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► **To cite this version:**

Caroline Petit, Christine Aubry. Road traffic pollution: how should farmers and retailers adapt. Farming Systems Design 2009 an international symposium on Methodologies for Integrated Analysis of Farm Production Systems, Aug 2009, Monterey, United States. hal-01197873

**HAL Id: hal-01197873**

**<https://hal.science/hal-01197873>**

Submitted on 3 Jun 2020

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## ROAD TRAFFIC POLLUTION: HOW SHOULD FARMERS AND RETAILERS ADAPT?

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### INTRODUCTION

Increasing urbanisation worldwide is leading to the extension of road and motorway networks, worsening air pollution (Colvile *et al.*, 2001). The impact of this pollution is frequently studied in terms of the risks to human health related to inhalation (e.g. respiratory diseases). Some studies have considered the risks associated with the consumption of contaminated food products grown next to major roads (Armar-Klemesu, 2000). We investigated this aspect in the Ile-de-France region surrounding Paris. This region is both the largest urban conurbation in France, with a major road network, and a large agricultural area. At least 50 % of the land in this region is cultivated, corresponding to about 600,000 ha, most of which (94%) is under arable crops (IAURIF, 2006). Recent land use policy in the region has been oriented to maintain periurban agriculture, to promote more environmentally friendly farming systems and to support the marketing of agricultural production at regional level. Road traffic generates various airborne pollutants, some of which are deposited alongside roads, constituting a localised chronic pollution problem (Promeyrat-Qotbi, 2001). Farms located close to roads may be affected by these emissions, which may decrease food product quality. The proximity of food crops to roads raises questions about the spatial compatibility of farming and road networks, although there is currently no scientific consensus concerning potential health risks for producers and consumers. However, some actors in agricultural supply chains (co-operatives, large-scale distributors) have tried to limit potential risks by producing technical guidelines, including isolation distances between major roads and fields farmed under contract (Rémy and Aubry, 2008).

### MATERIALS AND METHODS

We analysed these "isolation distances" laid down in technical guidelines and the involvement of actors of the supply chain, retailers and farmers. We used both agricultural science and social science methods to carry out surveys: (i) of supply chain actors - those recommending contracts including an isolation distance from roads, to investigate the functioning of these guidelines and their scientific objectivity; (ii) of farmers in two agricultural zones in the Ile-de-France region (the Versailles and Bière plains), to determine whether they take into account proximity to roads and the associated risks of crop contamination in the spatial organisation of their farms. We hypothesised that safety distances between roads and fields might become generalised to all food supply chains in the future. Then we carried out a cartographic simulation, with ArcGis 9.2 software, of these distances in the zones studied, and discussed possible adaptations with the farmers questioned.

### RESULTS AND DISCUSSION

We found that safety distances in the cereal supply chain were included in technical guidelines to create market opportunities in a context of market segmentation, in the absence of real scientifically demonstrated risks. Some agribusinesses, particularly in the aromatic plants sector, took the same view, including isolation distances in quality contracts with farmers and presenting their position as the application of a precautionary principle. Although only a few farmers in Ile-de-France are working under such contracts, these contracts were found to have a considerable impact on farms, in terms of both technical management and total farm area. We observed that the imposition of isolation distances from farms can change and diversify the spatial distribution of crops and their rotation on farm (map 1). More globally, in the studied zones our cartographic

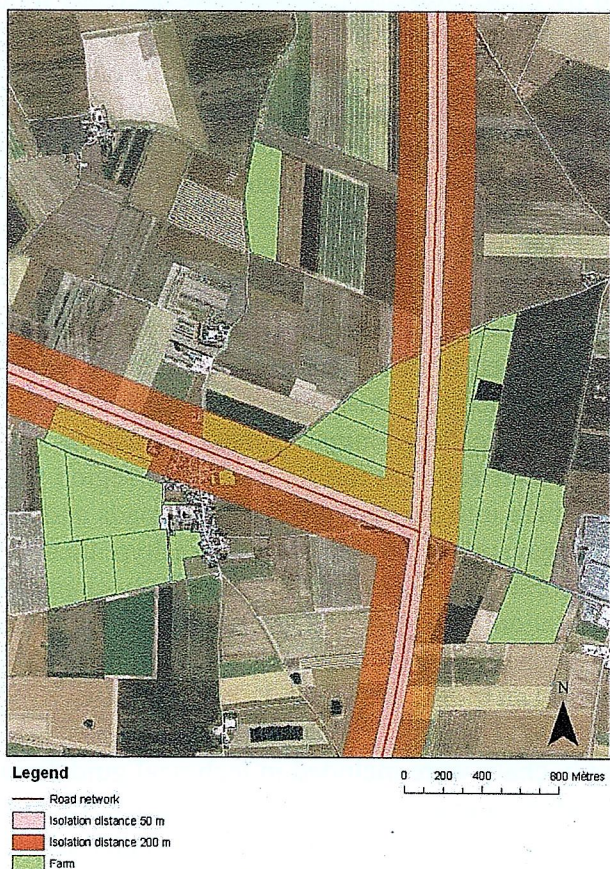


simulation showed that an isolation distance of 250 metres currently used in the cereals supply chains may affect between 10 and 50 % of the farm area under arable crops (map 2). Our study shows there is a gap between scientific knowledge and practices in agribusiness world. There seems to be no consensus in the scientific community about the appropriate isolation distance to be recommended for agricultural spaces adjoining roads. There is little scientific justification for these distances, the application of which would lead to an exclusion of a sizeable area from agricultural use — a particularly difficult issue in a periurban region crossed by a dense network of roads. We conclude that more scientific research is required into the health risks associated with farming close to roads concerning the links between the deposition of pollutants, the transfer of these pollutants into plants and risks for human health.

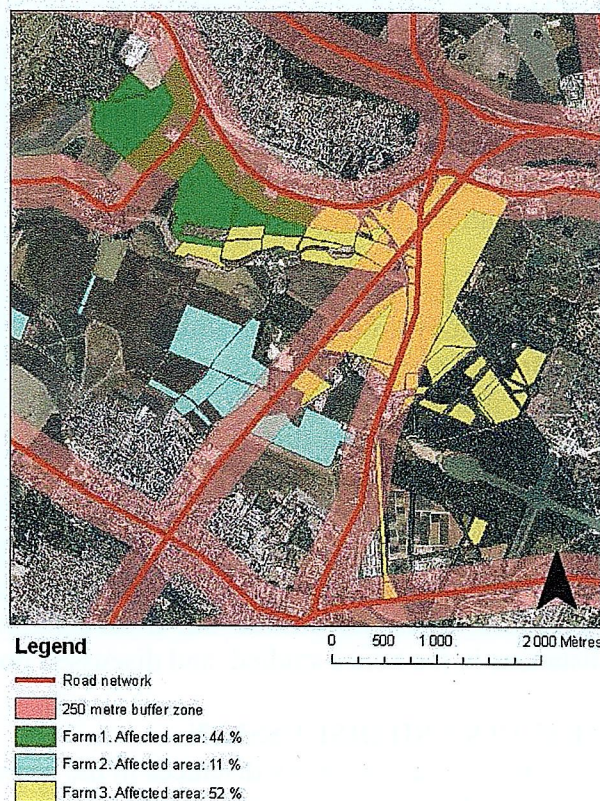
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**FIGURES AND TABLES**



**Map 1 :** Presence of isolation distance on a farm (50 metres and 200 metres)



**Map 2 :** Simulation of a 250 metres buffer zone around the roads in the Versailles plain. The intersection of these two elements is used to calculate the agricultural area included in the buffer zone. This area was calculated as a proportion of total utilisable agricultural area.