



OECD work on nitrogen indicators

OECD-TFRN workshop “The Nitrogen Cascade
and Policy: Towards integrated solutions”

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OECD work on nitrogen

Fact-based policy analysis

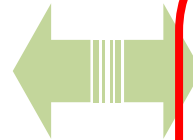
Policy analysis, evaluation & guidance

Sectoral: Agriculture

- ▶ Environmental performance; green growth

Whole economy: Integrated policies and management

- ▶ Review of coherence & effectiveness
- ▶ Policy guidance



Monitoring and reporting

Information base

- ▶ N related data
- ▶ Nitrogen budgets & balances: agriculture, whole economy

Indicators

- ▶ Agri-environmental indicators
- ▶ Economy-wide indicators (green growth, environmental)



- Use in policy work:**
- ▶ Agriculture, environment
 - ▶ Green growth studies → SDGs
 - ▶ Country peer reviews



Related international initiatives

INMS, INI, GPA, CBD, UNEP GPNM, UNECE-CLRTAP, etc.



- **Move from a sectoral to a bigger N picture**
 - Extend work on agricultural nutrient balances/budgets to other sectors/sources (industry, energy, transport, waste water, etc.)
- **Develop a few operational indicators (suite) that could be**
 - Implemented in a harmonised way across OECD countries
 - Used to monitor green growth & environmental performance (→ SDGs)
 - Used in OECD policy work: country reviews, policy analysis & evaluation
 - Included in OECD indicator sets: → green growth indicators, core set of environmental indicators
- **→ Indicators derived from national nitrogen budgets**
- **→ Selected for their policy relevance, analytical soundness and measurability**



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Main suggested indicators

- **Output indicators**
 - Index of Nr emissions (outputs) and related intensities
 - Emissions to air (NO_x, N₂O, NH₃), to freshwater, food-related emissions
 - **Input indicators**
 - Index of new Nr creation (inputs)
 - Fertiliser, fossil fuel use, biological nitrogen fixation (BNF)
 - **Balance indicators: inputs-outputs**
 - Nr balance: Monitor potential environmental threats → connect to ecosystem health
 - **Efficiency indicators: output/input ratios**
 - N use efficiency (NUE): Monitor productivity → connect to economic aspects, to management performance
 - Consider full chain of N flows with focus on the most significant flows
- Focus on balance and efficiency indicators



Monitoring environmental performance: OECD Core Set of environmental indicators

Issue	Environmental Object	Environmental Pressures	Environmental Conditions	Societal Responses
Eutrophication	Mitigate the negative effects of nutrient (N and P) surpluses and deficits on ecosystems and on food production, and improve the efficiency of nutrients use in human activities (link to planetary boundaries: biogeochemical cycles of N and P).	<ul style="list-style-type: none"> ● National nutrient balances (Nr, P) [R★] Total inputs, total outputs, balance ○ Agricultural nutrient balances (N, P) 	<ul style="list-style-type: none"> ● Nutrient concentrations in environmental media Nr and P in water (inland, marine); in soil ○ BOD/DO in water ((inland, marine) 	<ul style="list-style-type: none"> ● Nutrient (N, P) removal rates in domestic and industrial wastewater ● Population connected to sewage treatment <input checked="" type="checkbox"/> <hr/> <p><i>Indicators for consideration in country reviews</i></p> <ul style="list-style-type: none"> – N and P use efficiency [R★] – user charges for sewage treatment as % of costs – nutrient testing by farmers
Acidification	Reduce emissions of acidifying pollutants to limit the exposure of the population to air pollution and mitigate the impacts of acidification on ecosystems.	<ul style="list-style-type: none"> ● Index of acidifying substances ○ Emissions of NO_x and SO_x <input checked="" type="checkbox"/>, NH₃ ○ Emissions of Nr to air 	<ul style="list-style-type: none"> ● Exceedances of critical loads of acidity in water & soil ○ Concentrations of acidifying air pollutants see Environmental quality of life 	<p><i>Indicators for consideration in country reviews</i></p> <ul style="list-style-type: none"> – expenditure on air pollution, ODA, R&D, patents

● **Core indicator** ○ Proxy indicators

R: area that requires further work;

– Supplementary indicators and indicators for consideration in country reviews.

R★: area for further work and research by the OECD.



Monitoring progress towards green growth: Indicator groups and topics

1 The environmental and resource productivity of the economy

Theme	Proposed indicators	Type
Carbon & energy productivity	1. CO₂ productivity	
	1.1. Production-based CO ₂ productivity	M
	1.2. Demand-based CO ₂ productivity	M
	2. Energy productivity	
	2.1. Energy productivity	M
	2.2. Energy intensity by sector	M
Resource productivity	2.3. Share of renewable energy sources	M
	3. Material productivity (non-energy)	
	3.1. Demand-based material productivity	M
	3.2. Waste generation intensity and recovery ratios	M
	3.3. Nutrient flows and balances (N, P)	M
• Nutrient balances in agriculture (N, P) per agricultural land area and change in agricultural output	P	
Multifactor productivity	4. Water productivity	M
	5. Multifactor productivity reflecting environmental services (comprehensive measure; original units in monetary terms)	M

- Full chain use efficiency
- Industry breakdown

Type: M = Main indicators P = Proxy indicators when the main indicators are not available

2 The natural asset base

3 The environmental dimension of quality of life

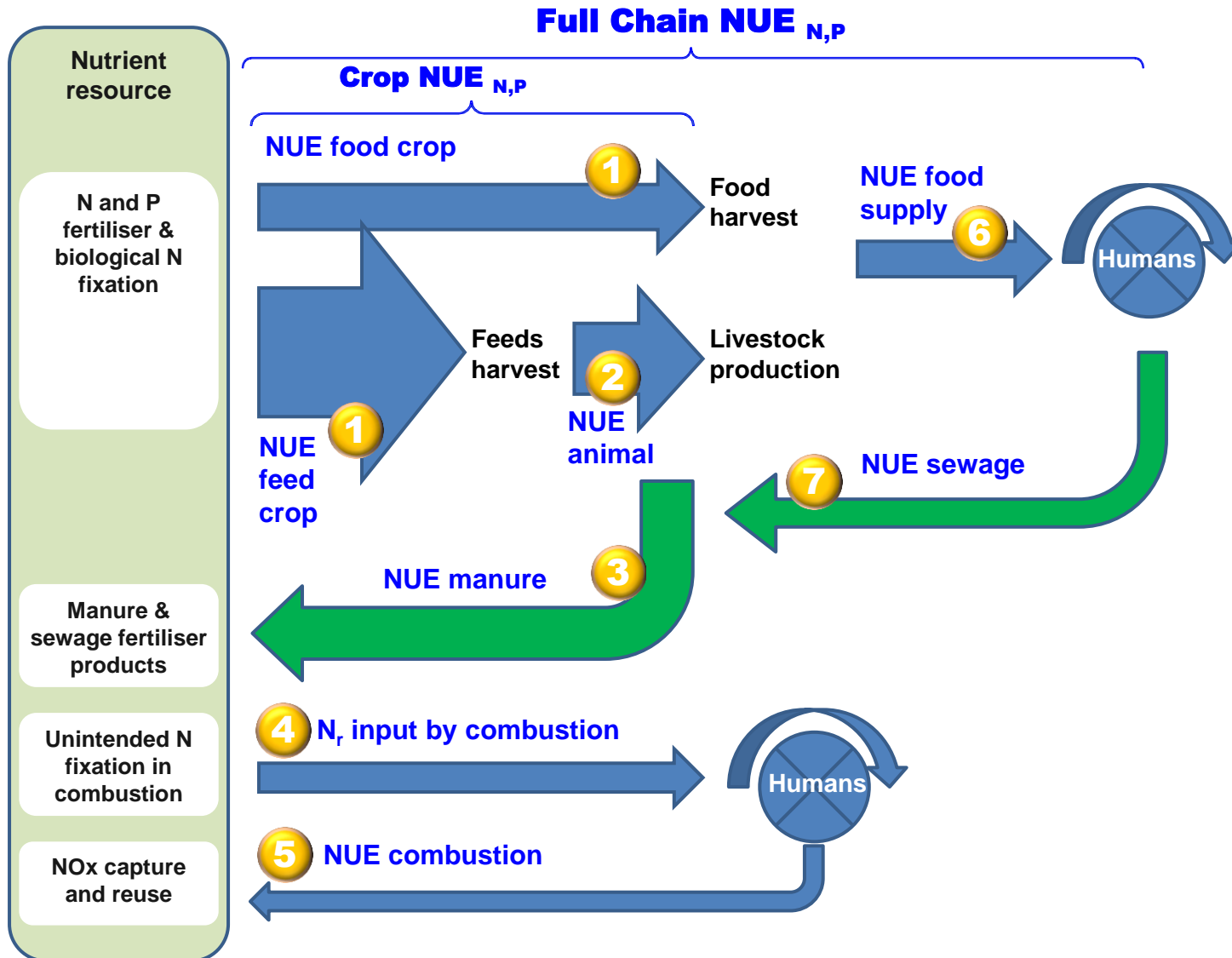
4 Economic opportunities and policy responses

Socio-economic context and characteristics of growth



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Full chain Nitrogen Use Efficiency





The information base for nitrogen indicators

National nitrogen budgets (NNB)

- **(Simplified) reporting template for constructing NNB & deriving indicators** (coordinated with work by UNECE-TFRN)
- **Tiered approach**
- **8 essential pools and sub-pools**

<i>Pool-ID</i>	<i>Sub-pool</i>	<i>(Sub)Pool-Name</i>
1		Energy and fuels
1	A1+B	Energy conversion (includes flaring and fugitive emissions from fuels)
1	A2	Manufacturing Industries and Construction
1	A3	Transport
1	A4	Other energy and fuels (e.g., residential)
2		Material and products in industry (processes)
3		Humans and settlements
4		Agriculture
4	A	Animals
4	B	Manure / manure management
4	C/D/E/F	Crops & agricultural soils
5		Forest and semi-natural vegetation including soils
6		Waste
6	A	Solid waste disposal
6	B	Wastewater handling
6	C	Waste incineration
6	D	Other waste
7		Atmosphere
8		Hydrosphere
8	A	Inland waters (including ground water)
8	B	Coastal and marine waters



National nitrogen budgets (NNB)

Feedback from countries

- **Detailed budgets for informing decision making**
 - Important to get started and to support initial country assessments
 - Help to ensure that nothing important gets overlooked
 - Help to identify flows in the cascade that matter most
 - Help to identify policy intervention points
- **Simplified budgets for monitoring major trends**
 - Important for regular use & international comparisons
 - Focus on flows that matter most
 - Easy to maintain and update
- **When used in a green growth (or SDG) context**
 - Ensure links to economic information & coherence with the System of Environmental and Economic Accounting (SEEA)
 - Ensure the availability of a breakdown by industry if possible
- **Implementation challenges**
 - Work to be fully integrated in an official work plan with appropriate coordination (in countries; in the OECD PWB)
 - Voluntary reporting not easy for countries that are facing budget restrictions.



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Work in progress

- **Review relevance and interpretation issues**
 - Review the extent to which country-specific factors affect the interpretation, policy relevance and international comparability of the indicators.
 - Identify the additional information needed to explain the underlying drivers and to connect the indicators to economic information.
- **Refine and agree on the indicators' definitions**
 - i.e. the ways in which the indicators could be expressed and presented (as absolute values, as changes compared to a reference year, as intensities per unit of GDP, per capita, per land area, etc.)
 - Working Party on Environmental Information: 2016 meeting
- **Perform pilot calculations of indicators**
 - Based on simplified reporting templates
 - Work postponed due to insufficient volunteering countries

→ **Coordination and coherence with policy work and other international work on N**