers, venom



Spiders: venom



Insects:  
Various target taxa

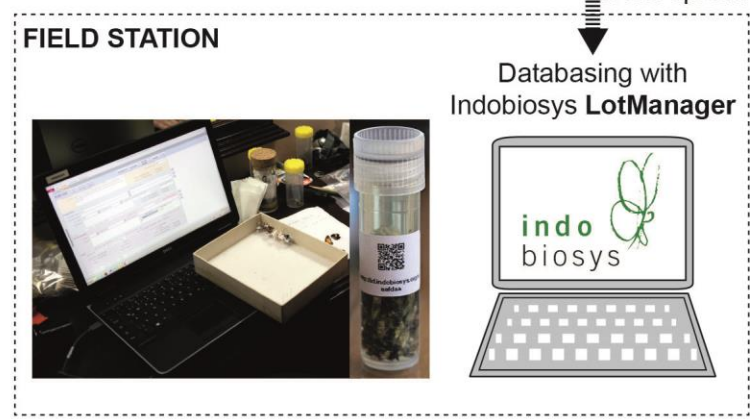
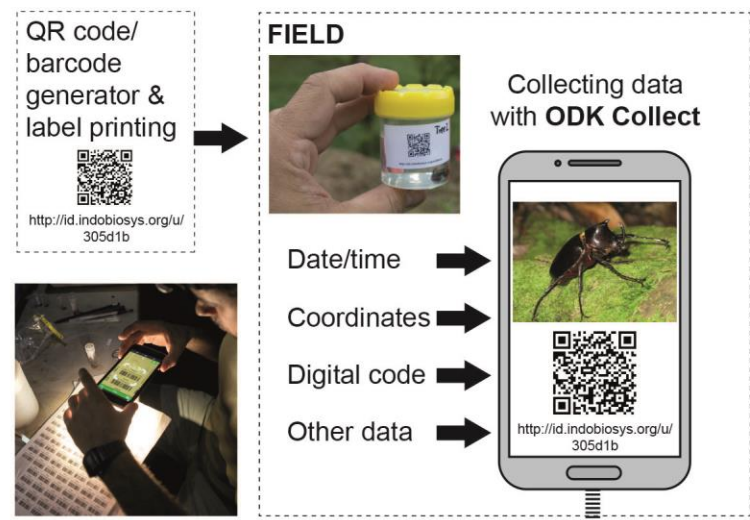


Snail slime: anti-infective substances  
Cone snail: venom

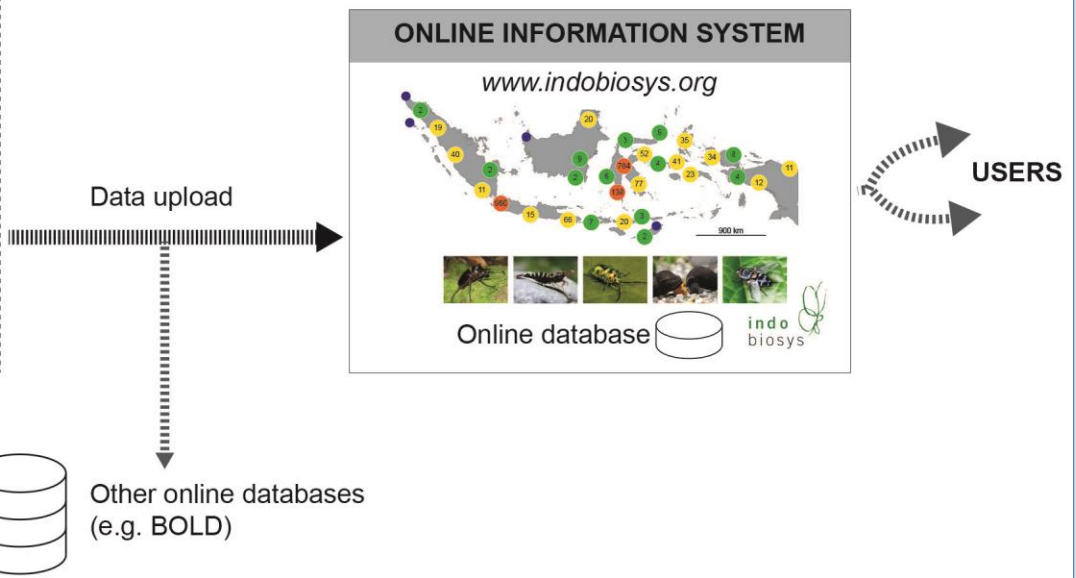
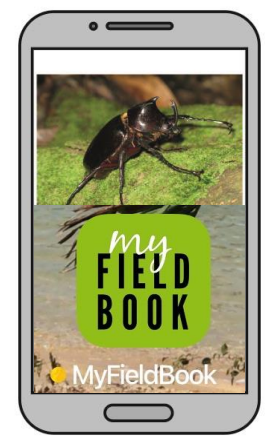


# A biodiversity discovery workflow

## Going digital



Novel digital workflow to track and manage samples and data from the field to the lab & museum collections

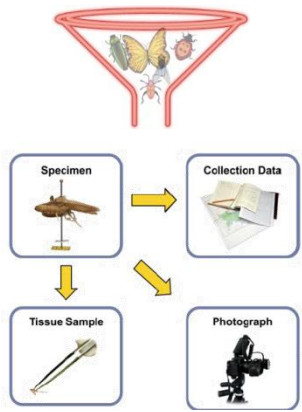




# A biodiversity discovery workflow



## Taxonomic workflow



## Digital workflow



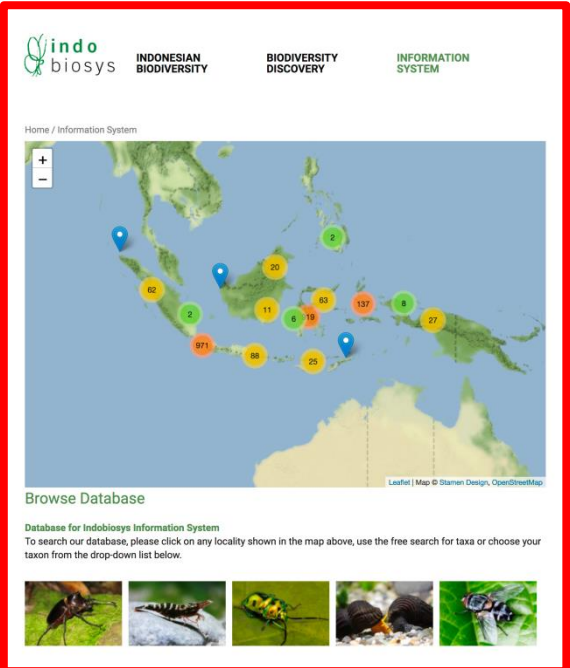
## Existing knowledge



> Expertise  
> Infrastructure



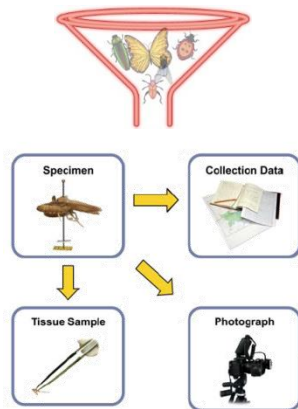
## Online Information System





# A biodiversity discovery workflow

## Taxonomic workflow



## Digital workflow

- › **Expertise**
  - › Field methods
  - › Data management
  - › DNA Barcoding
  - › Digitization
  - › *Taxonomy*
- › Infrastructure

## Existing knowledge



## Online Information System

The screenshot shows the 'Indo Biosys' Online Information System interface. At the top, it says 'INDONESIAN BIODIVERSITY BIODIVERSITY DISCOVERY INFORMATION SYSTEM'. Below this is a map of Indonesia with various colored dots indicating different localities. A 'Browse Database' section is visible, with a search bar and a list of taxa. At the bottom, there are several small images of different insect species.



# Innovative approaches to biodiversity discovery and characterization in Vietnam (VIETBIO)

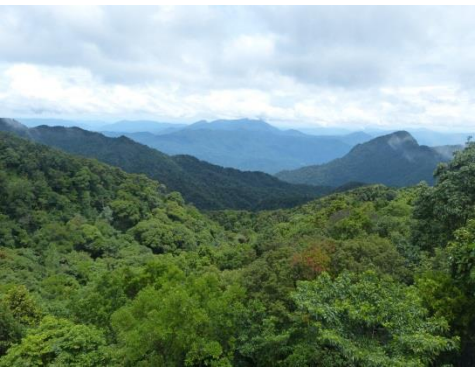
2017-2020 (2021)



VIETNAM NATIONAL  
MUSEUM OF NATURE  
BẢO TÀNG THIÊN NHIÊN VIỆT NAM



**ITB**  
VIỆN SINH HỌC NHIỆT ĐỚI  
**INSTITUTE OF TROPICAL BIOLOGY**





- **Development and transfer of an integrated biodiversity discovery and monitoring system for Vietnam**
- German side will provide state-of-the-art equipment and training in specific skills
- Establishment of an integrated biodiversity data and information system





## Two types of joint activities:

### Field training in Vietnam

- Collect data and samples/specimens for training purposes
- Test innovative field inventory and recording methods

### Training of Vietnamese researchers and technicians in state-of-the-art biodiversity research methods (4 modules)

- Training stays of 3 months in Berlin (MfN & BGBM)
- Use modern equipment for documenting and analyzing samples/specimens, for subsequent use in Vietnam



VIETNAM NATIONAL  
MUSEUM OF NATURE  
BẢO TÀNG THIÊN NHIÊN VIỆT NAM



**ITB**  
VIỆN SINH HỌC NHIỆT ĐỚI  
**INSTITUTE OF TROPICAL BIOLOGY**



## Field training in Vietnam





## Training module 1 – Integrated data management

### Topics

- Field data capture tools, QR Codes
- Data base with web portal (online interface for all recorded information)

### Training

- Entire workflow
- Data mobilization & rapid publication

## Training module 2 – Digitization

### Topics

- High throughput digitization
- Data mobilization
- Sustainable data management

### Training

- Digitization methods and workflow
- Data publication
- Links to international data portals

## Training module 3 – DNA barcoding

### Topics

- Voucher-based high throughput methods (standard barcoding) adapted to the conditions in Vietnam
- Data mobilization

### Training

- Laboratory methods and high throughput vouchering

## Training module 4 – Bioacoustics

### Topics

- Automated procedures for the reliable acoustic recognition of animal sounds
- based on a reference data base

### Training

- Acoustic recording & analysis Setup of acoustic reference data base
- Application of acoustic monitoring in the field

## Mutual benefits

- Access to new biodiversity data and samples from Vietnam &
  - valuable experiences for German researchers
  - Access to modern technology & know-how through an extensive training program for Vietnamese scientists who
  - become equal partners in international research programs
- Sustainable biodiversity inventory and monitoring, related disciplines (systematics, evolutionary biology, biogeography, forestry, agriculture, etc.)



VIETNAM NATIONAL  
MUSEUM OF NATURE  
BẢO TÀNG THIÊN NHIÊN VIỆT NAM



**ITB**  
VIỆN SINH HỌC NHIỆT ĐỚI  
**INSTITUTE OF TROPICAL BIOLOGY**



# Biodiversity Teaching in a Philippine-Cambodian-German Network (BIO-PHIL)

2018-2021





- › Establish biodiversity research in Philippine and Cambodian university curricula







- › Establish biodiversity research in Philippine and Cambodian university curricula

- › „**Training of trainers**“

- › Five course modules:

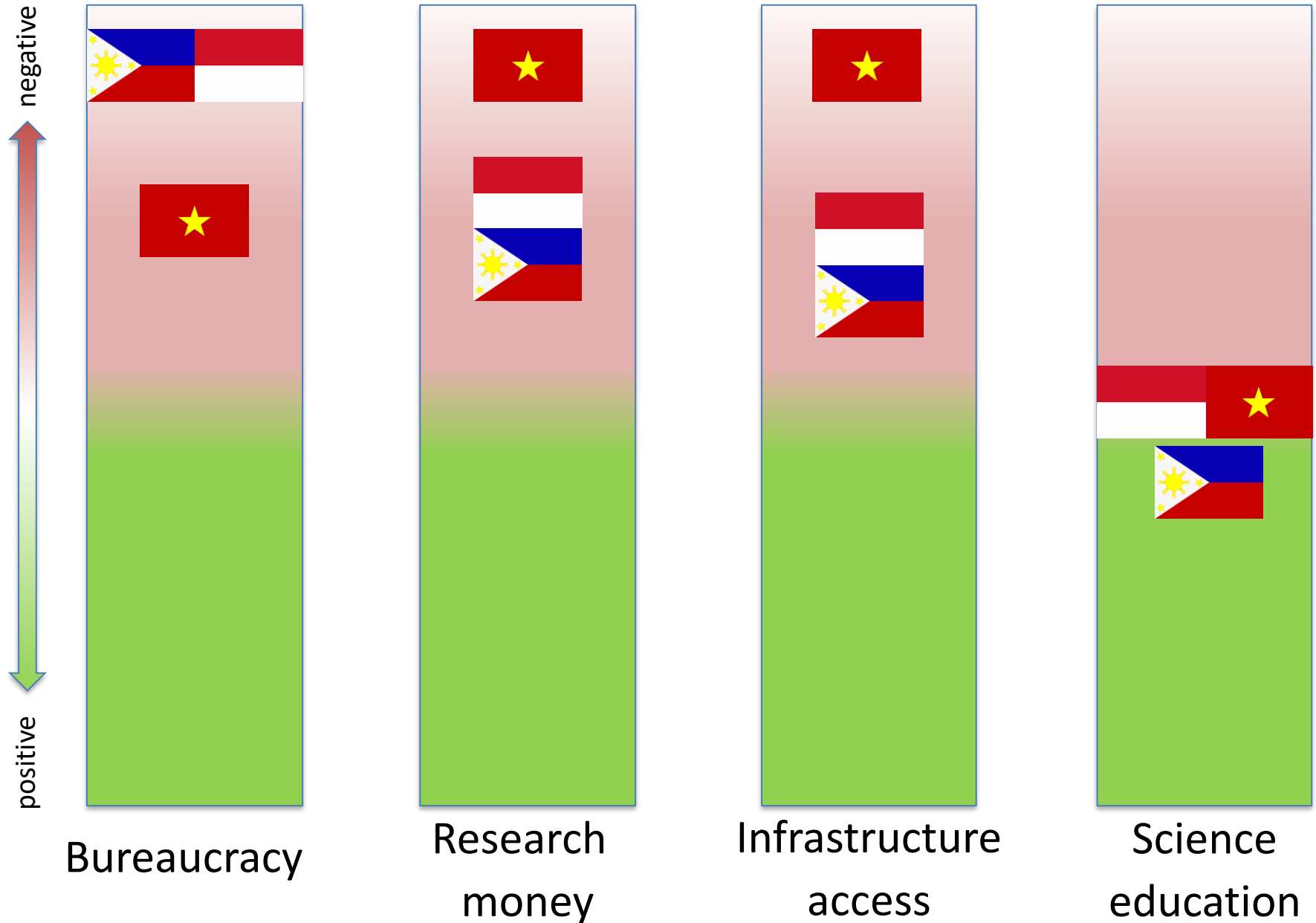
- › Core scientific skills
- › Field methods
- › DNA Barcoding
- › GIS and SDM
- › Digitization

- › Student conference

- › Research stays in Germany



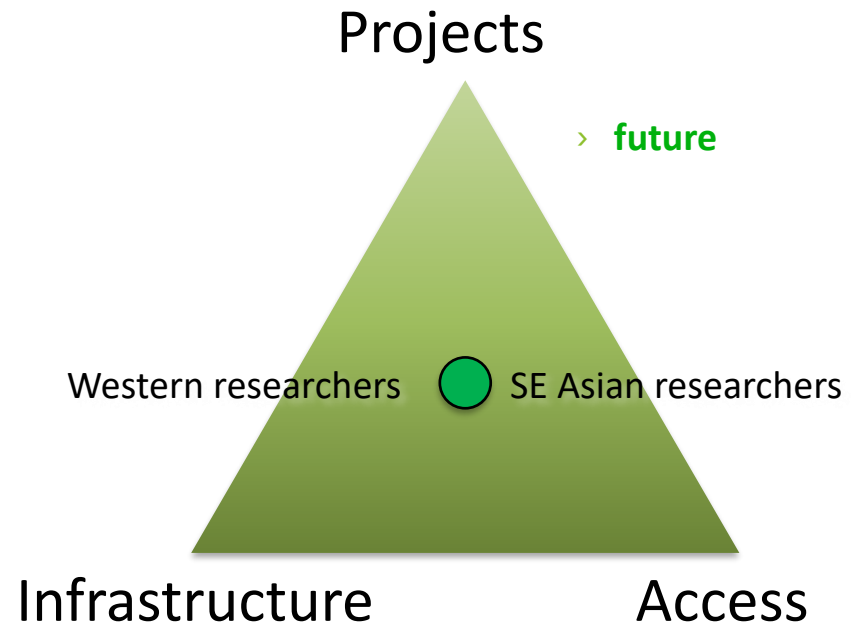
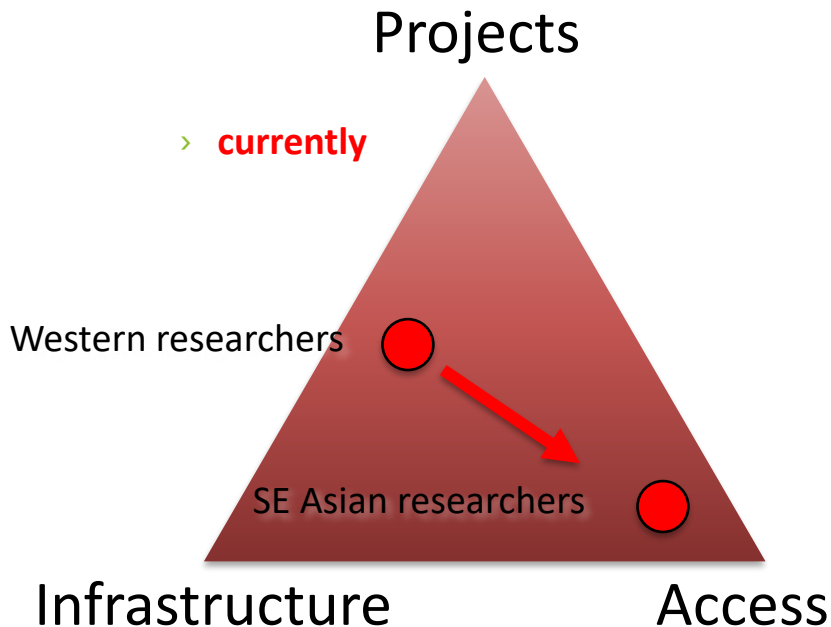
# Impediments to biodiversity research for SE Asian researchers





## Conclusions for future capacity building in SE Asia

- More emphasis on access to research infrastructure (including technical staff)
- Wade in early - target university students
- Bureaucracy first



**Thank you for listening...**

**... and thanks to all our partners for the fruitful collaboration  
and to the German government, especially the Federal Ministry  
for Education and Research (BMBF), for its sustained support of  
our research and capacity building activities in SE Asia**



*Für Natur  
Natur  
Natur  
für Natur*  
**für Natur**

**MUSEUM FÜR  
NATURKUNDE  
BERLIN**