Urban soil contamination: managing the risks in food projects

As more and more people grow food in cities, this raises questions regarding risks associated with urban soils contamination. Indeed, urban land has a history, and that history, an impact on soil contamination and human health. Urban does not always mean pollution, and pollution does not always mean health hazards. However, risk analysis needs to be more systematically integrated into urban food policies.

This is why a team of French researchers and institutions published a methodological guide that takes stock of 10 years of research on the topic. The guide highlights a few key points that any urban policy maker should keep in mind when developing an urban agriculture or a gardening policy.

Investigating the past

There are over 300 soil contaminants. Searching for all of them is therefore not an option, as it would be too expensive. This is why any risk analysis should focus on identifying which are the more likely ones.

In order to do so, one has to turn into:

- **The history of the site.** Urban land has experienced centuries of human activities, and contamination is the result of that history. **Industrial or agricultural activities or even gardening: any activity can potentially pollute the land.** Old petrol stations, garages or printing shops are well known sources of pollution, but they are not the only ones. For example, bad quality soil can have been brought to fill in the site, or traces of pesticides, fertilisers or muckspreading can be found in old agricultural land. Even former allotments can be contaminated by poor quality gardening practices. In order to dive into a site's history, one should use any source that is available, from archives to the memory of people who have lived there or used the site in the past… One can also rely on a close examination of the site itself. This, for instance, can reveal if and where waste was burnt there.
- **The urban context:** a site can be impacted by air pollution arising from activities across the city (heating, transportation, industries…). For instance, incinerators can lead to high level of dioxins.
- **Geology itself.** For instance, granitic soils are naturally different, regardless of human activities.

Sending the soil to the lab

To analyse the soil, it is necessary to take samples and send them to the lab. Samples are collected to account for the site's history (the potentially most polluted areas) and for its future potential uses (areas where you

want to grow food, for instance). The analysis should search for common indicators of human activity, complemented with whichever pollutant the history of the site, and its context, point to.

Once you know how much pollutants there is in the soil, you can then compare this concentration with that of nearby agricultural land. In some countries, public authorities establish thresholds that should not be exceeded. There are no common thresholds at the international level, though.

Making sense of the results

Assessing how much pollution there is in a given soil sample is straightforward enough. However, it is more complicated to interpret these results as far as health-related implications are concerned. Indeed, these impacts will not only depend on the pollutant's concentration, but also on its toxicity, the way people are exposed to it, and the characteristics of these people.

For instance, people can be exposed to pollutants in multiple ways:

- Eating fruit and vegetable produced on site.
- Eating small amounts of the soil itself. A gardener can swallow up to 480mg of soil per day. And kids are particularly exposed as they often put their fingers in their mouth.
- Breathing dust and gas coming from the soil.
- Touching the soil.

It is therefore not easy to deduct the exact amount of pollutants people will be exposed to from the sole data regarding their concentration in the soil. Research still needs to advance on that.

As a consequence, as analysis often relies on the total amount of concentration that was measured, it can over-estimate the risk.

Managing the risk entails adapting uses to the quality of the soil

Only relying on the analysis of soil contamination is therefore not enough for risk management. The results of the analysis should rather be considered a good basis upon which a democratic dialogue can take place in order to reach a decision.

If the site is highly polluted, then it is better not to grow food. But when results are more mixed, the question will be: **are the risks associated with the pollution counterbalancing the many benefits of urban food growing?** As all sites are different, no generic answer can be given. Choices can also be discussed with the gardeners themselves as they are the ones that will eventually put in practice whatever advice public authorities will give them.

Policy makers can mitigate for health-related risks while taping into social benefits. They can do so through practices such as scraping the soil or replacing the contaminated soil with good one, or by giving advice as to what plants should or should not be cultivated. This, of course, is only effective if such practices and advice are closely implemented and actually followed.

Policy officers should also keep in mind that food growing is only one option for the use of permeable land in a sustainable city. If food is not relevant, then urban land has many other services to offer, from storing carbon to preserving biodiversity, to regulating temperature and water flows…

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