Chapter 1

INPUT DATA PROVIDED BY THE NETHERLANDS

Input data provided by national experts from the Netherlands for the assessment of lead pollution levels are overviewed in this chapter. In particular, emission and monitoring data involved into the assessment is described. Information about preparation of other input information needed for the assessment as well as brief description of the model, is available in Annex A.

1.1. Emission data of lead in the Netherlands

Trends in Pb

Lead (Pb) emissions in the Netherlands decreased by 315 Mg in the 1990-2012 period, corresponding with 95% of the national total in 1990 (Fig. 1.1). This decrease is attributable to the transport sector, where, due to the removal of Pb from gasoline, the Pb emissions collapsed. The remaining sources in 2007 are industrial process emissions, in particular from the iron and steel industry [*Jimmink et al*., 2014].

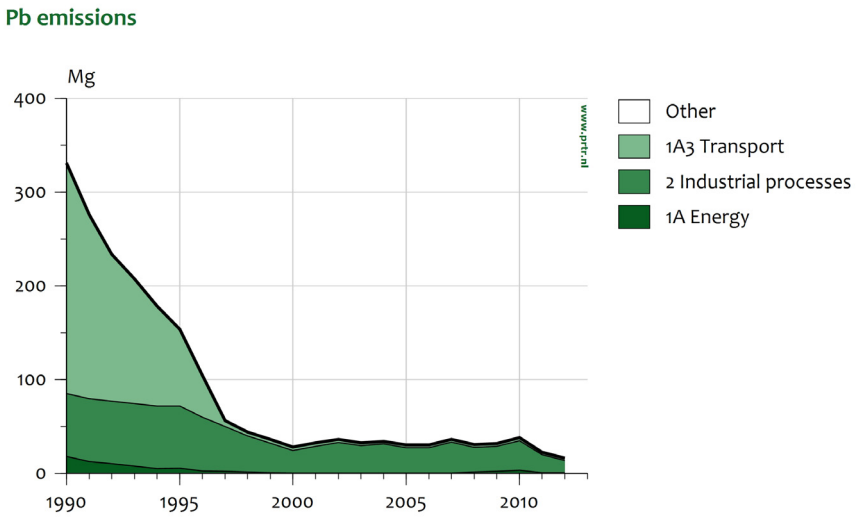

Fig. 1.1. *Lead emission trend per sector in the Netherlands, 1990-2012.*

Experts from the Netherlands provided information on 2007 emissions from 22 source categories. However, five source categories with the highest emissions contribute more than 90% to national total emission. Therefore, for modelling purposes emission source categories were summarized in 6 groups (Table 1.1).

Table 1.1. *Emission source categories of lead in 2007 and their groups, as used in the model assessment for the Netherlands*

NFR code	Source category	% of total	Group of emission source categories and its fraction of total
2C1	Iron and steel production	64.51	Iron and steel production (64.51%)
1A3biii	Road transport: Heavy duty vehicles	0.0001	Transport (except for aviation) (14.94%)
1A3dii	National navigation (Shipping)	0.0001	
1A3bii	Road transport: Light duty vehicles	0.0005	
1A3biv	Road transport: Mopeds & motorcycles	0.003	
1A3bi	Road transport: Passenger cars	0.077	
1A3di(i)	International inland waterways	0.22	
1A3c	Railways	0.60	
1A3bvi	Road transport: Automobile tire and brake wear	14.03	
2C5e	Other metal production	1.47	Industrial processes (9.13%)
2B5a	Other chemical industry	3.75	
2A7d	Other mineral products	3.91	
1A4ai	Commercial / institutional: Stationary	0.022	Small combustion installations (5.59 %)
1A4bi	Residential: Stationary plants	5.57	
1A3ai(i)	International aviation (LTO)	0.15	Aviation (5.24%)
1A3aii(i)	Civil aviation (Domestic, LTO)	5.09	
1A2e	Stationary combustion in manufacturing industries and construction: Food processing, beverages and tobacco	0.001	Remaining categories (0.58%)
1A2fi	Stationary combustion in manufacturing industries and construction: Other	0.003	
1A1b	Petroleum refining	0.072	
1A1a	Public electricity and heat production	0.076	
7A	Other (included in national total for entire territory)	0.18	
6Cc	Municipal waste incineration	0.25	

The first group includes only one category 2C1 '*Iron and steel production*', which is responsible for more than 60% of national total emission in the year 2007. Transport emissions were divided into two groups: '*Transport'* (except aviation) and proper '*Aviation*'. The reason to pick out aviation as individual group is explained by its considerable contribution to national total emission and due to its specific spatial distribution. Unlike other transport categories, distributed over the entire country, emission from aviation (landing and take-off) is concentrated in several gridcells with where airports are located. Two other considerable groups are '*Industrial processes*' and emissions from '*Small combustion installations*'. All other categories are grouped in '*Remaining categories*' which contribution is around 0.6% of national total emission.

Contribution of different groups of emission source categories varies largely among the provinces (Fig. 2.1). Contribution of the "*Iron and Steel Production*" is the highest in Noord-Holland (95% of total emission in the province), while in the other provinces the contribution is relatively small or even negligible (Fig. 1.2). Contribution of "*Transport*" group is considerable in almost all provinces. In Overijssel and Utrecht its contributions are 67% and 78%, respectively, and in Friesland, Gelderlnd, Noord-Brabant and Zuid-Holland the contribution exceeds or almost reaches 50%. Southern part of the country is characterized by the most significant contribution of emissions from "*Industrial processes*" group. In Zuid-Holland the contribution reaches 75%, and in Limburg – 60%. The highest contribution of "*Aviation*" is noted in the northern part of the country: 65% in Drente, and 70% in Flevoland provinces. The highest contribution from "*Small combustion installations*" group takes place in Flevoland (33%), followed by Overijssel (31%).

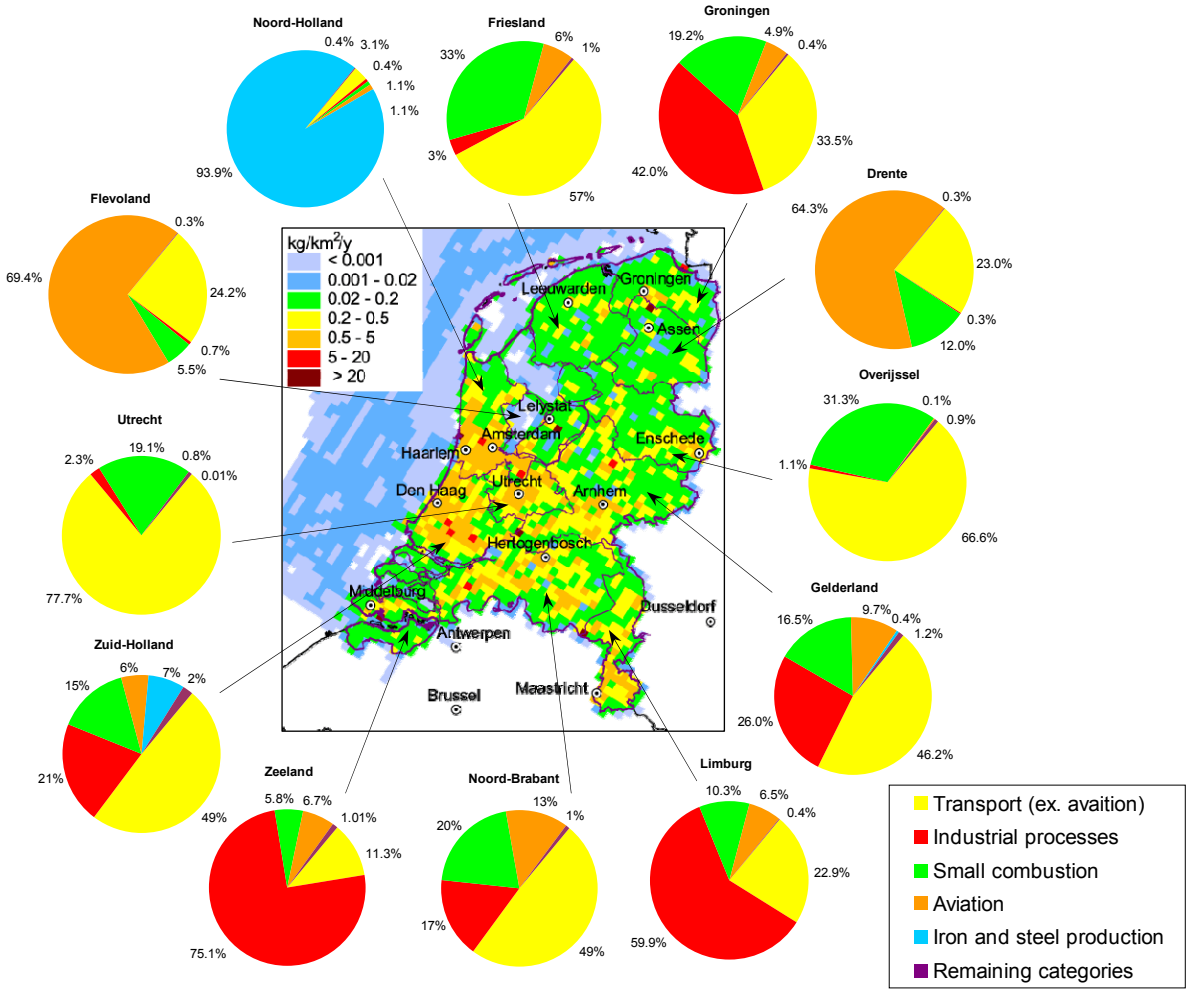

Fig. 1.2. *Emission of lead from national sources (map) and contributions of emission source categories to total anthropogenic emissions in provinces (pie charts)*

1.2. Monitoring data

In 2007, measurements of lead in the air were performed at 4 monitoring stations of the Dutch National Air Quality Monitoring Network. In 2008, a new method to measure metals in ambient air was implemented in the Dutch National Air Quality Monitoring Network. A comparison study between the old and new method showed that the new method yields values for the lead concentration, which are 1.4 times larger than the old method [*Hafkenscheid et al.*, 2010].

Wet deposition measurements of lead are performed at 4 monitoring stations in the Netherlands in 2007. The measurements are performed with wet-only samplers, which were implemented in the Dutch National Air Quality Monitoring Network in January 2006 [*van der Swaluw et al.*, 2010].

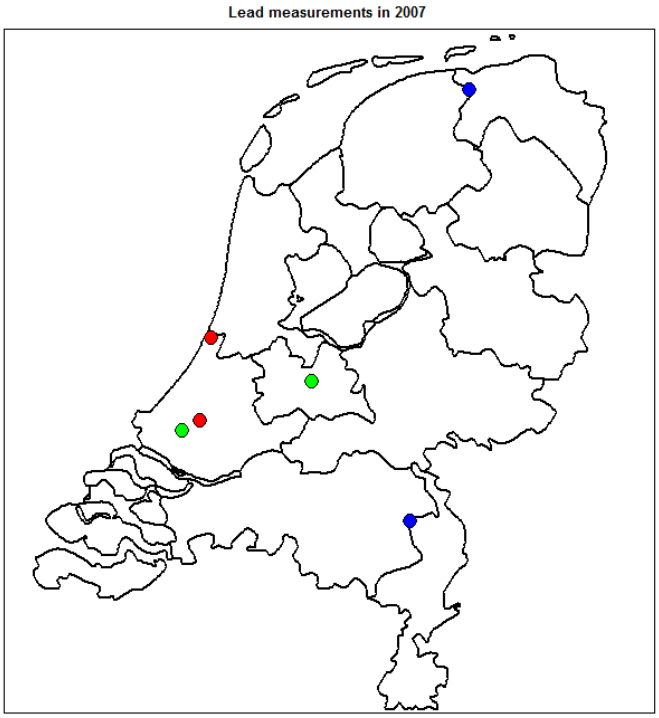

Fig. 1.3. *Monitoring stations in the Netherlands in 2007 for air (green dots), wet deposition (red dots) and stations at which both air& wet deposition are measured (blue dots).*