DIFFUSE POLLUTION, DEGRADED WATERS

EMERGING POLICY SOLUTIONS

Hannah Leckie

OECD Environment Directorate

IWRA Webinar: World Water Day 2017 - Wastewater

22 March 2017

Paris, France

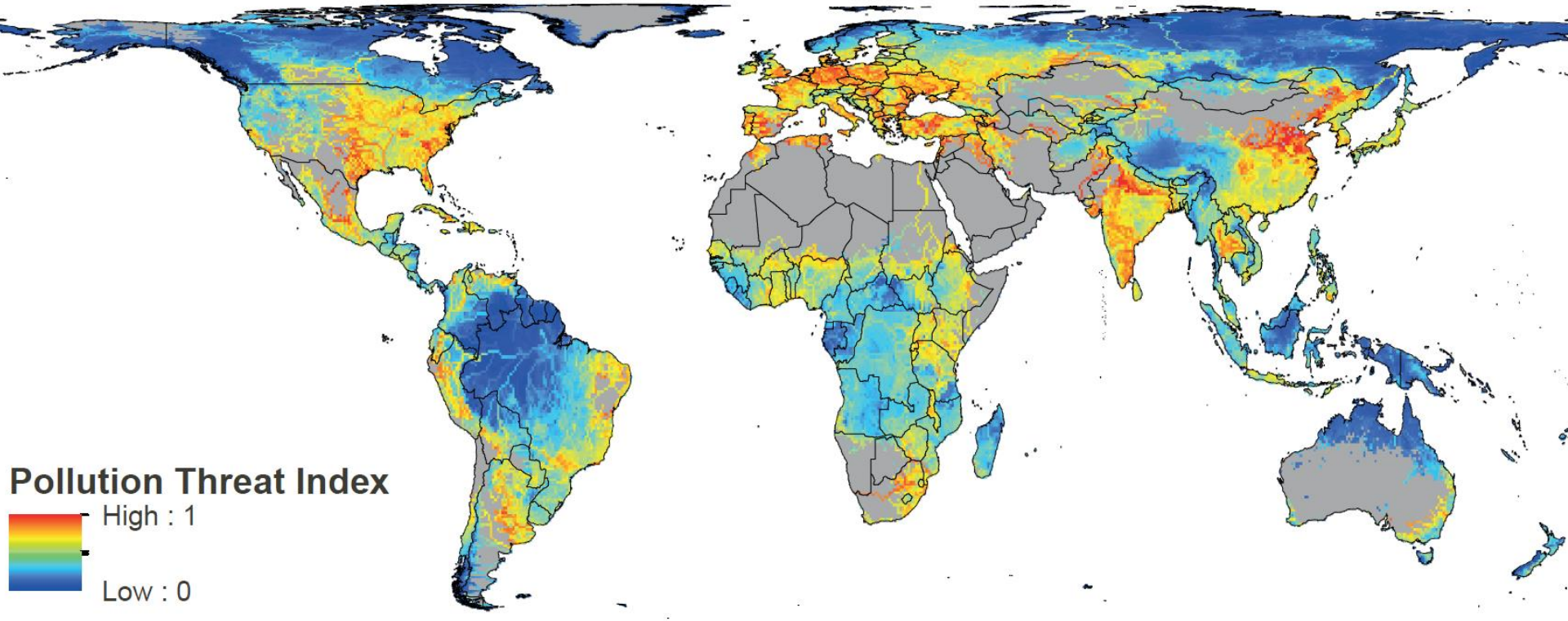
BETTER POLICIES FOR BETTER LIVES

Outline

1. The water quality challenge
2. The economic case for policy action
3. Emerging policy solutions
4. A framework for diffuse pollution management
5. A role for central government

The water quality challenge

Global distribution of water pollution hazard, 2000



Source: Sadoff et al. 2015; Vörösmarty et al. 2010

Point vs Diffuse source pollution

Point source – direct pollution to water bodies. E.g. discharge from wastewater treatment plants

Easy to identify and less costly to manage

Diffuse source – indirect pollution, high spatial and temporal variability. E.g. pesticides and nutrients from fertiliser and livestock

Difficult to manage, political resistance

The cost of inaction

Country	Type of water quality impact	Annual cost (millions USD)
Australia	Algal blooms associated with excessive nutrients in freshwater	116 – 155
Belgium	Drinking water treatment costs	167 – 264
France	Agricultural nitrate emissions and pesticides	695 - 1219
Korea	Reducing chemical contamination of drinking water	106
Netherlands	Nitrate and phosphate pollution	371 - 695
Spain	Nitrate and phosphate pollution	208
Sweden	Coastal eutrophication	1257
Switzerland	Agricultural pollution	690
United Kingdom	Drinking water treatment costs, agricultural pollution of surface water, estuaries	458
England	Total cumulative cost of water pollution (point and diffuse sources)	892 - 1656
United States	Drinking water impacts from nitrogen pollution	19000
	Impacts of nitrogen pollution on freshwater ecosystems	78000
	Drinking water costs of nitrate contaminated wells	12000
	Pesticide contamination of groundwater	2000
	Controlling highway runoff from major highways	2900 -15600
	Costs of gastrointestinal illnesses attributed to drinking water	2100-1380
Europe	Health costs of nitrate in drinking water – colon cancer	1062

Note: References to studies presented in OECD (2017), *Diffuse Pollution: Degraded Waters: Emerging Policy Solutions*

Diffuse pollution management options

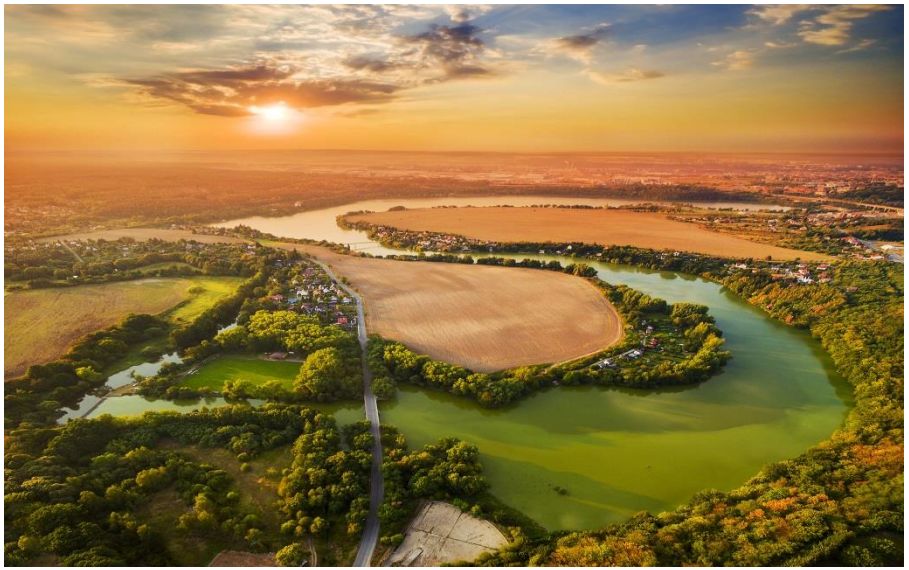
- Manage land use practices and inputs as proxies
- Reward or penalise polluters collectively within a catchment
- Manage estimated diffuse pollution emissions from individual polluters using computer modelling



Emerging policy solutions

- Pesticide taxes, Norway
- Pollution taxes on livestock, France
- Payment for Ecosystems Services, England
- Point-diffuse water Quality Trading, Chesapeake Bay Watershed, USA
- The 'natural capital' allocation of nutrient discharges allowances, New Zealand
- Diffuse-diffuse water quality trading, Lake Taupo, New Zealand

Framework for diffuse pollution management



Risk-based approach

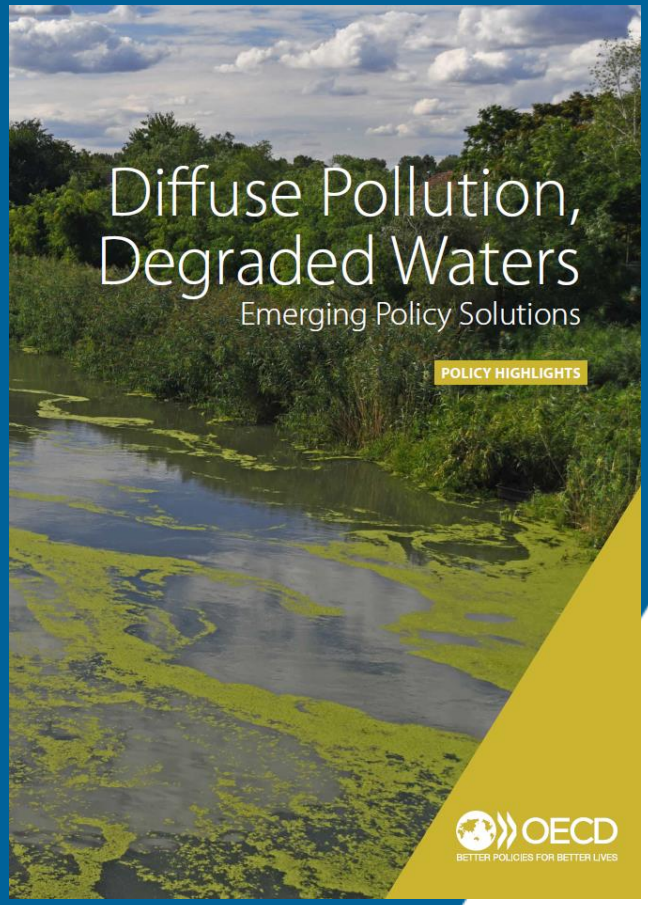
- Know the risks
- Target the risks
- Manage the risks

Policy principles

- Pollution prevention
- Polluter Pays
- Equity
- Principles on water governance
- Treatment at source
- Beneficiary Pays
- Policy coherence

Role for Central Government

- Strong over-arching regulatory frameworks
- Enforced minimum water quality standards
- Space for stakeholder and community engagement
- Notice of policy changes and implementation options
- Seed funding and space for experimentation



Thank you

http://www.oecd.org/water

Hannah.Leckie@oecd.org

OECD
BETTER POLICIES FOR BETTER LIVES

ADDITIONAL SLIDES

Impacts of water pollution

Urban and domestic use

Increased water treatment and inspection costs, maintenance costs from scouring and premature ageing of infrastructure, increased wastewater treatment costs with implementation of more strict regulations. Emergency and clean-up costs from spills/accidents.

Ecosystem health

Damage to freshwater and marine ecosystems (e.g. fish kill, invertebrates, benthic fauna, flora, habitat degradation) and loss of ecosystem services, which may require investment in additional or different grey infrastructure alternatives to replicate these services.

Human health

Polluted water is the world's largest health risk, and continues to threaten both quality of life and public health. Associated with this are health service costs, loss life expectancy, and emergency health costs associated with major pollution events.

Industrial productivity

Exclusion of contaminated water for industrial use results in increasing water scarcity. Scouring of infrastructure, and clean-up costs from spills/accidents.

Social values and tourism

Prohibition from recreational use (e.g. swimming, fishing, seafood gathering), beach closure, impacts on aesthetics, cultural and spiritual values. Losses in fishing, boating, rafting and swimming activities to other tourism activities or to other ventures with superior water quality.

Agricultural productivity

Exclusion of contaminated water for irrigation results in increasing water scarcity. Irrigation with contaminated water causes damage to, and reduced productivity of, pasture and crops, soil contamination, impacts to livestock health and production, and scouring of infrastructure.

Commercial fisheries

Direct and indirect fish kill, contamination of shellfish.

Property values

Waterfront property values can decline because of unsightly pollution and odour.

Policy instruments to manage water quality

Water-related risk	Regulatory	Economic	Voluntary or information-based
Water pollution	Water quality standards Mandatory best environmental practices and restrictions on inputs Pollution discharge permits Non-compliance penalties – non-renewal of resource permits or greater restriction on current permits Non-compliance fines	Pollution taxes (on inputs) Pollution charges (on outputs) Water quality trading Payment for ecosystem services	Information and awareness campaigns Farm advisory services for improved farming techniques (to minimise negative impacts on water quality) Contracts/bonds (e.g. land retirement contracts) Best environmental practices (or good management practices) Environmental labelling – products that meet certain environmental standards can be marketed and sold at a premium and/or subsidised.
Risk to the resilience of freshwater ecosystems	Minimum environmental flows (also for pollution dilution) Specification obligations relating to return flows and restrictions on discharges in drought conditions	"Buy-backs" of water pollution allowances to ensure adequate water quality for ecosystem functioning	Information and awareness campaigns Voluntary surrender of pollution discharge allowances

Who Pays and Who Benefits?

A reflection of policy instrument choice and enforcement

- *Polluter Pays*
  - Less successful with diffuse pollution
  - Internalises the external cost of pollution
  - Raises revenue for water quality management
  - Several barriers
- *Beneficiary Pays*
  - More successful with diffuse pollution (PES)
  - Seen as “rewarding” the polluter