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.

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Increased and prolonged exposure to odour pollution is having a significant impact on affected communities. The need for action is becoming more urgent with the growing recognition at all levels of the harmful effects of bad air quality on people’s health and lives. Reducing the impact and improving the affected citizens’ quality of life will require a collaborative approach by all stakeholders; a reliable measure of the real nuisance will be central to this initiative and crucial to its success.

Odour issues can therefore generate conflicts between the residents and the emitters which have to coexist in increasingly limited space, and lead to possible obstacles to the continuation or expansion of odour-emitting activities.

Overview of the general distribution of odour sources in all European D-NOSES partner countries (source: D-NOSES deliverable D4.1, based on over 220 cases of odour complaints reported in the local and national press from the past 8 years).

European environmental regulations largely ignore odour issues

Odour pollution has repeatedly been ignored in environmental regulations leaving citizens defenceless. According to the Directive 2010/75/EU on Industrial Emissions, European countries must prevent and limit air, soil and water pollution, as well as negative environmental effects such as odours. A European standard defines how to sample and measure odours in the laboratory (EN 13725:2003) (see next page), thereby quantifying odour emissions. However, no standard regulates the need for an odour risk analysis at the planning stage or the requirement for odour control management to be included in permits. Ultimately, there are still no common criteria to establish impact odour thresholds. We advocate that odour thresholds need to be established in cases where residents are impacted and odour nuisance is present.

DISPARATE ODOUR REGULATIONS IN EUROPE

Some efforts have been made to regulate odours throughout Europe at the national, regional and even municipal levels\(^7\). However, it has not led to the drawing up of clear, Europe-wide definitions, terms and criteria and there are still many European areas that have no odour regulations at all. Due to the lack of regulations, situated technical studies are rarely conducted, data on odour pollution are scarce or not accessible, and the implementation of effective odour control strategies is usually disregarded. It is often the citizens who build the pressure for local authorities and odour emitting industries to monitor and control odour emissions.

WHEN CITIZENS GET INVOLVED

Inhabitants of a southern German district have been complaining about nightly odour nuisance since 2015. The centralisation of residents’ observations by the municipality, although late, was crucial in advancing the search for odorous sources. The collection and cross-referencing of spatiotemporal and weather data made it possible to delimit the area concerned and identify a potential emitter. Empowering citizens to collect data through the use of innovative tools could have enabled the authorities to act more quickly to prevent and reduce odour emissions.

Odour regulation in eight European countries and in Chile (D-NOSES partners)

EU Directive 2010/75/EU on Industrial Emissions (applies to all European partner countries)

**AUSTRIA**

- No national regulation on odours
- Recommendation to apply the “Directive for the Assessment of Emissions from Livestock Farming” (2017, replacing the previous one from 1995) in diverse regulations and permit procedures

**BULGARIA**

- Under the Environmental Protection Act, certain permits include conditions for monitoring and strict control of odour emissions
- Some odour issues are addressed in single regulations (ordinances) related to waste management, air pollution, wastewater treatment, etc.
- An ordinance related to air pollution includes sanctions for industries releasing odorous substances

**GERMANY**

- Federal Immission Control Act (BImSchG) regulates the licensing of potential odour emitters and defines significant odour nuisance
- Technical Directive on Air Pollution Control (TA Luft) describes the use of BImSchG in practice and sets specific emission limits
- Directive on Odour Immissions (GIRL) sets limit values for odour exposure in habituated and industrial zones

**GREECE**

- No national regulation on odours

**ITALY**

- No national regulation on odours
- Local guidelines on odour emissions, primarily based on a modellistic approach (Region of Lombardy, Region of Piemonte, Region of Puglia, Province of Trento)

**PORTUGAL**

- No national regulation on odours
- Diffuse emission of pollutants is regulated by Article 9, DL No. 39/2018 of June 11
- Some environmental licences present conditions to minimise odours

**SPAIN**

- No regulation on odours at national or regional level, but in some municipalities (Liça de Valls, Banyoles, Alcantarilla, Las Palmas, etc.), although there is no coherence between ordinances
- In Catalonia, a specific regulation to control odour pollution was drafted in 2005, not adopted, but used as reference to set odour limits from different emitting activities elsewhere in Spain

**UK**

- Environmental Protection Act 1990 assigns a duty to the local councils to investigate all odour complaints
- Several guidelines on odour management, Pollution Prevention and Control in Scotland

**CHILE**

- Since 20 years there is an emission standard for total reduced sulphur compounds (TRS) associated with the manufacture of sulphated pulp
- During the last 5 years, there have been several actions alongside a national odour management strategy that includes adoption of international technical standards, odour evaluation within the environmental licensing scheme (guideline on odours published in December 2017 providing standards) and ongoing efforts on odour emission standards for selected activities (e.g. piggeries).

THE NEED FOR A BOTTOM-UP, MULTI-LEVEL GOVERNANCE MODEL

Odour pollution has generally a local impact and therefore local regulations are often the most effective management strategy. Regulations on national and international levels, however, are crucial to provide a fundamental framework and are even required in some countries (e.g. Portugal). Citizens, as the producers of many odorous products (e.g. waste and wastewater), are co-responsible for odour emissions. Their inclusion in local decision-making and management processes enables them to increase their awareness of environmental challenges, adjust their behaviour and co-create local regulations for sustainable communities.

Through the inclusion of citizens, industries can improve their relationships with communities, and local authorities can increase transparency and confidence in public institutions.

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Measuring odours and impacts

COMMON METHODS USED

An odour is commonly characterised by its concentration, rather than by its chemical composition. Expressed in odour units per cubic metre (ou/m³), odour concentration is determined in a laboratory by dynamic olfactometry, a sensorial technique based on the participation of a panel of people with confirmed average sensitivity (method standardised at European level EN 13725:2003, under revision). The quantification of odour emissions at the source based on this technique serves as input data to odour dispersion models. Such models provide easily understandable averaged results that are not only descriptive, but also predictive (useful for new plant under construction)\(^{10}\).

However, the results of this technique have high uncertainty levels, do not report citizens‘ discomfort or real-time annoyance and therefore do not provide accurate estimates of their exposure to odours.

Methods to evaluate odour impact at the receptors (citizens) include the recent European standard EN 16841:2016\(^ {11}\) on field inspection of odours (grid and plume methods) through human assessors, which are used increasingly for environmental odour assessment. However, these field inspections are time-consuming and often induce high costs, and still do not provide real-time information on the discomfort of the impacted citizens.

There is a need for a cost-effective technique to assess the perceived nuisance directly within the community. Citizens own the most precise and cost-effective sensor to measure odours - their own noses - and have a clear motivation for engagement: recovering their quality of life.

The involvement of citizens helps the industry and local authorities to obtain real-time data at lower economic costs. These data inform the optimisation of industrial processes and reduce the impact of odour pollution on the communities, while advancing the state of the art of odour management.

The intervention of citizen science in odour pollution is therefore of great interest. Citizen science has recently been experiencing an increase in support from the European commission, mainly in the fields of environmental monitoring and regulations. In addition, the open science movement has gained a lot of awareness. As a result, open science and citizen science project numbers have been steadily increasing throughout Europe and beyond.

\[\text{“Informed opinion and active co-operation on the part of the public are of the utmost importance in the improvement of the health of the people.”} \]

\(\text{(WHO)}^{4}\)

Our approach in D-NOSES: empowerment of citizens to co-design local solutions

The Distributed Network for Odour Sensing, Empowerment and Sustainability (D-NOSES) project is an EU H2020-SwafS (Science with and for Society) funded project that aims to provide an inclusive, bottom-up approach to tackle odour pollution issues at all levels in a cost-effective way.

Our approach is to empower citizens to become a driving force for change through citizen science. Odour problems can be mapped using the free collaborative mapping app OdourCollect (https://odourcollect.eu), which will allow industries to optimise their processes and to check the effects of newly implemented good practices and corrective measures at a lower cost. This methodology takes citizens‘ annoyance into account through first-hand observations and enables citizens to co-design solutions with all stakeholders, such as environmental NGOs, local authorities, odour-emitting industries and odour experts.

THROUGH THE IMPLEMENTATION OF THE PRINCIPLE 10 OF THE RIO DECLARATION (1992), D-NOSES WILL STRENGTHEN:

- Not only access to information, but also generation of new data in odour pollution through the International Odour Observatory (https://dnoses.communitymaps.org.uk)
- Public participation in local decision-making (multi-level engagement strategies of stakeholders and communities, co-creation and citizen science approaches)
- Access to justice through advocacy actions to introduce odour pollution to the policy agendas.

TAKE HOME MESSAGES

- Odour pollution is linked to environmental and health issues and therefore needs to be more closely regulated in Europe.
- The inclusion of citizens in odour regulation and management processes is beneficial for all stakeholders, as it promotes scientific education, improves relationships and increases confidence in public authorities.
- Be part of the solution! Get involved in our co-creation process: Find out more on the D-NOSES website (www.dnoses.eu)