IMPASSE

Luca Nizzetto,
Martyn Futter,
Marco Vighi,
Kees Van Gestel,
Peter Dillon

Water JPI
WaterWorks2015 Cofunded Call
6 April 2017, Stockholm

MOTIVATION

- Microplastics (MP) are an emerging environmental concern
- Focus on marine contamination
- Domina
- Wastev to sewage
- 63,000- pean and No
- MPs ma ded or adsc
- Unknov pacts to farm an human

Water JPI

OBJECTIVES

- To experimentally assess loads and fluxes of MPs at field scale and exposure of downstream freshwater environments in 3 relevant case study catchments in Europe and Canada.
- To assess accumulation and impacts of MPs on soil and freshwater organisms
- To assess the transfer of hazardous substances in MPs to crop and dairy products

OBJECTIVES

- To set up the first model of MP transport and budgets of MPs in catchments
- To deliver information on MP exposure and impacts to the relevant stakeholders and collect, from them, suggestions on possible management scenarios
- To illustrate to the stakeholders the results of the selected management scenario analysis
- To analyse economic and environmental implications of the identified management scenarios

CONSORTIUM DESCRIPTION

Norwegian Institute for Water Research (NIVA, Oslo, Norway)

Luca Nizzetto, Sinder Langaas, Bert Van Bavel

Coordination
MP analysis
Stakeholder analysis and communication

Swedish University of Agriculture (SLU – Uppsala, Sweden)

Martyn Futter

Catchment Modelling
Case study management
Management scenario assessment
Stakeholder analysis and communication

CONSORTIUM DESCRIPTION

IMDEA – Water (Alcalá de Henares, Madrid, Spain)

Marco Vighi

Fresh water ecotoxicology
Stakeholder analysis and communication

Vrije University Amsterdam (Amsterdam – The Netherlands)

Kees Van Gestel

Soil ecotoxicology

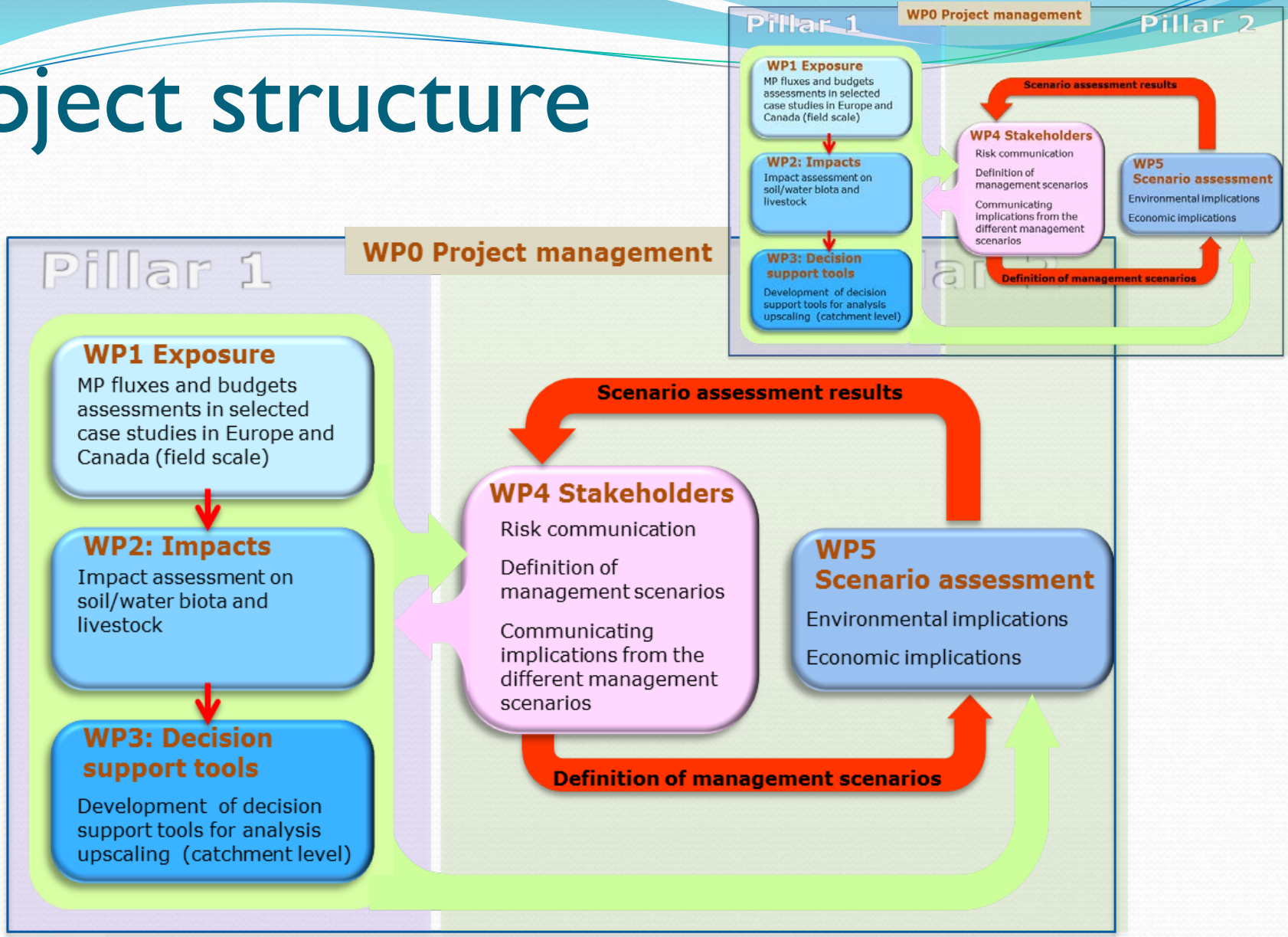
CONSORTIUM DESCRIPTION

Trent University (Peterborough, Ontario, Canada)

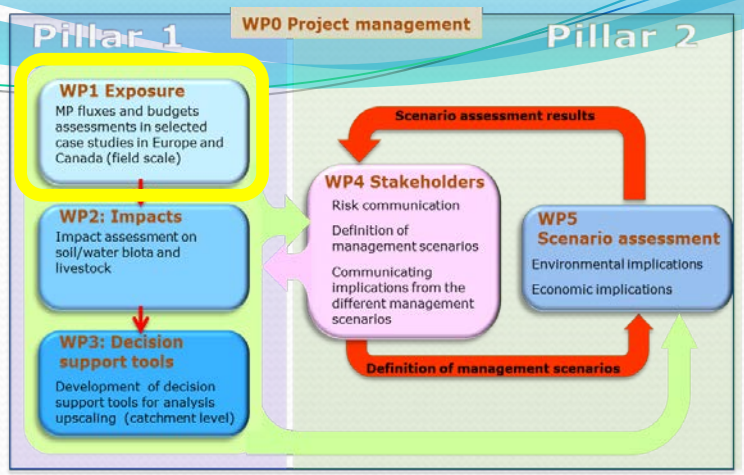
Peter Dillon, Jill Crossman

Case study management
Managment scenario assessment
Stakeholder communication

Project structure



WP1. Exposure



- Objectives

Analyse loadings and fluxes of MP in agricultural soils

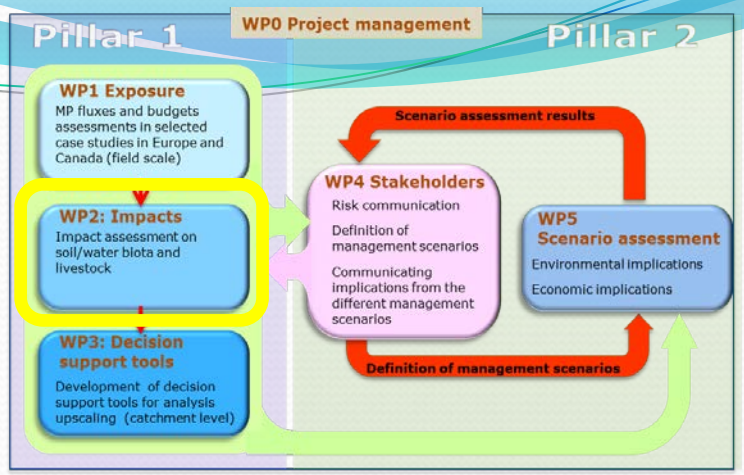
- Analysis of MP in fertilizers, soil, field runoff, streams and sediments

-3 Case study in farms in Sweden, Spain and Canada

- Partners

NIVA (coord.) + SLU, IMDEA, Trent Uni.

WP2: Impacts



- Objectives

Asses effects of MP on soil and fresh wáter organisms.

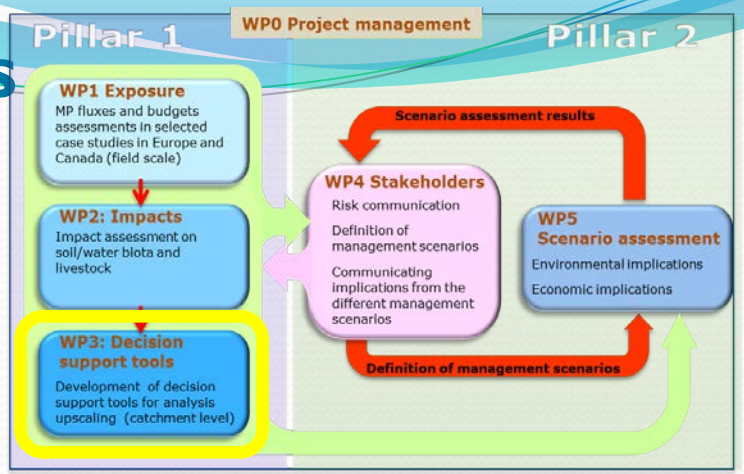
- Mesocosms test with soil and stream invertebrates and fishes.

Assess transfer of chemicals from MPs to crop and or livestock (e.g. Milk)

- Partners

IMDEA, VU, SLU.

WP3: Decision Support Tools



- Objectives

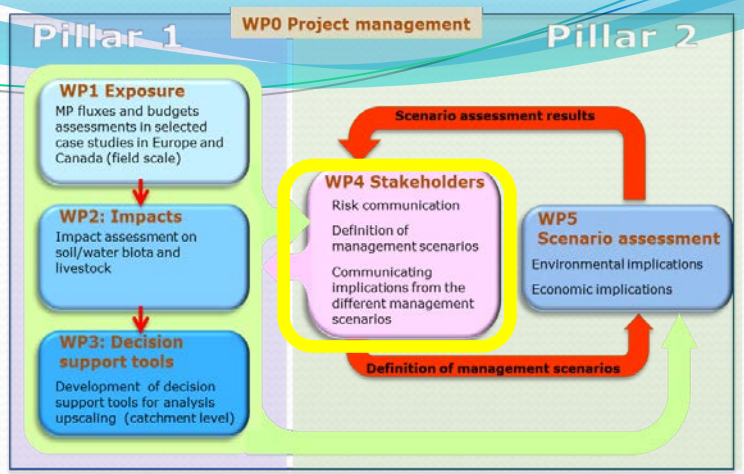
Further development of mechanistic catchment model of MP transport.

- Using data from WP1 to calibrate/validate INCA-MP model (hydrological driven)

- Partners

NIVA, SLU

WP4: Stackeholders (SH)

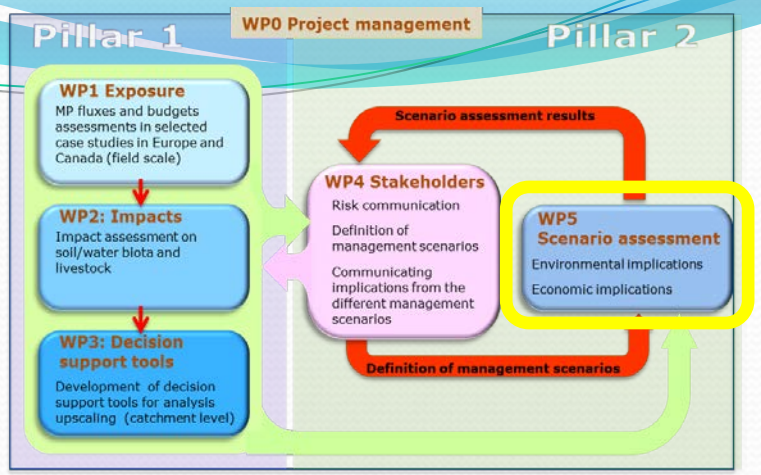


- Objectives

Communicate results from WP1 and WP2 to Farmers Organizations

Federation of Swedish farmers (Peter Wallenberg)
Union of Norwegian Farmers (Finn E Ødegård)
Ministry of Environment And Climate Change (Ontario, Canada)
Lake Simcoe Region Conservation Authority
Ontario Water Centre
Entitad de Saneamiento y Depuracion de le Region de Murcia (ESAMUR) (Spain)
Union de Pequeno Agricultores y Ganaderos (UPA) (Spain)
Coordinadora de Organizaciones de Agricultores y Ganaderos (COAG) (Spain)
Plastic Soup Foundation (The Netherlands)

WP5: Scenario assessment



- Objectives

Evaluate economic and environmental implications of management options

- Using data from WP1, WP2 and model in WP3 and incorporating options from Stakeholders

- Partners

NIVA, SLU, Trent Uni.

Expected Impact of the Project

1. Cross-cutting issues	**New integrated analysis of MP risk and management scenarios.** **Advance the science of MP in soil/fresh water.** **New models for analysing management/mitigation**
2. Build on on-going research activities	New knowledge and data for MP source inventory development. Useful for: JPI Ocean initiatives (BASEMAN - NIVA partner) FP7 CleanSea, UNEP programme on plastic North American Great Lakes research on MPs.
3. Participation of stakeholders	In depth interactive stakeholder involvemen (see WP4).
4. Communication to society	Risk/impact management and best practices discussed directly to stakeholders (WP4). Immediate impacts on the sector expected.
5. Improvement of environmental water quality and protection of human health	Delivered data packages and decision support tools necessary for environmental protection. (First hand data on MP!) Significant impacts on agricultural and environmental policy expected.

Expected Impact of the Project

6. Implementation of existing and breakthrough scientific knowledge in agricultural practices	**New decision support tool (IMCA-MP).** **New analysis of catchment-scale MP budgets.** **New knowledge on MP ecotoxicology in soil fresh water.** **Assessment of exposure of crop and diary products.**
7. New cost-effective technologies and management approaches (Technological impacts)	New mechanistic model of MP transport in catchments. List of best practice elaborated with Stakeholders Analysis of practice economic and environmental implications.

Expected Impact of the Project

8. Support to national and European policies (Policy Impacts)	The EU Water Framework Directive (WFD), Waste Water directive, Common Agricultural Policy (CAP) Canadian Agricultural Policy Framework (APF) EU Water Blueprint, EU Floods Directive, Great Lake Water Quality Agreement (GLWQA). EU Bioeconomy Strategy, 2012 Ontario Sampling and Analysis Protocol under the Nutrient Management Act, 2002. EU Marine strategy framework directive (Descriptor 10); UNEP Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA); UNEP Global Partnership on Marine Litter (GPML); Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol) to the Cartagena Convention. European Overarching strategy for Circular Economy concerning the reuse of nutrients.

How will the project target to following aims of the call:

- Multidisciplinarity

Ecotoxicology, environmental chemistry, Modelling, Socioeconomics ➔ **Integrated assessment**

- fundamental and/or applied approaches

Development of novel basic knowledge on MP behavior and impacts and direct application ➔ **Assessment of management options**

How will the project target to following aims of the call:

- to stimulate mobility of researchers within the Consortium

Joint work in 3 selected case studies ➔ **mobility of researchers at NIVA, IMDEA, SLU, Trent Uni**

Co-supervision of Students ➔ **SLU + VU**

- to enhance collaborative research and innovation during the project life and beyond

Complementary skills ➔ **Reciprocal stewardship**

Integrative analysis tools ➔ **Development of a new model as an integrated decision support tool**

Thanks for your attention

"The authors would like to thank the EU and (enter National funders names) for funding, in the frame of the collaborative international consortium (consortium acronym) financed under the ERA-NET Cofund WaterWorks2015 Call. This ERA-NET is an integral part of the 2016 Joint Activities developed by the Water Challenges for a Changing World Joint Programme Initiative (Water JPI)."