

# Applications for nitrogen budgets: INMS and beyond

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## INMS : International Nitrogen Management System

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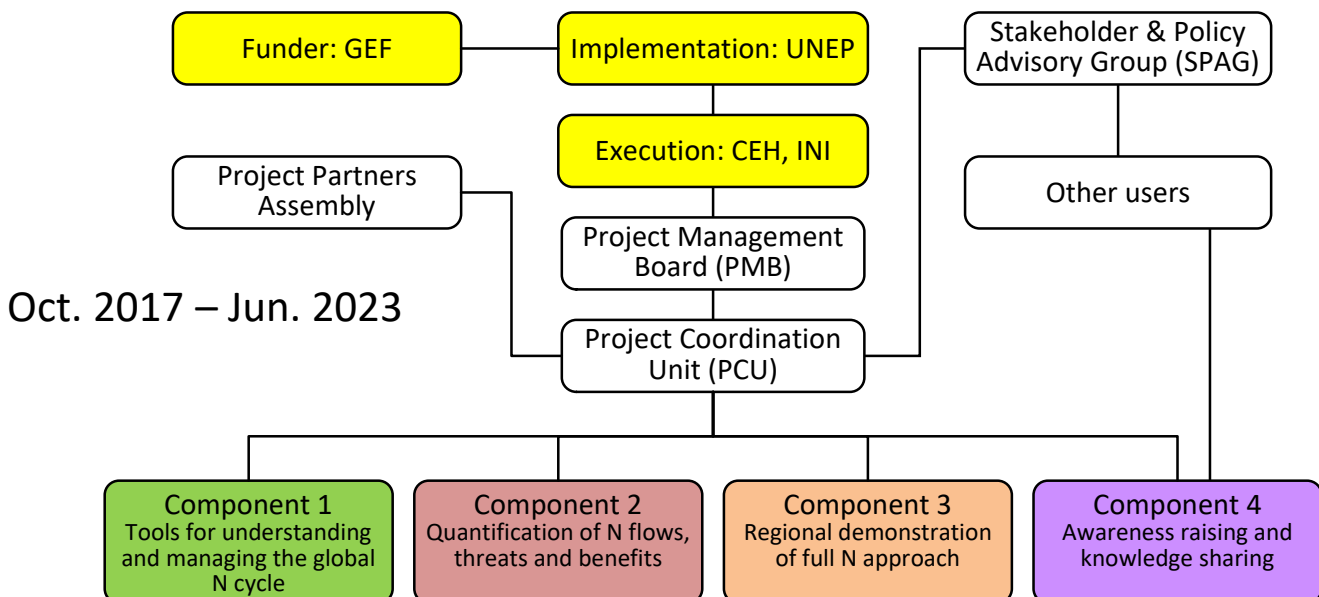


Fig. 1. Configuration of the INMS Project



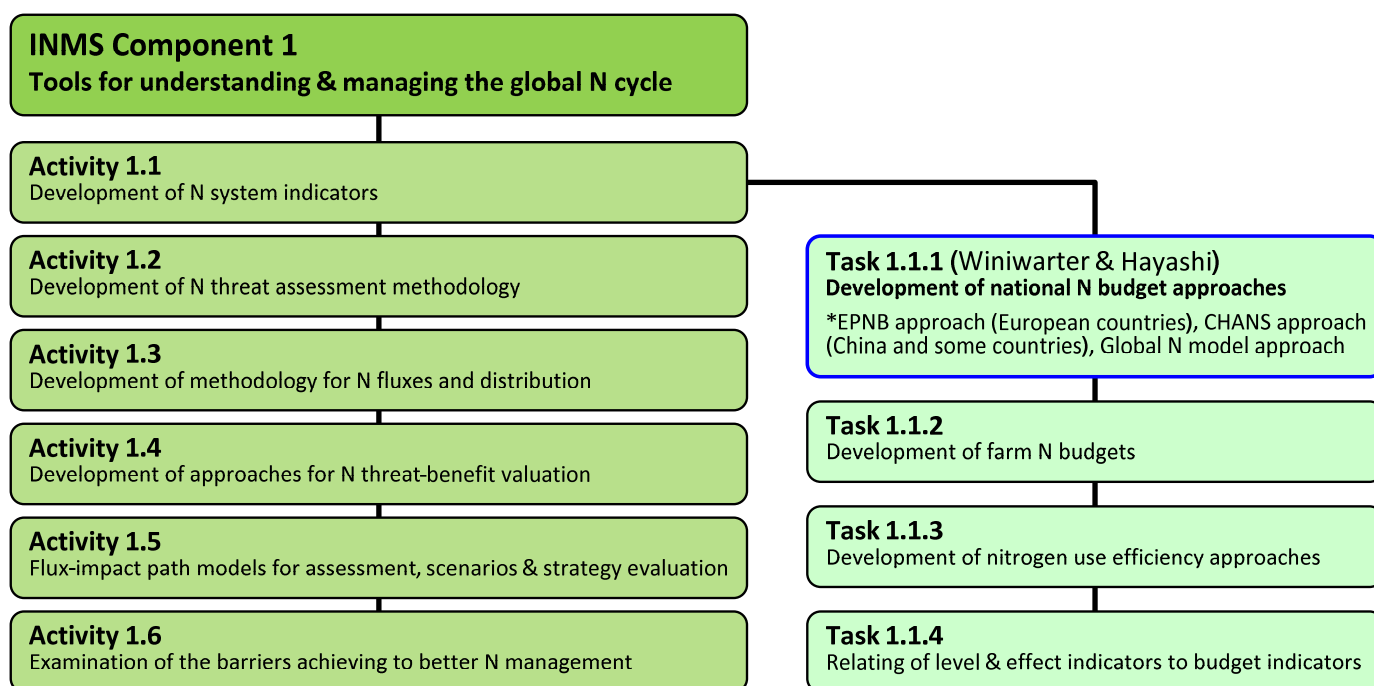


Fig. 2. Configuration of the INMS Component 1



## Guidance Document on National Nitrogen Budgets

Deliverable of T1.1.1/A1.1/C1/INMS

In preparation

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- Preface
- Executive summary
- Introduction
- Guidance to estimate nitrogen budgets for a nation
- EPNB guidance
- CHANS guidance \*CHANS: Coupled Human and Natural Systems
- Guidance on generic N models
- Guidance on N budgets results based on case studies
- Appendices



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In preparation

## Chapter 7 Deriving nitrogen performance indicators based on statistical information

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- **Executive summary**
- **Introduction**
  - Indicators useful to grasp the nitrogen issue
  - Types of indicators (e.g., performance indicators, impact indicators)
  - Focus of this chapter
- **Methodologies**
  - Classification of N indicators
  - Linking causal and impact N indicators
  - Indicators focused in this chapter (N budgets, N use efficiency, N surplus/deficit)



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## Chapter 7 Deriving nitrogen performance indicators based on statistical information

- **Methodologies (continued)**
  - Evaluation of N budgets
  - Evaluation of N use efficiency
  - Evaluation of N surplus/deficit
- **Application examples**
  - National-scale N budgets (Germany, Japan, and East Europe)
  - Nitrogen use efficiencies of various systems
  - Soil N surplus in the world
- **Discussion**
  - Lessons learned from the application examples
  - Limitation of the indicators
  - Way forward
- **Conclusions**



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# An example of national N budgets: case of Japan

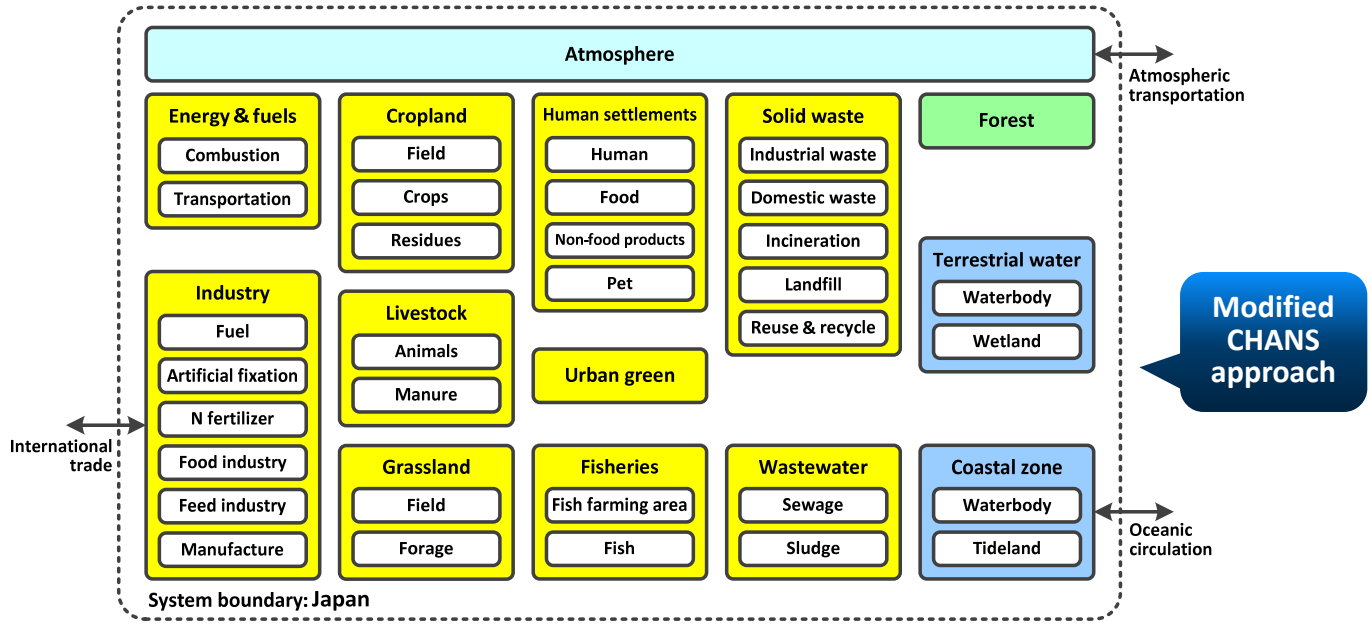


Fig. 3. Pools and sub-pools for nitrogen budgets estimation in Japan  
Hayashi *et al.* (2021) *Environ. Pollut.* 286, 117559.

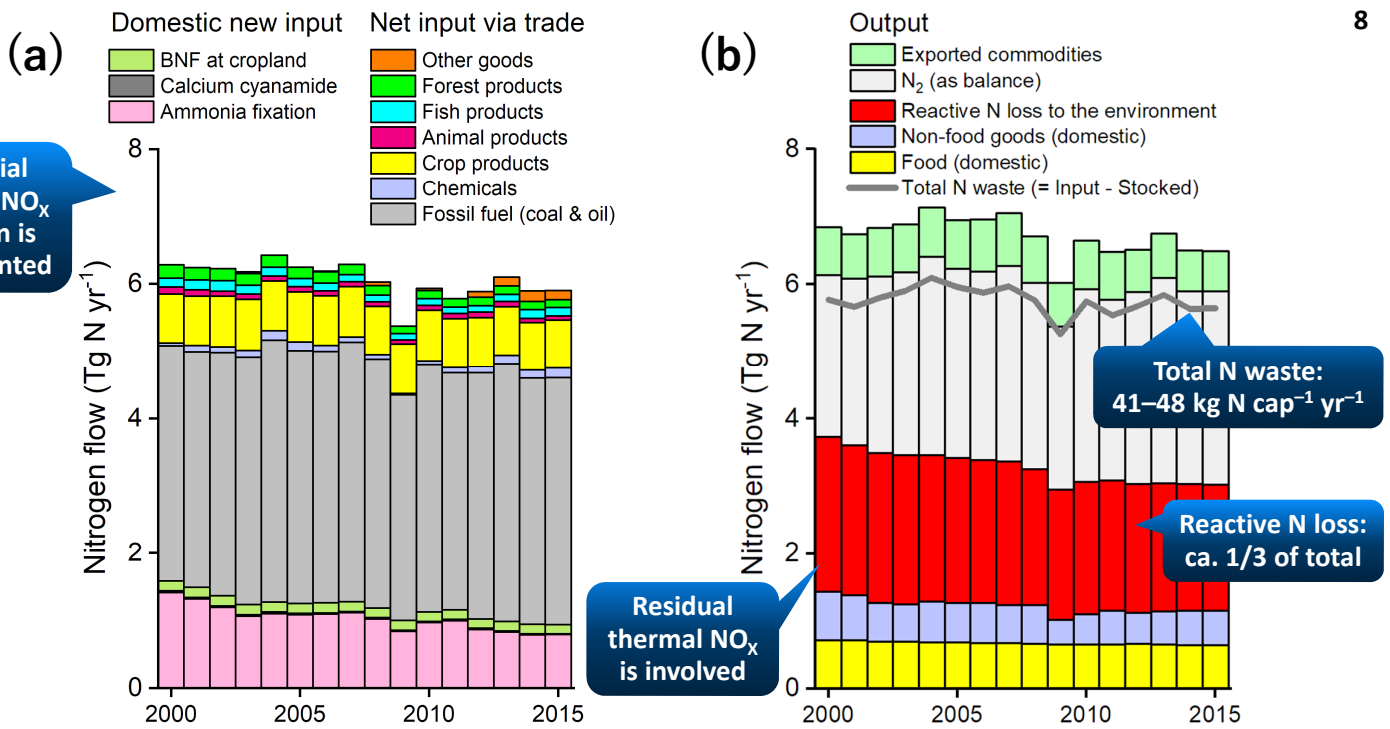
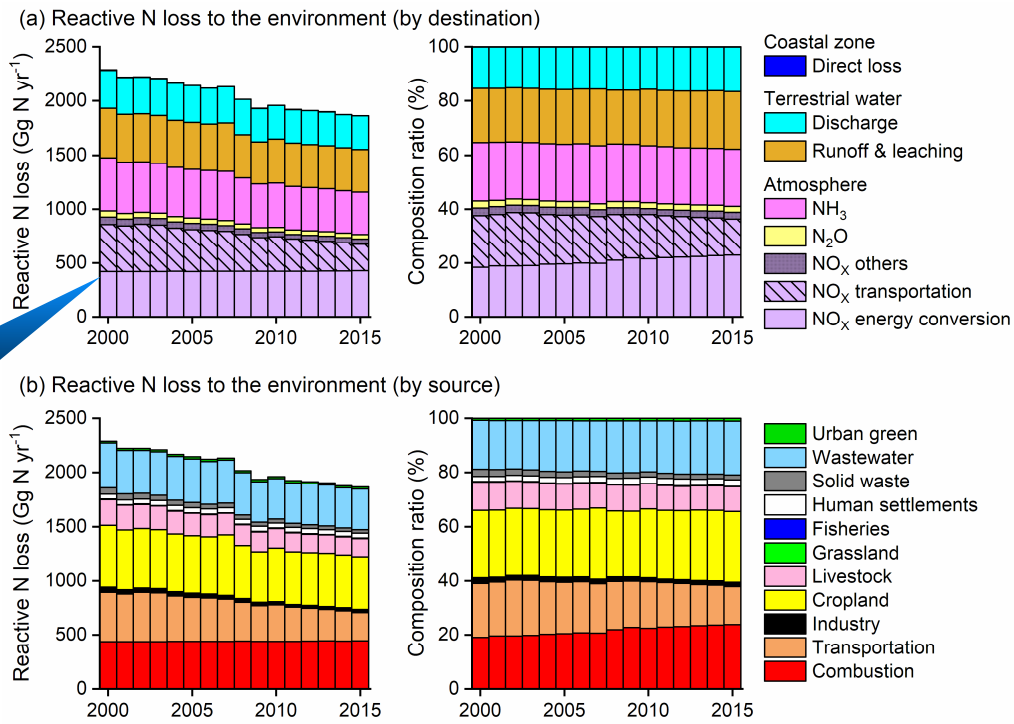


Fig. 4. (a) Input of new reactive N and (b) fate of input N in Japan





Decrease in transportation NO<sub>x</sub> cf. Automobile NO<sub>x</sub> PM Control Law



Fig. 5. Reactive N loss to the environment in Japan (a) by destination (b) by source

Hayashi *et al.* (2021) *Environ. Pollut.* 286, 117559.

### Conclusive remarks and future expectations

- Completion: The guidance document and INA Ch.7 as T1.1.1 INMS
- Visualisation: National N budgets visualisation tool (CEH tackling)
- Standardization: Calculation and reporting system (UBA/EPNB tackling)
- International collaboration 1: NNB beyond Europe
- International collaboration 2: For UNEP, communications with the Nitrogen Working Group (member states)
- International collaboration 3: A 6-year project “Towards Sustainable Nitrogen Use Connecting Human Society and Nature” (Sustai-N-able) (FY2022–2027, RIHN14200156) funded by RIHN, Japan (PL: Kentaro Hayashi)

