

Outlook on environmental monitoring in Finland

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FinBIF & FEO's national workshop

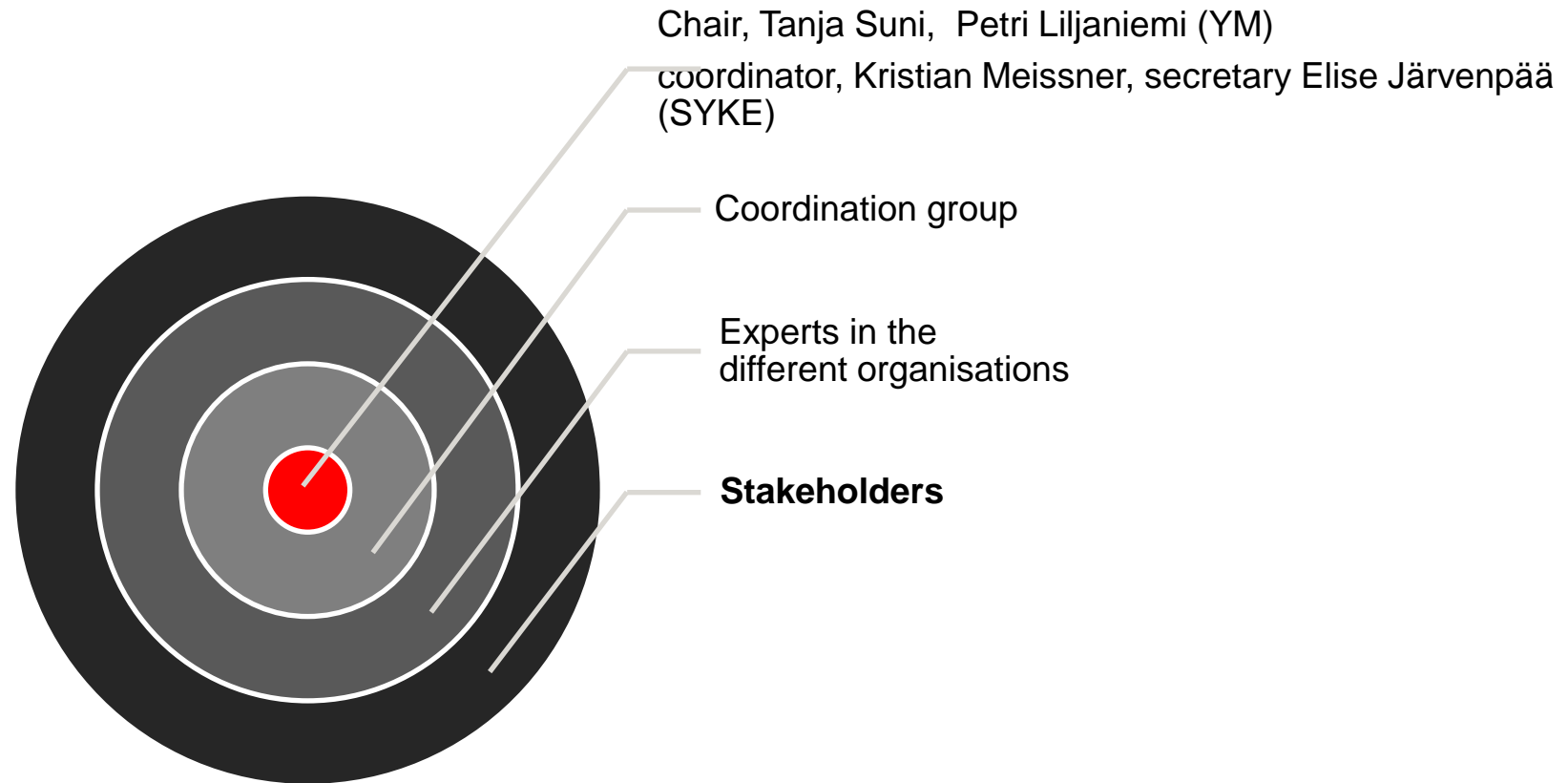
SYKE 10.10.22

The objectives of national environmental monitoring in a nutshell

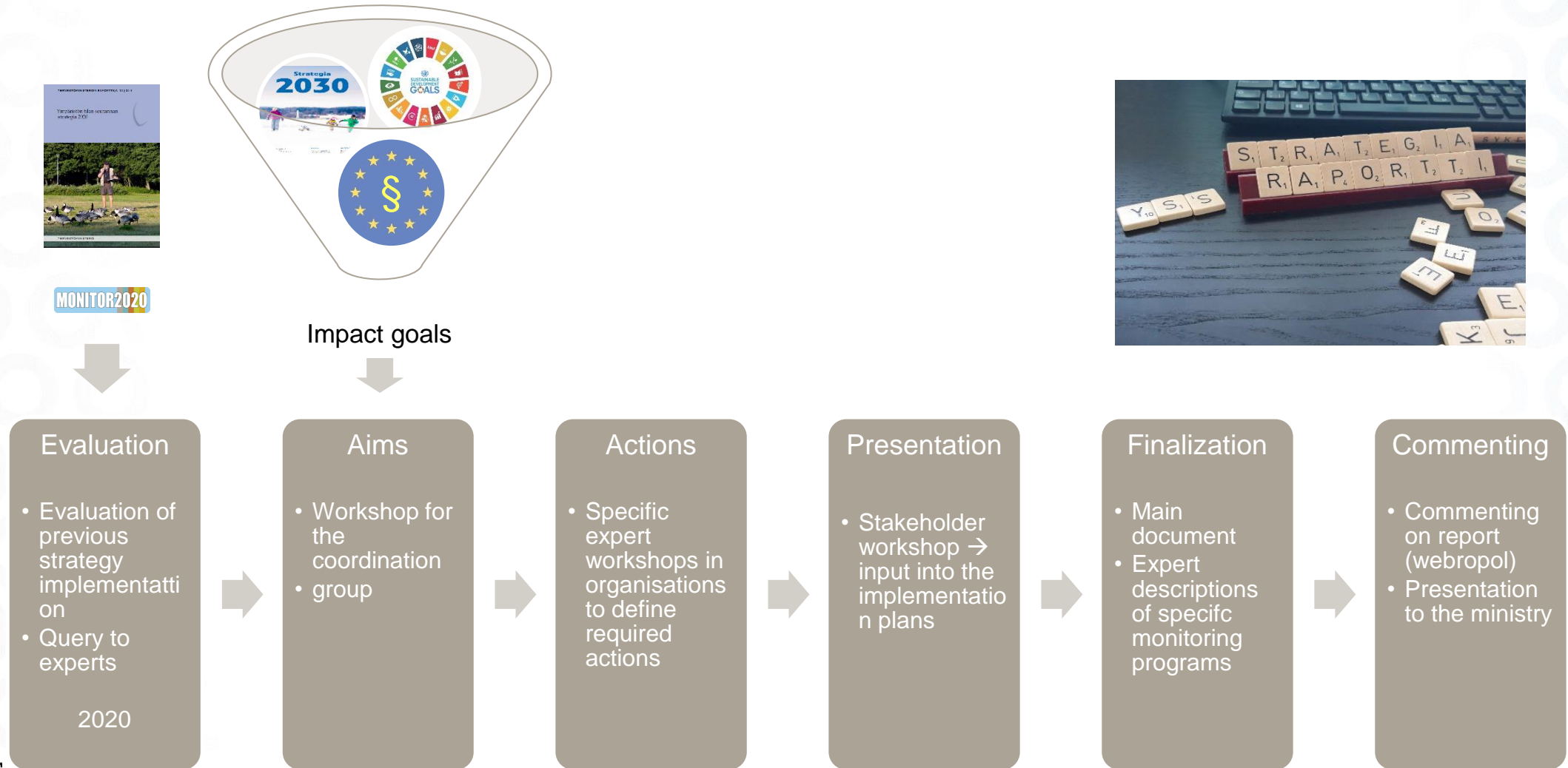
- Produce monitoring information about Finland's state of the environment and changes therein
- Support managerial decision making



The renewal of the national monitoring strategy (YSS)



Process



AIM 1. The cooperation and flow of information between data producers and endusers is seamless → better use of monitoring information



Required changes

- Improve information exchange between the data producers of monitoring programs
- Breach the gap between potential capability and actual ability



To be considered

- Definition of cost effectiveness of measures



Specific aim

- The coop of different monitoring stakeholders is improved
- Synergies are identified and exploited
- Use of a common portal to find environmental monitoring information



Delinineation

- Identification of main problems and gaps
- Identifying mechanisms that enable the use of best practices
- Alignment of development with other govt programs (e.g. TIHA)

AIM 2. Novel monitoring methods are taken into routine use

Required changes

- Definition of adequacy of novel and development needs of current monitoring methods
- International cooperation on method and standard development

To be considered

- Criteria and a process chain for uptake of novel methods are lacking
- New methods entail new requirements for current data infrastructures

Specific aim

- Definition of acceptance criteria and a process chain for novel method uptake (and evaluation of old methods)
- Advancement of approval, uptake, quality control and standardisation of novel methods

Delineation

- Setting of a TRL threshold for piloting (DNA, micro plastics)
- Piloting of several new methods/monitoring program

AIM 3. The gathering of data, information production and distribution are automated



Required changes

- Establishment of data specific precision and accuracy requirements
- Development of dataflows



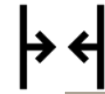
To be considered

- Data use and demands may change → enable versatile data use
- Inherent risks with automated data interpretation
- Secure stable funding of monitoring



Specific aim

- Speed up data use through improvement of dataflows
- Improvement of coordination of monitoring to enable flexibility to also fulfill new information needs



Dilineation

- TRL delimits the most potential development targets / low hanging fruits
- Related to EU directive monitoring
- Biodiversity

AIM 4. Monitoring is adaptive and flexible



Required changes

- Establish structures enabling the (near) real time use of monitoring information
- The need to account for new information needs
- Data mining of existing data



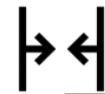
To be considered

- Integrate external monitoring data (e.g. corporate)
- Improve interoperability
- Use best practices
- Use machine learning more extensively



Specific aim

- Develop data infrastructures that support adaptability
- Clarify the responsibilities and cooperation structures between stakeholders
- Increase use of ML
- Create mechanisms to actively include new information needs



Delineation

- Piloting
- Increase transgovernmental monitoring programs
- Climate change, circular economy



AIM 5. Data infrastructure to support aims 1-4



Required changes

- The data infrastructure of organizations engaging in env monitoring needs to be jointly developed
- Use of common standards
- Breach the gap between potential capability and actual ability



To be considered

- Improve interoperability and common use
- Better definition of overall data-governance
- Data is federated
- Inclusion of new data sources



Specific aim

- Monitoring systems are interoperable
- Synergies are identified and fully explored



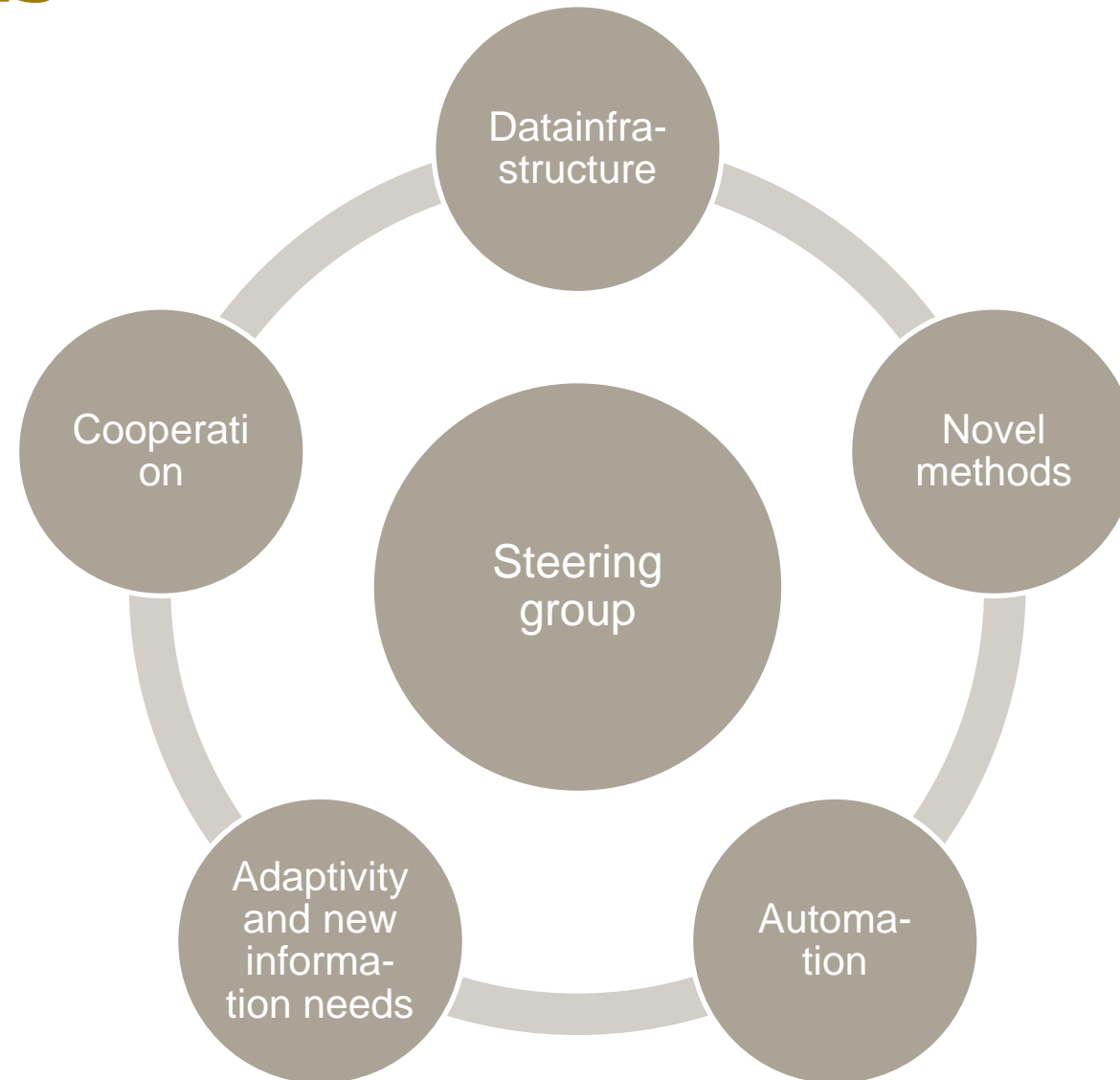
Delineation

- Government API specifications
- VM-TIHA
- Quality criteria of data



Moving from strategy (YSS) to implementation (FIMON) 2023

- FIMON is an umbrella to advance the strategic aims of YSS beyond organizational borders
- A steering group coordinates FIMON (Ministry of the Environment chairs, SYKE coordinates)
- Experts work in the respective WGs
- Steering group members are represented in WGs

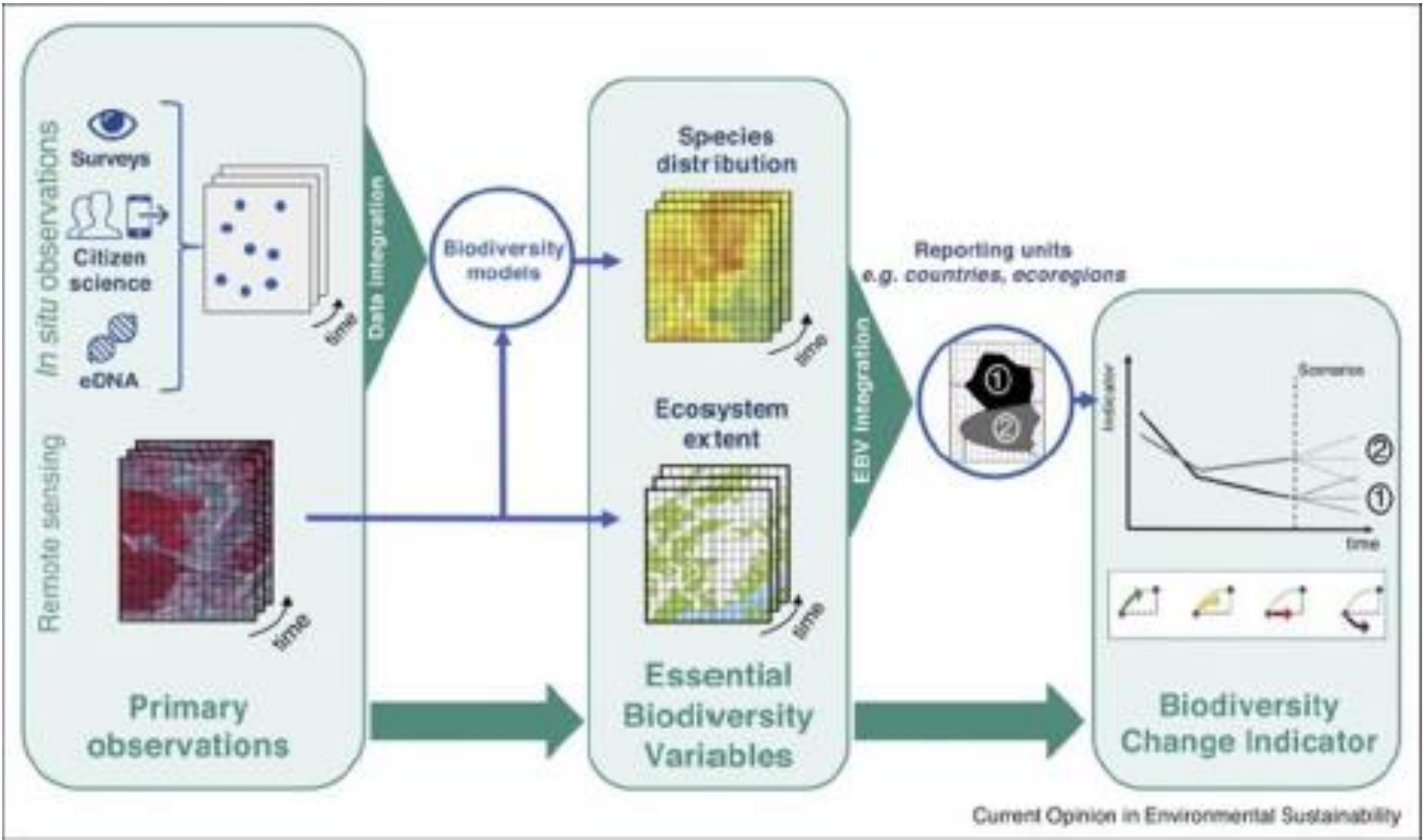


- Each WG draws up an action plan that is accepted by the steering group
- Information flow and exchange is vital to the success
- Ongoing projects (e.g. FEO) are integrated and used in the WGs
- Stakeholders are integrated through open work platforms and workshops

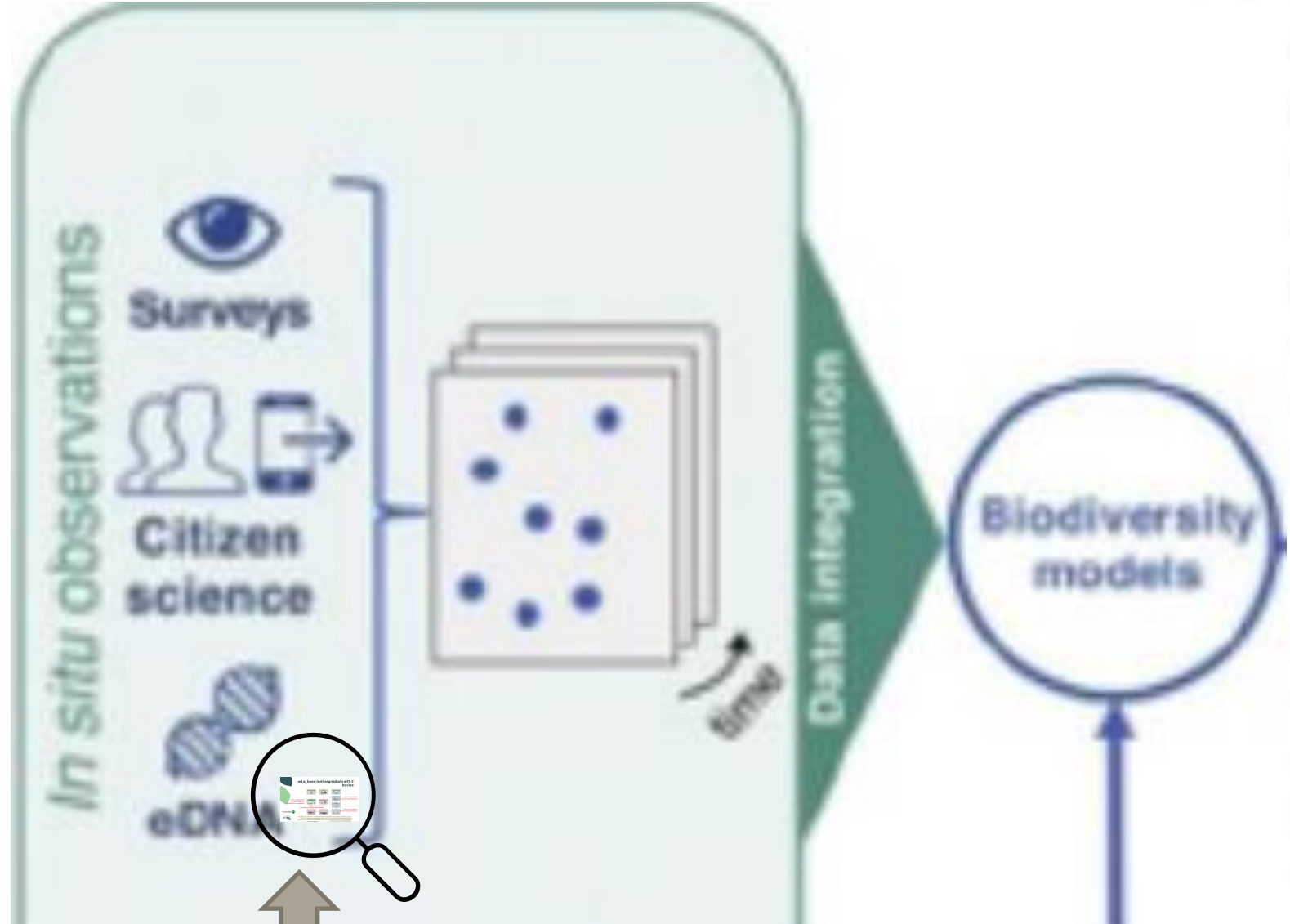
Foresight and active action- molecular method integration into routine monitoring

- Finnish monitoring stakeholders are engaged in frontline networks
- SYKE has actively piloted the use of molecular methods
- SYKE has pushed for method standardization
- Recent developments:
- SSUNGA 77 The key for a successful UN's Post-2020 Global Biodiversity Framework - standards for measuring biodiversity with molecular tools
- <https://www.whitehouse.gov/ostp/news-updates/2022/09/13/opening-remarks-second-national-workshop-on-marine-environmental-dna-edna-jane-lubchenco/>

Navarro et al. 2017



Need for methodological standards



2. The challenges that need to be solved

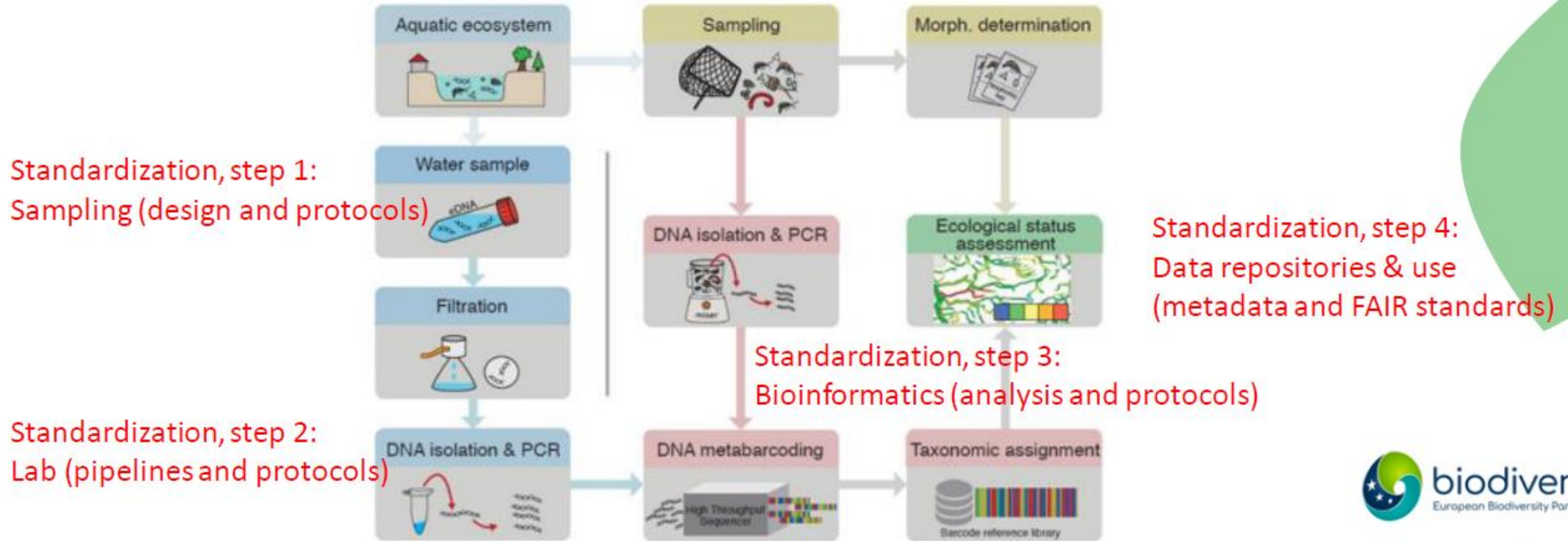
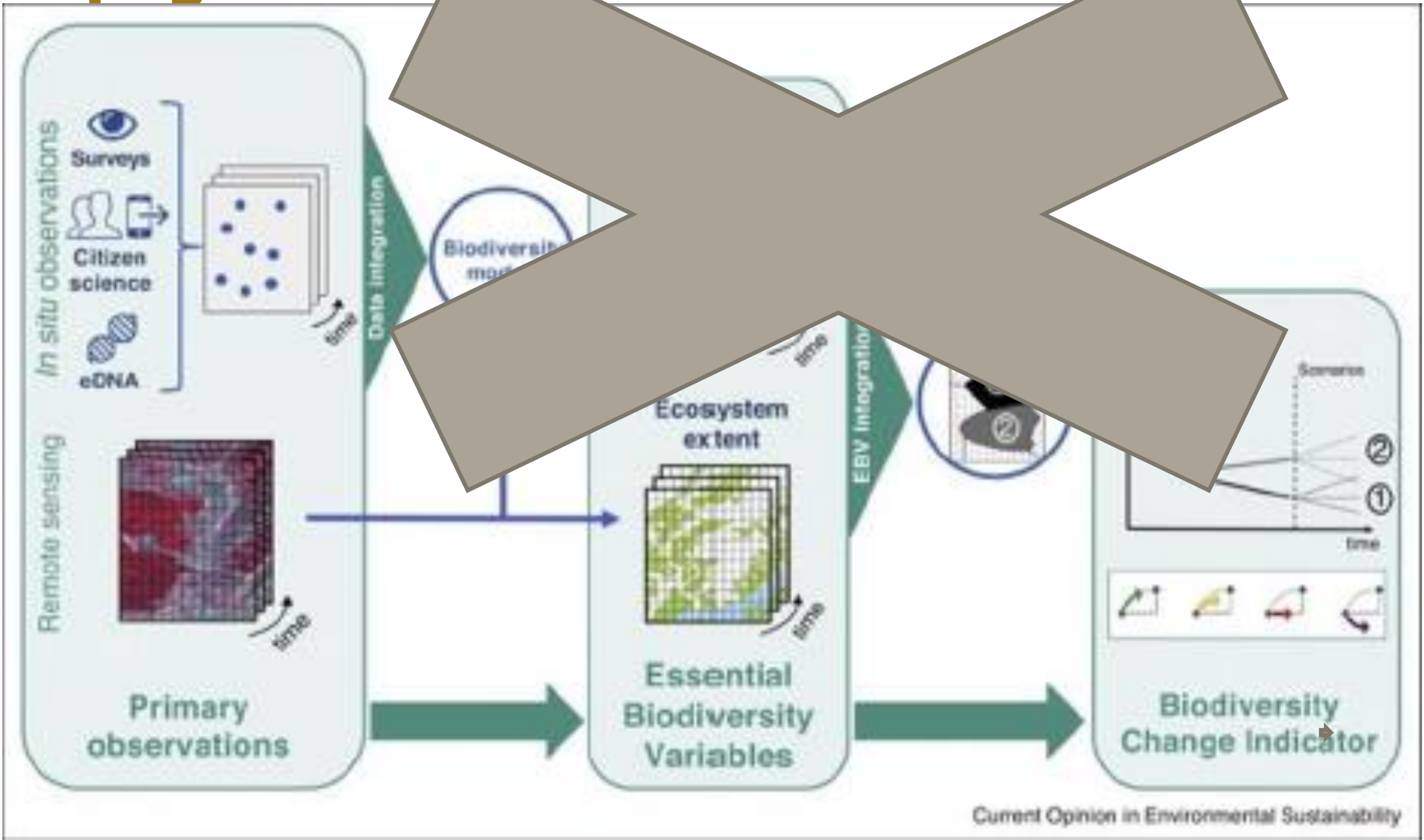


Figure 2. Different approaches for environmental monitoring based on community data: traditional morphological species determination (here from a kick-net sample of invertebrates), bulk DNA metabarcoding from a homogenized sample and eDNA metabarcoding (here from a water sample). Reproduced from Hering et al. (2018).

From: Norros et al. 2022

Failure to standardize leads to risk of error propagation



Moving forward

We need to:

- **Cooperate!**
- **Think big (ger!) → links to international context**

In closing

To researchers:

*Stop writing papers,
start writing standards!*

To officials:

Start demanding standards !