

How to characterize environmental noise closer to people's expectations

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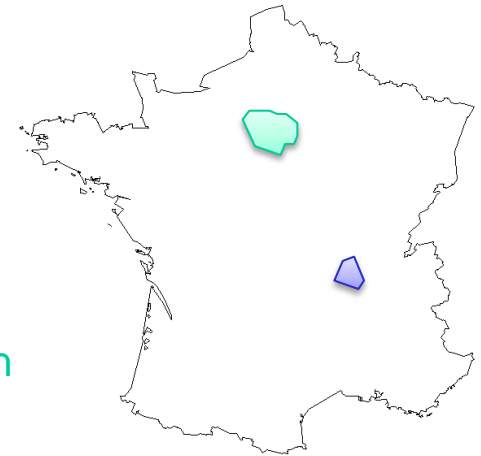
INTRODUCTION



- non-profit organisation
- created in 1996 by Greater Lyon



- non-profit organisation
- created in 2003 by IDF region



HARMONICA project (**HARMO**nised **Noise** Information for **Citizens** and **Authorities**).

- three year European project
- funded by the LIFE+2010 program



1. CONTEXT

Observations :

- Lden, Leq poor capacity to take into account eventful and temporal fluctuations of urban soundscapes
- limits of the only-acoustic indicators to be consistent with residents' daily life

Objectives : new indexes, closer to people's expectations, easy to understand, integrating the continuous and eventful nature of noise

Research based on two fields :

- **engineering** (acoustics)
- **humanities** and **social sciences** (perception, expectation)

2. OBJECTIVES

4 objectives

- 1- **Assessing** the current level of knowledge from the involved people
- 2- **Establishing** a frame of reference for public expectations in terms of information
- 3- Quantifying annoyance and link the values in the new index
- 4- Comprehending the level of acceptance and understanding of new indexes

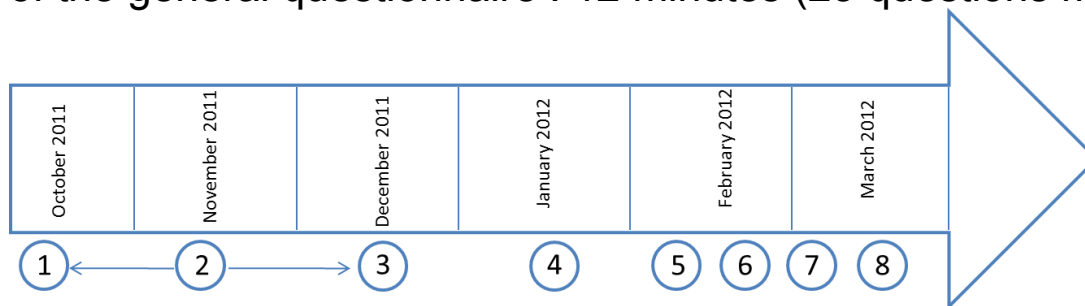
3 approaches

- A **telephone survey** by questionnaire, with 800 people (objectives 1 and 2)
- A **on-site survey** by questionnaire with 240 inhabitants or public space users, coupled with acoustic monitoring (objectives 3 and 4)
- An evaluation in **experimental situation** from a panel of politicians and policy makers, experts in acoustics and general public (objectives 3 and 4)

3. METHODOLOGY

3.1. Telephone survey

- two weeks in February/March 2012
- on a sample selected by the method of quota : 400 persons /territory (800 in total)
- average duration of the general questionnaire : 12 minutes (25 questions mostly “closed”)



- ① Topics of interview
- ② Pre-test
- ③ Call for tenders
- ④ Provider selecting
- ⑤ Telephone pre-test
- ⑥ Greater Lyon survey
- ⑦ Paris urban area survey
- ⑧ Results

3.2. On-site survey & laboratory surveys

3.2.1. Indexes

The four indexes are characterized by:

- Index 1 : **background noise, variation of the amplitude and number of noise events** ;
- Index 2 : the **duration** when the noise levels do not exceed the thresholds (different for day, evening or night) ;
- Index 3 : **average noise level, background noise, number and duration of the quiet moments, noise level of the noisiest events** ;
- Index 4 : **average noise level**, particularly taking into account the loudest noises.

Example of the description of one index

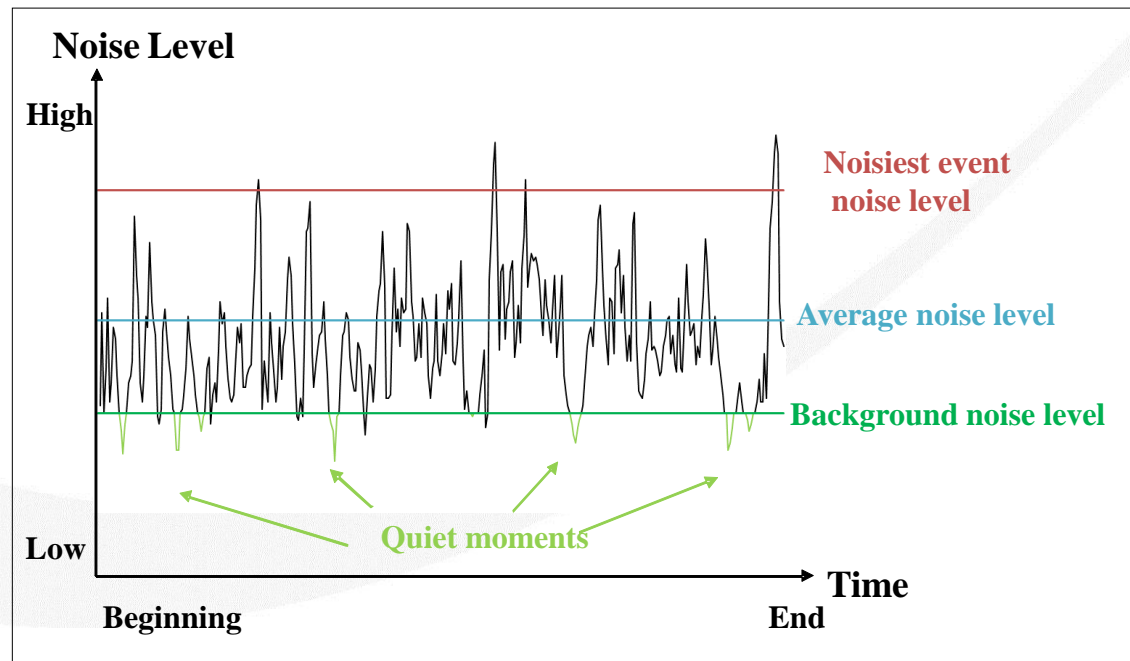
This index is made from four characteristics :

- *Average noise level*
- *Background noise, meaning the noise apart special events*
- *Number and duration of the quiet moments*
- *Noise level of the noisiest events, for example when a plane, a car or a train is passing by.*

Thus:

If the average noise level is low, that there are many quiet moments and the sound level of individual events is low, then the index is good (close to 0) ;

If the average noise level is high, that there are few quiet moments and the sound level of individual events is high, then the index is bad (close to 10).



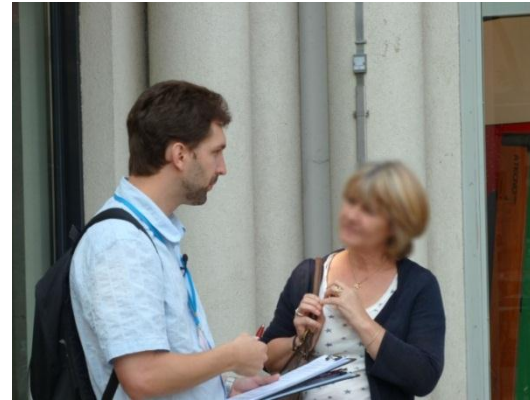
3.2.2. On-site survey

T 1 On-site surveys with inhabitants

8 sites,
240
respondents

- 8 permanent noise measurement terminals Laeq(1s)
- 8 audio recording representative of the atmosphere of the selected sites (Binaural recording) + photo report
- 8 x 30 surveys : 240

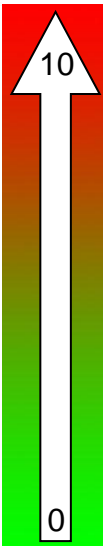
- residents or passers-by on four distinct sites of two areas (Lyon and Paris)
- sex and age pseudo-Gaussian distribution



Protocol

1st : perceived noisiness at home/public space and noise annoyance (scale from 0 to 10)

2nd : understanding of the indexes and ability to reflect the respondents feeling



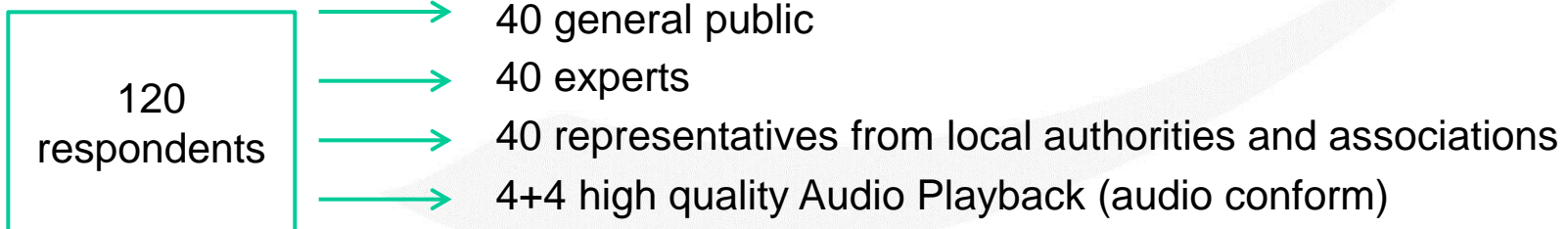
3.2.3. Experimental approach, interviews in laboratory

60 people for each of the two areas (120 people) :

Per territory,

- 20 experts: acousticians, researchers, operating engineers
- 20 elected representatives of the community of citizens,...
- 20 members of the general public, randomly sampled

T 2 Laboratory surveys with three different groups



Protocol

1st : photographs (more neutral possible) & four recordings in a random order
-> assess the perceived noisiness and potential annoyance (scale of 0 to 10)



2nd : understanding of the indexes and ability to reflect the respondents feeling

4. MAIN RESULTS

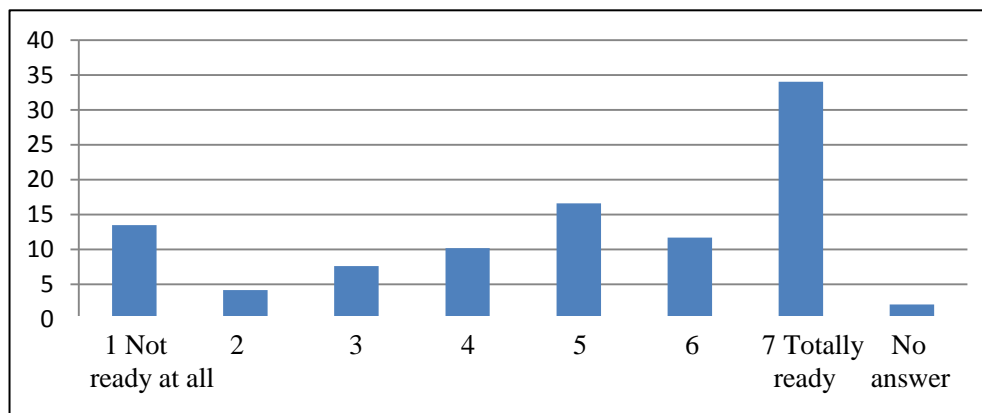
4.1. Telephone survey

- In your opinion, what are the methods used by experts to evaluate the noise?

Measurement or recording	70.7 %
Surveys (questionnaires, interviews, statistical analysis)	3.0 %
Calculation (topographic data, traffic data)	1.1 %
(Do not know)	8.7 %
Measure the average noise level ?	36.3 %
Measure the number of noise peaks ?	23.6 %
Measure the exposure time to a certain level of noise ?	31.3 %

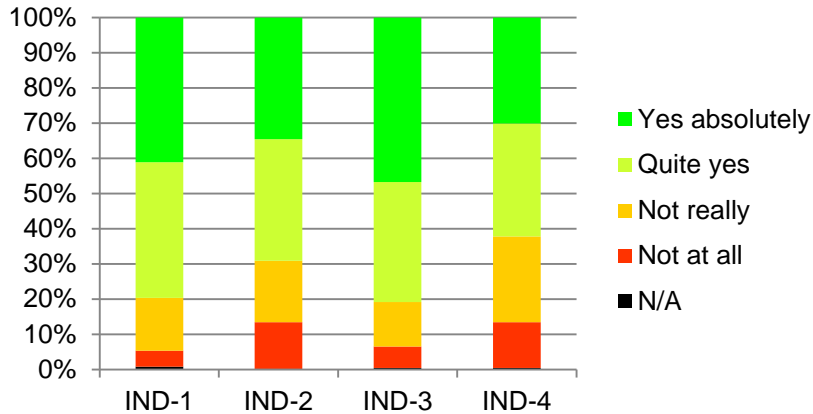
- To the question "*would you like more information about the acoustic environment of your home*" **26% of respondents** expressed an expectation in terms of information.
- Who do you trust the most to inform you about the sound environment?

The State	3.1 %
Administrative areas or departments	3.2 %
Local council, local authorities	11.4 %
Private organisations specialized on noise	5.7 %
Public organizations (associations) specialized on noise	13.5 %

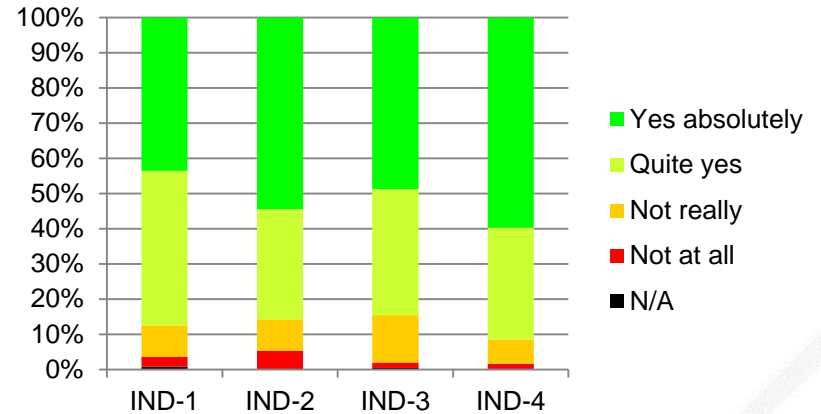


4.2. On-site survey (n=246)

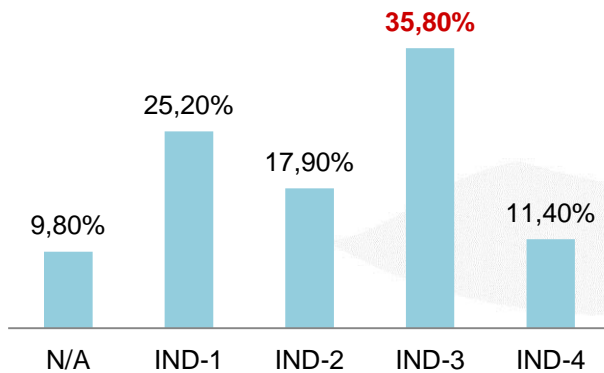
- Understanding of the indexes



- Ability to reflect the respondents feeling

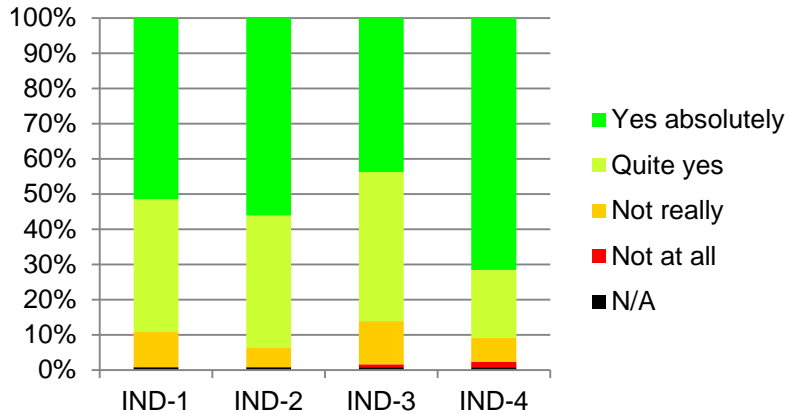


- Favourite index (n = 246)

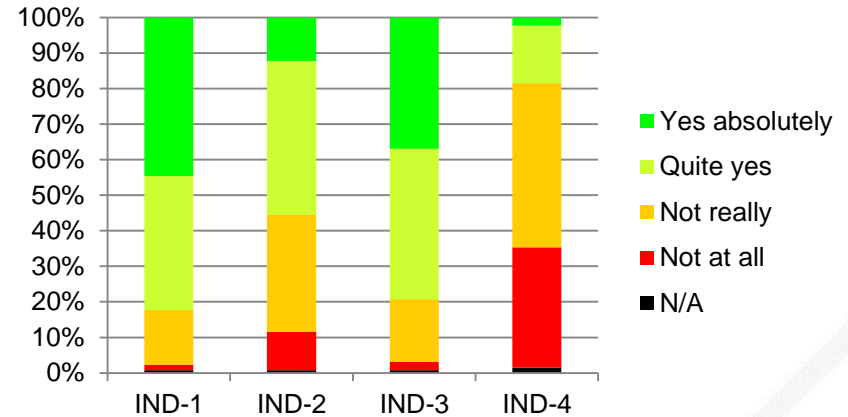


4.3. Experimental approach (n=130)

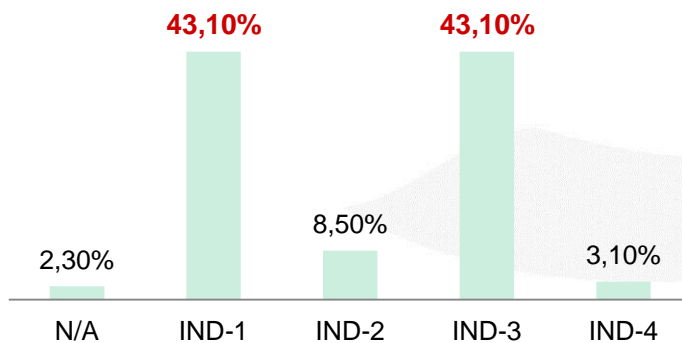
- Understanding of the indexes



- Ability to reflect the respondents feeling



- Favourite index



CONCLUSION

- The results of the three methods (telephone survey, on-site survey and experimental approach) provide **complementary** and **coherent knowledgeable elements**.
- public's expectations in terms of information is **high** (it affects about 50% of people sensitive to noise in their homes, or about 15% of the total population).
- important role to play for **local authorities** and **independent organisations**
- very **high expectation** for indexes that would better reflect **temporal variations**