

D-Noses

Distributed Network for Odour Sensing,
Empowerment and Sustainability

Revisiting Odour Pollution in Europe: The D-Noses contribution

Rosa Arias, D-Noses Project Coordinator

28th October 2021



Founded by the Horizon 2020
programme of the European Union
Grant Agreement No 789315

#dNosesEU #odourObservatory



Odour pollution is not just a nuisance

- **Odour pollution** is the second reason for citizens' environmental complaints after noise across Europe, accounting for **more than 30% of citizen environmental complaints worldwide**.
- There is evidence that persistent exposure to odours can have **adverse effects that go beyond mere inconvenience** as continuous headache, anxiety, stress, lack of concentration, sleeping disorders and even increased respiratory problems.
- **Odours may have an economic impact** (e.g. tourism or loss of property value).
- Odour nuisance is connected to a fall of productivity, reduced economic activity and lowered house and community prices.
- WHO has stated that odour nuisance **affects quality of life**.



How are odours traditionally managed?

TRADITIONAL ODOUR MANAGEMENT

- ✓ Sampling, dynamic olfactometry (EN 13725:2003) & dispersion modeling => Average Impact
- ✓ Field observations (VDI 3940:2006 o EN 16841:2016) => Frequency of nuisance



- ✗ Citizens defenceless due to the lack of regulation
- ✗ Heterogeneous regulatory framework, no coherence
- ✗ Generation of socio-environmental conflicts in the affected communities
- ✗ Poor quality of life
- ✗ Sustainability reduced



Private studies, done by the industry or environmental authorities. Usually:

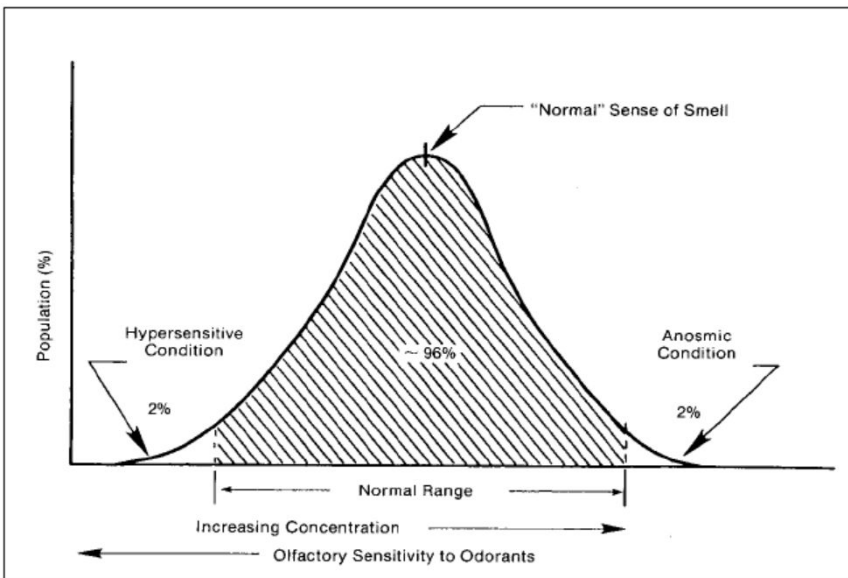
- ✗ No transparency
- ✗ No communication with the citizens
- ✗ No access to environmental information

In many countries, there are no specific regulations for odour pollution - nobody is usually obliged to its management and citizens are unprotected. It's not just nuisance, since there are health related issues.

TOP-DOWN APPROACH



OUR NOSE IS THE BEST SENSOR TO MEASURE AMBIENT ODOURS



Odour acuity (the ability to smell a certain odour) in the population follows a lognormal distribution. 2% are predictably hypersensitive and 2% are insensitive. (IPCC H4, Part 1, UK 2002)

Why don't we change the paradigm?

- ✓ Can we simplify and use our own noses instead of trying to mimic our perception?
- ✓ Can we use a **bottom-up approach** to start from considering the real perception of odours to better understand the problem?
- ✓ Can we change the concept of “complaint” by “real time odour observation”?
- ✓ Odour measurement in the field was a complicated task... until now!

This new approach can be complementary to traditional odour monitoring techniques



D-NOSES: Odour Pollution monitoring through Citizen Science



- A new, bottom-up methodology based on citizen science and participation and co-creation strategies to address odour pollution in 8 European countries, Chile and Uganda
- Produce new sets of data to inform policy makers and optimize industrial processes
- Increase awareness of odour pollution at local, regional, national, European and global level



D-NOSES

Distributed Network for Odour Sensing,
Empowerment and Sustainability

Transdisciplinary team of experts in
odours, citizen science, municipalities,
NGOs and industrial associations.
Quadruple helix approach

14 partners

9 countries

3,1M€

2018-2021

<https://dnoses.eu/>



D-NOSES #dNosesEU #odourObservatory

The Objectives of D-NOSES

Ultimate goal: Introduce odour pollution in the policy agendas at a global scale in the medium to long term.



D-NOSES

Distributed Network for Odour Sensing,
Empowerment and Sustainability



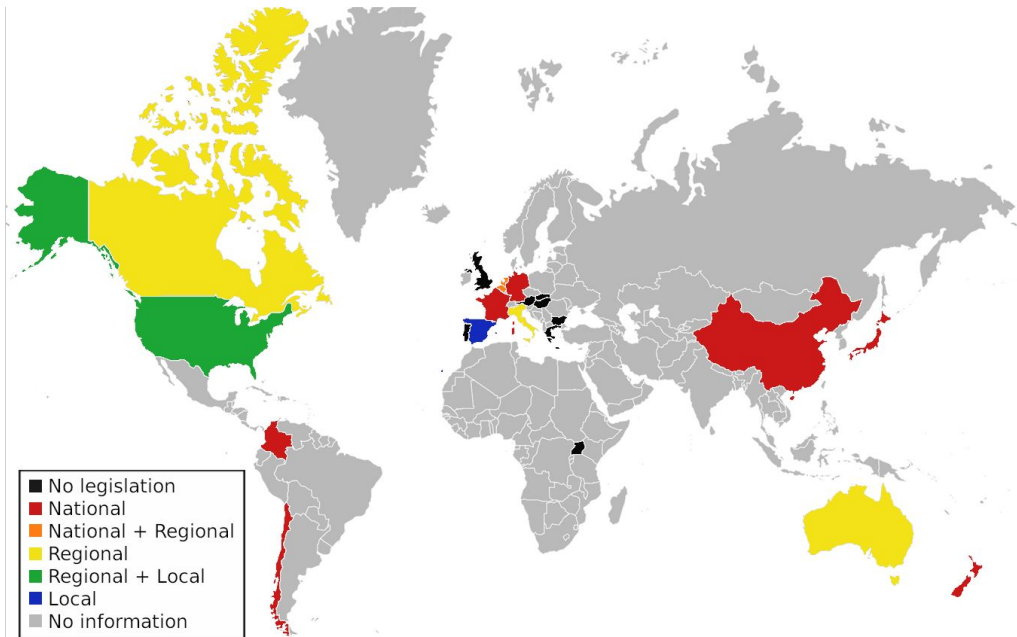
To reach this goal, D-NOSES intends to:

- 01. Raise awareness in odour pollution**, and address environmental and sanitary related problems, through a **multi-level engagement strategy** at global, national and local levels, to pave the way for increased sustainability and quality of life for future regulations, strictly related with our **multi-level governance model**.
- 02. Provide access to information** in odour pollution by creating **The International Odour Observatory**.
- 03. Collect evidence through 10 local case studies in European and non-European countries** for validating methodologies and producing **DIY guidelines for project replicability**.
- 04. Standardize methodologies and impact criteria** and provide common **scientific guidelines for policymaking**.
- 05. Produce the Green Paper and the Strategic Roadmap for Governance** in odour pollution to advocate and inform common, bottom-up efficient and coherent regulations.
- 06. Increase global sustainability** and contribute to the fight against **climate change** by reducing some odours (CH_4) that are in turn greenhouse gases (GHGs).



The Odour regulatory framework trend worldwide and in Europe

Regulating odour pollution is not a straightforward endeavour - one of the reasons is the **complexity of reliably measuring** odour emission and immission levels.



- Most of the countries worldwide **still do not have any regulations** to deal with odour pollution.
- **Dynamic olfactometry** is becoming the predominant methodology in almost all countries worldwide.
- Existing odour regulations are **heterogeneous** within EU Member States, regions, and even municipalities

DIRECTIVE 2010/75/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 24 November 2010

on industrial emissions (integrated pollution prevention and control)

Europe

In the European Union, odour pollution is regulated in the common regulatory framework about industrial emissions, known as **Industrial Emission Directive (IED)**

The compliance with BREF recommendations is one of the typical procedures that regional governments enquire for giving permits to new installations.

Only the newest BREFs included special paragraphs about odour reduction techniques or Odour Management Plans, while the 2018 Waste Treatment BREF includes the **first odour limit** for biological treatments of waste at European level.

Sectors where odour pollution and abatement techniques are included
More info in D 2.3 & 2.5



D-NOSES

#dNosesEU #odourObservatory

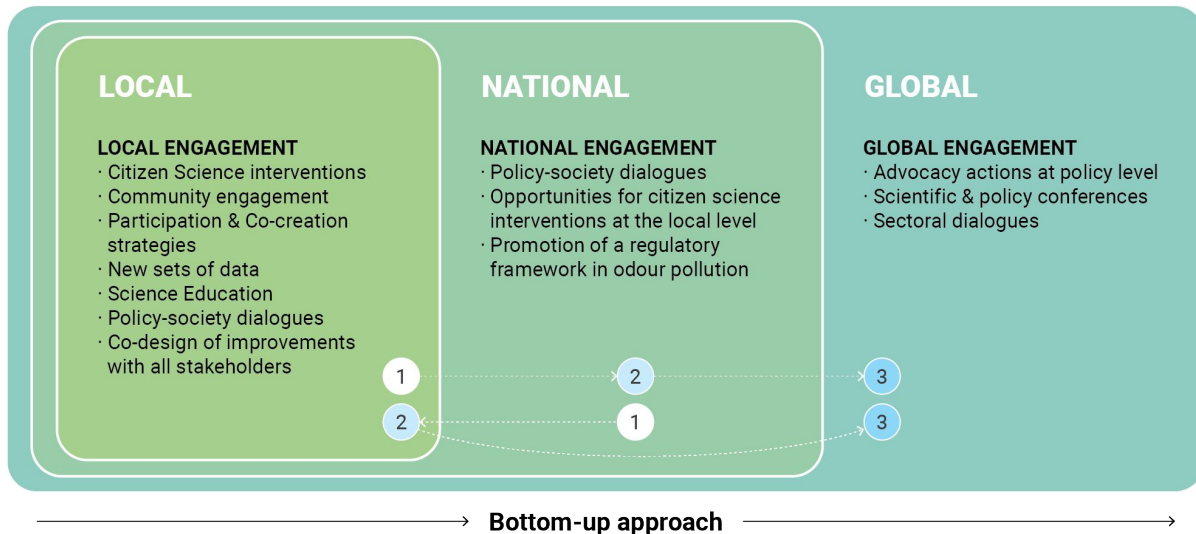
The need of a multi-level governance model to tackle odour pollution

Regulations at national and European levels, are crucial to provide a fundamental framework and are even required to deal with odour issues at the local level in some countries.

D-NOSES proposes a **multi-level governance model**, which aims at involving the different governance institutions at local, regional, national European and global levels to better regulate odour pollution.

Governance model needs to be adapted for each country

Multi-level engagement strategies for a multi-level governance model in odour pollution



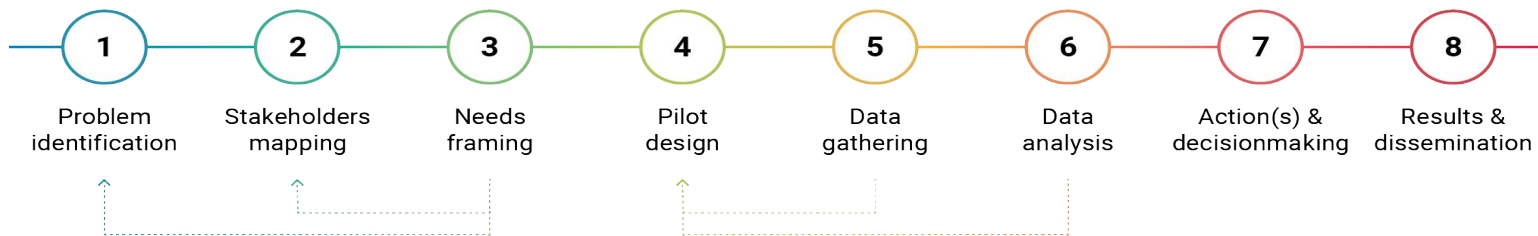
This model **can be applied worldwide**, and aims at involving the 4H using a **bottom-up approach** based on the promotion of a dialogue between affected stakeholders, which in result can improve their relationships, **increase transparency, accountability and confidence in public institutions**.



Citizen Science as a Necessary Methodology to tackle Odour Pollution

The few existing regulations differ from one another, making this global problem difficult to manage and in dire need of an urgent common framework.

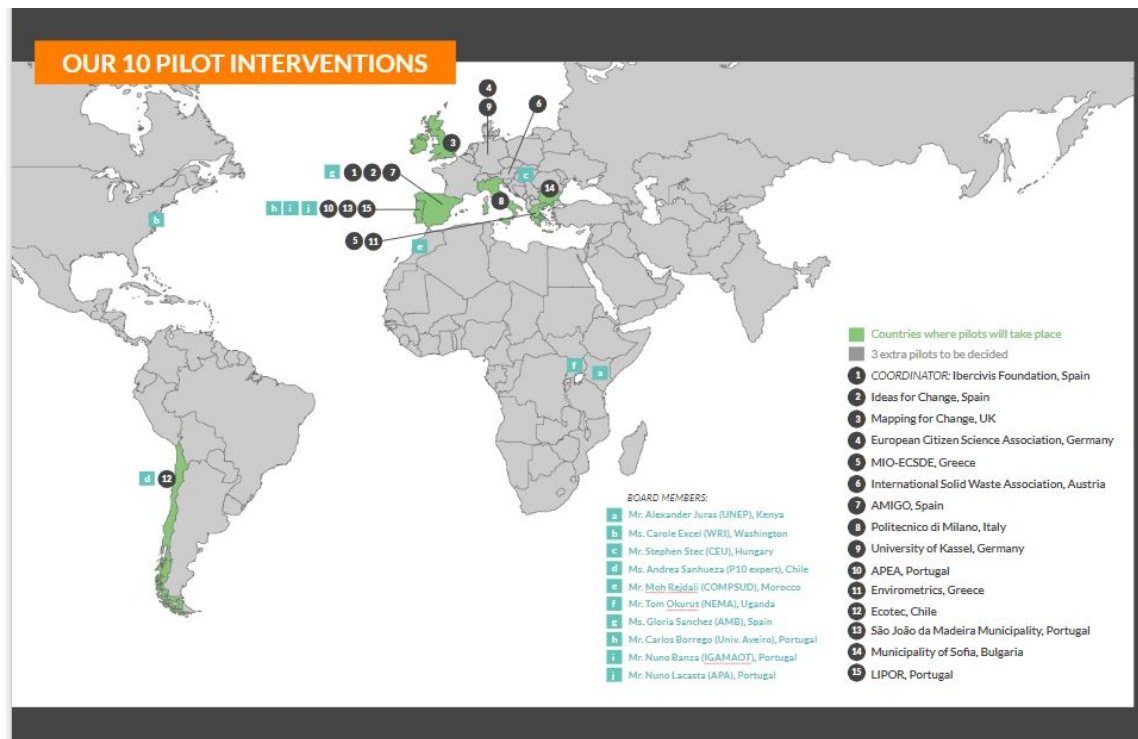
- 1- Uncertainty of sampling odour emissions limitations of dynamic olfactometry
- 2- Atmospheric dispersion modelling of odour impacts and odour regulations
- 3- Limitations of the continuous monitoring of odour emissions
- 4- Accounting for the annoyance potential of odours - real impact perceived by affected communities
- 5- Implementing of solutions to mitigate odour impact
- 6- Transparency of the process



Citizen science as a method represents an excellent tool to collaboratively tackle wicked socio-environmental challenges locally and globally.



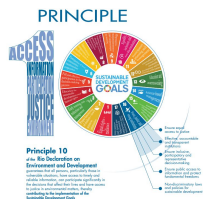
Validation: 10 Pilot Case Studies



10 Pilot Case Studies

- Barcelona, Forum Area: Pioneer Pilot (Spain)
- São João da Madeira (Portugal)
- Porto (Portugal)
- Thessaloniki (Greece)
- Sofia (Bulgaria)
- Lombardia (Italy)
- Schermbeck (Germany)
- Southall and Penrith (UK)
- Los Álamos (Chile)
- Kampala (Uganda)



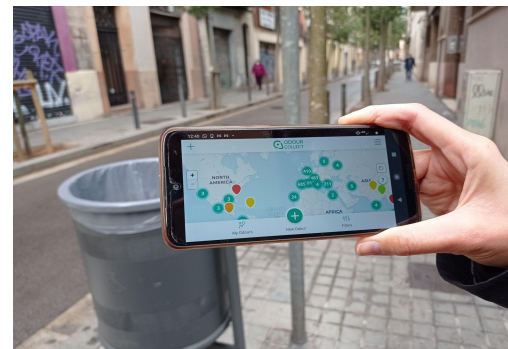


Co-creating collaborative odour maps: The App OdourCollect



OdourCollect is a software product that enables the co-creation of collaborative odour maps and facilitates data analysis of odour observations reported by affected communities via a phone app, webapp or manual upload in CSV data format.

Inspired by the German standard VDI 3940:2006 (current CEN 16841:2016).



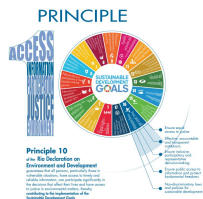
Components for the characterization of odour

- Quality (Type- Subtype)
- Intensity
- Hedonic tone



- Geolocation
- Real time





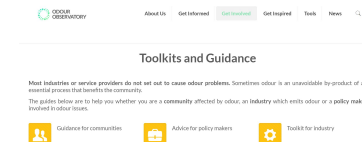
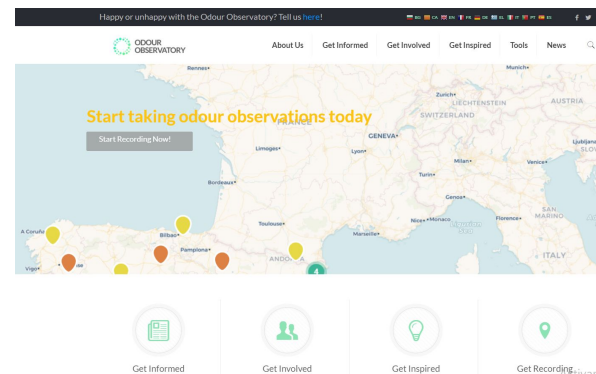
The Odour Observatory: access to information, inspiration and engagement.

Odour Observatory was created to **provide resourceful** information about odours for all stakeholders, to begin to level the playing field and increase awareness and knowledge in odour pollution → Access and right to contribute to odour information is **granted by the Odour Observatory**.

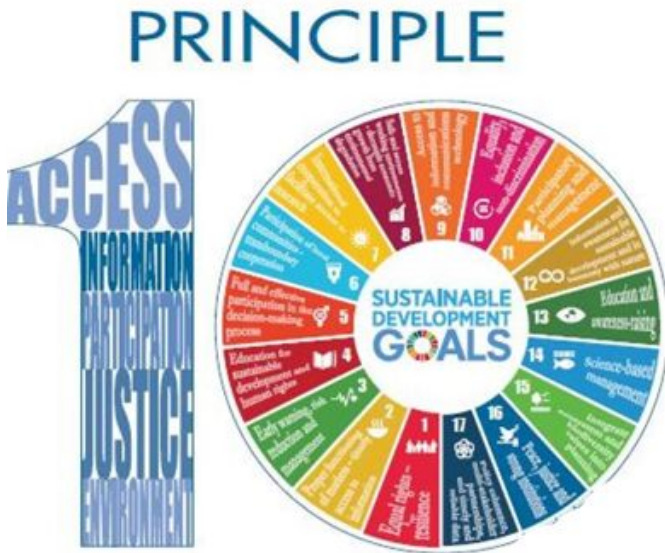
Its web-based platform includes information on odour issues, regulations, research, data collection methods and potential mitigation measures or solutions.

The information is presented in an accessible format, using plain, non-technical language that allows stakeholders to gain a more common understanding of the issues in odour pollution and management.

It also allows to **contribute** (e.g. affected communities or regulation maps)



Odours and Principle 10 of the Rio Declaration



Principle 10 promotes the idea that all people should have adequate access to information, be adequately involved in decision making, and have access to an open and fair justice system.

The lack of consistent regulation on environmental odours can also block citizens and industries' access to legal recourse

Citizen's Right to Contribute to Data

"we would not only enhance policy-society relations, but also strengthen environmental decisions through participatory democracy, as well as the accountability and transparency of our public institutions", Rosa Arias.

D-NOSES also considers all the **Responsible Research and Innovation** (RRI) dimensions.

Citizen science to contribute to environmental monitoring

Participation in the 22nd Meeting of the Parties to the Aarhus Convention to present a Statement on D-NOSES (thanks to Prof. Stephen Stec) - 19th June 2018



22nd Meeting of the Parties to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters

Geneva, 19th June 2018 (10-13h)

Intervention up to 5 minutes from the floor within the General Segment; Item 3-Substantive issues; (a) Thematic session on Access to information; (f) Dissemination of real time, up to date, accurate and functional environmental information in forms and formats meeting the needs of different users.

STATEMENT by Rosa Arias (D-NOSES Project Coordinator, Ibercivis, Spain)

- Thank you, Chair, for this opportunity to present information about the D-NOSES project to the Parties and stakeholders. My name is Rosa Arias, and I am joined by my colleagues Nora Salas and Professor Stephen Stec, who is one of the members of our Advisory Board.

News from the Aarhus Convention MoP7

Just yesterday new instrument to promote citizen science with 46 governments!

Recommendations on the more effective use of electronic information tools

<https://unece.org/sites/default/files/2021-08/ECE.MP.PP.2021.20.E.pdf>

Addendum to the recommendations

<https://unece.org/sites/default/files/2021-08/ECE.MP.PP.2021.20.Add.1.E.pdf>



D-NOSES

#dNosesEU #odourObservatory

The strategic roadmap for Odour Governance

Scope and purpose

Governments and environmental authorities have a complex task in the application of odour regulations and guidelines. There are as many approaches as countries and sometimes the **lack of a strong legislation minimizes citizens' protection.**

The **Strategic Roadmap for governance in odour pollution** serves to inform policymakers about the context and situation regarding odour pollution in Europe, focusing in the D-NOSES countries, which can inspire the development of a robust legislation framework on the matter.





Recent advances at the national level

Portuguese advocacy actions



Create a Portuguese high level policy group, to walk towards a **national regulation in odour pollution in the country**.

Spanish advocacy actions



In Spain, a **standard** to monitor odour pollution through **citizen science** is being promoted, with the support of the Spanish standardization body UNE.

Chile advocacy actions



Chile's draft of a first national odour emissions regulation covering the swine sector could be a blueprint for further regulations.

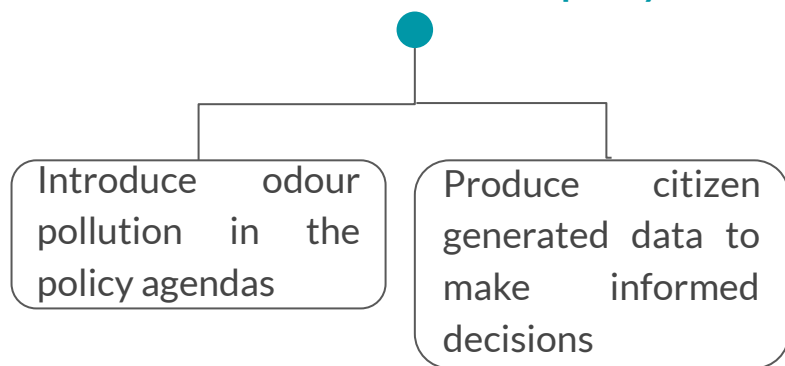
Colombia advocacy actions



Improvement of the procedure of execution and analysis of the **odour nuisance through surveys** using the OdourCollect App. Improved data quality and time.

Impacted communities by odour pollution should be taken into account in any future policy or legislative frameworks, and **citizen science** can be a first-rate tool for achieving it

One of the **main objectives of D-NOSES** was to work on the interface of **science** and **policy**



★ **Policy-society dialogues are crucial!**

- The difficulties in balancing stakeholders' interests can be surpassed through **transparency, accountability** and **dialogue**.
- D-NOSES advocates for a **multi-level engagement model** for governance in odour pollution which involves the different governance institutions at different levels.
- This multi-level governance model can be applied worldwide using a **bottom-up approach** based on the promotion of a dialogue between affected stakeholders.
- The **engage quadruple helix stakeholders** in local decision-making and management processes enables them to increase their awareness of environmental challenge.
- This new approach shifts the focus from pollution abatement to **pollution prevention**.





Scope and purpose of the Green Paper

Odour pollution, being the second cause of environmental complaints after noise, leads to a significant decline in the quality of life of those affected and **must be urgently addressed by policymakers**.

The **Green Paper on odour pollution** serves as a foundation for further development of research and plans by different stakeholders with specific objectives in odour pollution and a planned future White Paper.



Outline of the Green Paper

Chapter 1. INTRODUCTION

Chapter 2. TURNING A CHALLENGE INTO AN OPPORTUNITY: THE GREEN PAPER ON ODOUR POLLUTION

Chapter 3. MULTI-LEVEL GOVERNANCE MODEL IN ODOUR POLLUTION AND THE EUROPEAN POLICY CONTEXT

Chapter 4. CITIZEN SCIENCE AS A NECESSARY METHODOLOGY TO TACKLE ODOUR POLLUTION

Chapter 5. THE ODOUR OBSERVATORY: THE CIVIC RIGHT TO CONTRIBUTE TO ENVIRONMENTAL INFORMATION

Chapter 6. THE WAY FORWARD: INTRODUCING ODOUR POLLUTION IN THE POLICY AGENDAS

ODOUR POLLUTION A GROWING SOCIETAL CONCERN



HIGHLIGHTS

- Odour nuisances, being the second cause of environmental complaints after noise, lead to a significant decline in our quality of life and must be urgently addressed.
- Odour regulations across Europe and within countries differ significantly from each other. In many places they are even completely lacking. There is a need for bottom-up, multi-level governance in Europe in order to protect its citizens.
- Odorous gases are commonly measured at the source (emission). The level of the odours in surrounding residential areas (immission) is more complex to determine, but also much more relevant to measuring the impact on residents.
- The Distributed Network for Odour Sensing, Empowerment and Sustainability (D-NOSES) project will reverse the way in which odour pollution is commonly tackled, through a co-creative citizen science approach.

MAIN ODOUR ISSUES IN EUROPE

The sources that generate odours in European communities are numerous and diverse; in many cases the same community is exposed to more than one odour source. Industrial activities, waste management and agriculture/livestock represent the main challenges regarding odour emissions within Europe.

HOW TO CITE

D-NOSES consortium (2019) Odour Pollution - A growing societal concern. D-NOSES Policy Brief #1

Authors: Simone Rüfenacht (ECSA), Clarissa Gubral (ECSA), Alaa Abou Daher (MIO-ECSDE), Anastasia Roriotas (MIO-ECSDE), Jose Uribe (ISWA), Nora Salas Seoane (IBERCIVIS), Rosa Arlas (IBERCIVIS).

This policy brief was facilitated by the lead authors (ECSA) through open interaction and discussion with the D-NOSES consortium. While this was carried out as part of H2020 D-NOSES Coordination and Support Action project, the views expressed in it do not reflect the consensus opinion of D-NOSES partners.

The way towards the White paper

Environmental odours are widespread yet localized, complex and multidimensional and this *Green Paper* has shown that there is a lack of a proper, unified response to this problem in Europe.

To fill this gap, a multi-level approach that encompasses the different views and needs of the quadruple helix stakeholders.

The *Green Paper on Odour Pollution* genuinely wishes to prompt a constructive discussion on a harmonized odour policy given that it has not been given the priority it deserves.

A set of questions are provided below for future open and inclusive consultations towards the White Paper, with all stakeholders linked to the odour pollution challenge



Revisiting Odour Pollution in Europe: The D-NOSES contribution



D-NOSES

Distributed Network for Odour Sensing,
Empowerment and Sustainability

Thank You!

Rosa Arias, D-NOSES Project Coordinator. CEO & Founder at
Science for Change. Manager at OdourCollect.

rarias@bifi.es / @RosaAriasAlv



Coordinated by:

ibercivis

IDEAS
FOR
CHANGE

mapping for change



ecsa

European
Citizen Science
Association



ISWA

International Solid Waste Association

AMIGO



POLITECNICO
MILANO 1863



ENVIRONMENTAL
Business Consulting and Engineers

ecotec



S. João da Madeira
Câmara Municipal



lipor



Founded by the Horizon 2020
programme of the European Union
Grant Agreement No 789315

#dNosesEU #odourObservatory