

Monitoring of PFAS in edible crops of a highly contaminated area

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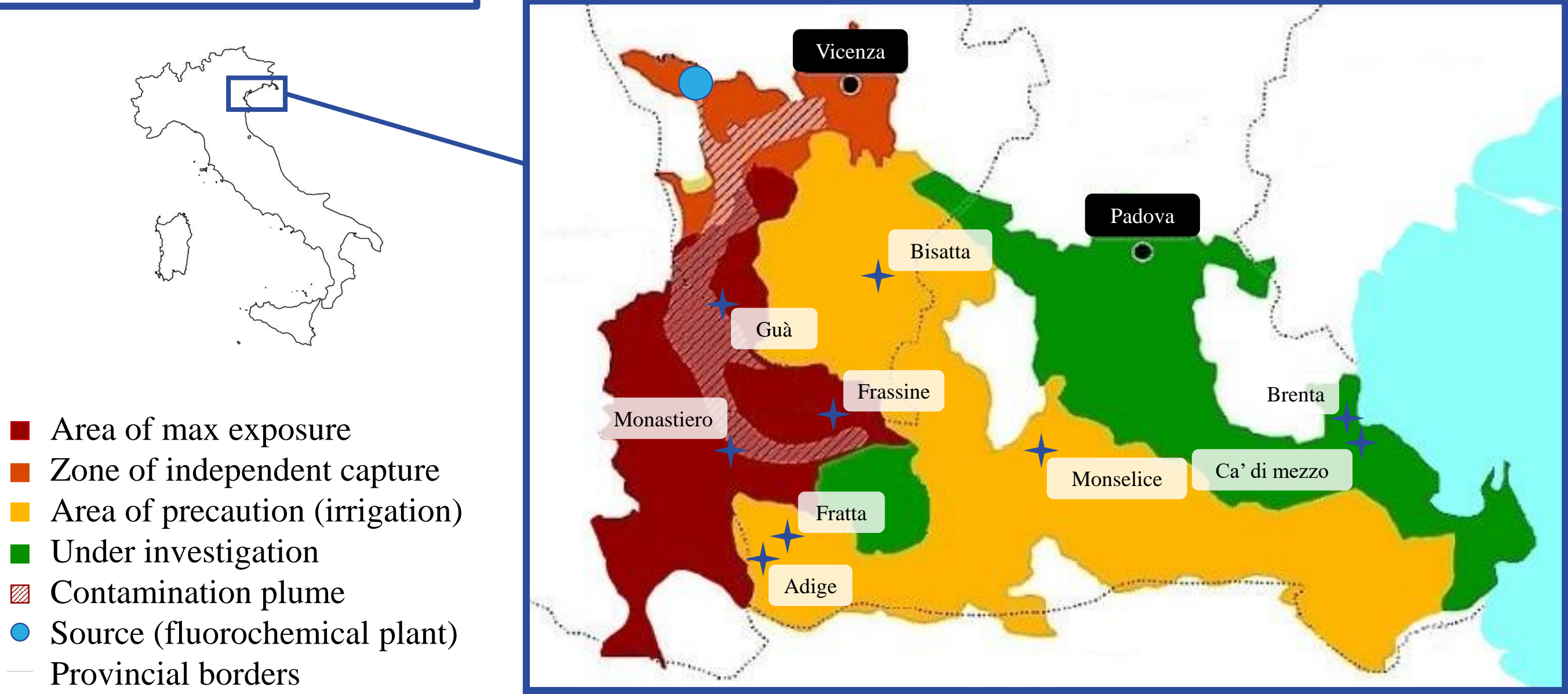
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Environmental Monitoring planned for Life Phoenix project

In 2013, large-scale contamination with PFAAs was discovered in Veneto region, northern Italy, as a consequence of the emissions from a fluorochemical plant (Miteni company) in the province of Vicenza (Valsecchi et al., 2015; WHO, 2017). Nowadays the total catchment area involves three Provinces (Vicenza, Padova and Verona) with a total area of about 540 km² and 350,000 inhabitants, but the total estimated involved area is wider (930 km²). Veneto region matched the results of the biomonitoring study to those of chemical analyses in order to define 3 areas with different health impacts (Red, yellow and Green). Even though elevated serum PFAAs concentrations were detected in the residents of the contaminated areas in Veneto, connected with contaminated drinking water consumption (Ingelido et al., 2018), comprehensive health risk assessment and research considering the food consumption are still lacking. For that reason, the LIFE project envisages an extensive monitoring program to assess the distribution of PFAS in different environmental matrices (water, soil, plants) in agriculture areas in the three areas. These sites are all characterized by the presence of a water body and enough soil to characterise the area of plants growth, moreover the selected stations are all featured by the presence of one ubiquitous aquatic vegetal species (*Phragmites australis*) and edible vegetables (*Zea mais*, *Lactuca sativa*, *Cichorium intybus*, *Allium cepa*). Water, soil and biological samples have been collected in 10 areas, including uncompromised site. The monitoring activity started in May 2018 and will last in March 2021. On the selected sampling sites surface and ground-waters, vegetables (3 different periods of the irrigation season for 24 months), soil and animals (3 periods every 12 months) will be analysed.

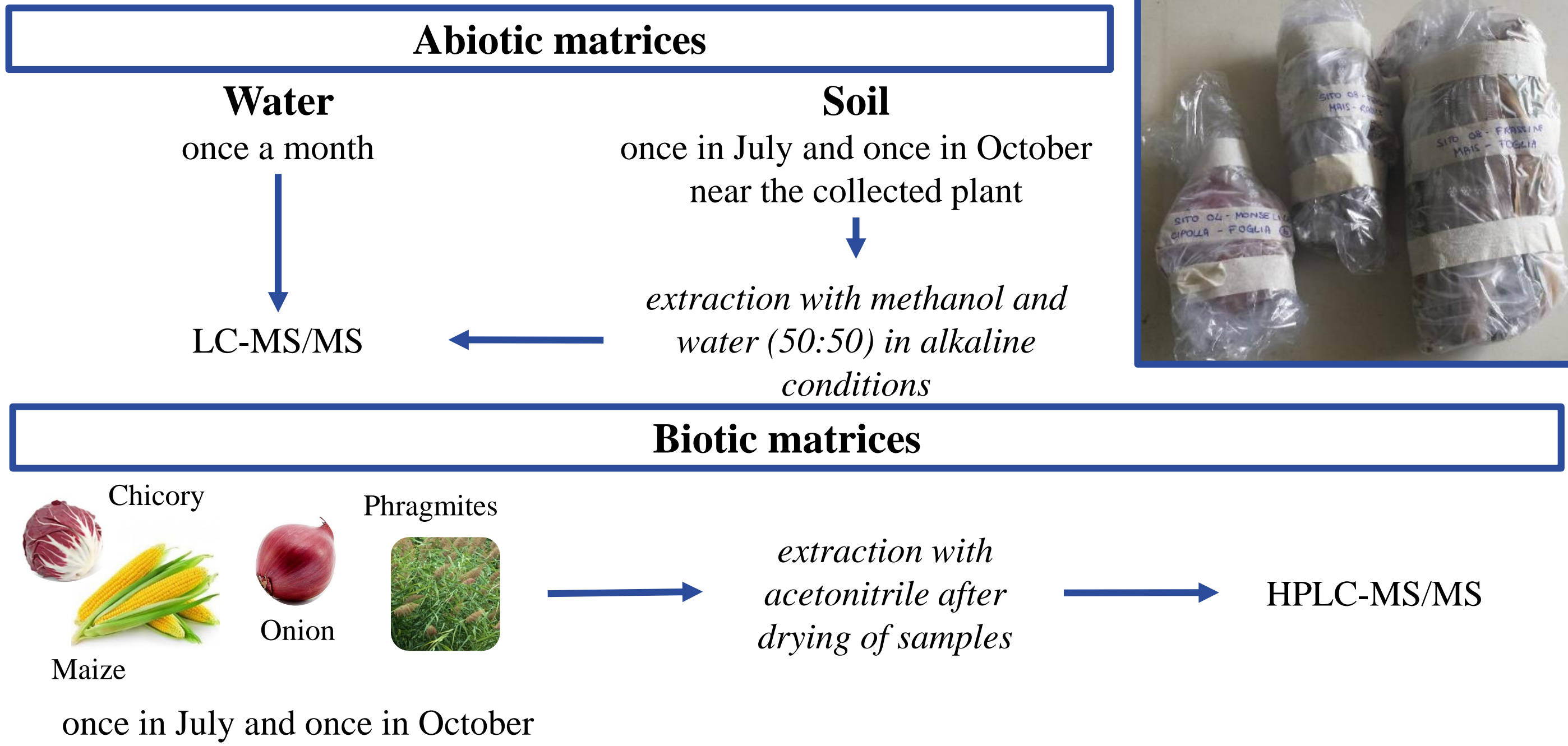
Sampling Area

Veneto region, Northern Italy

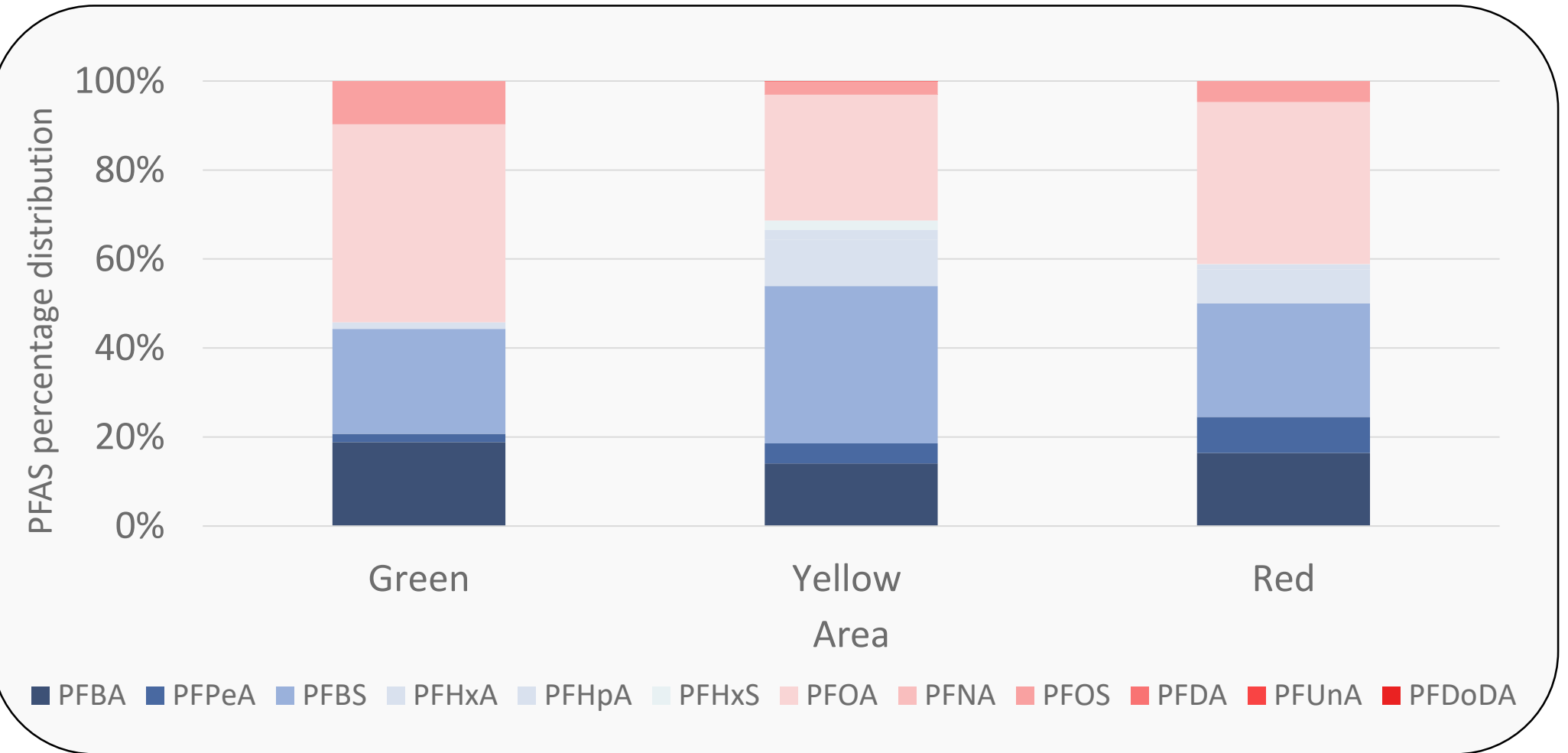
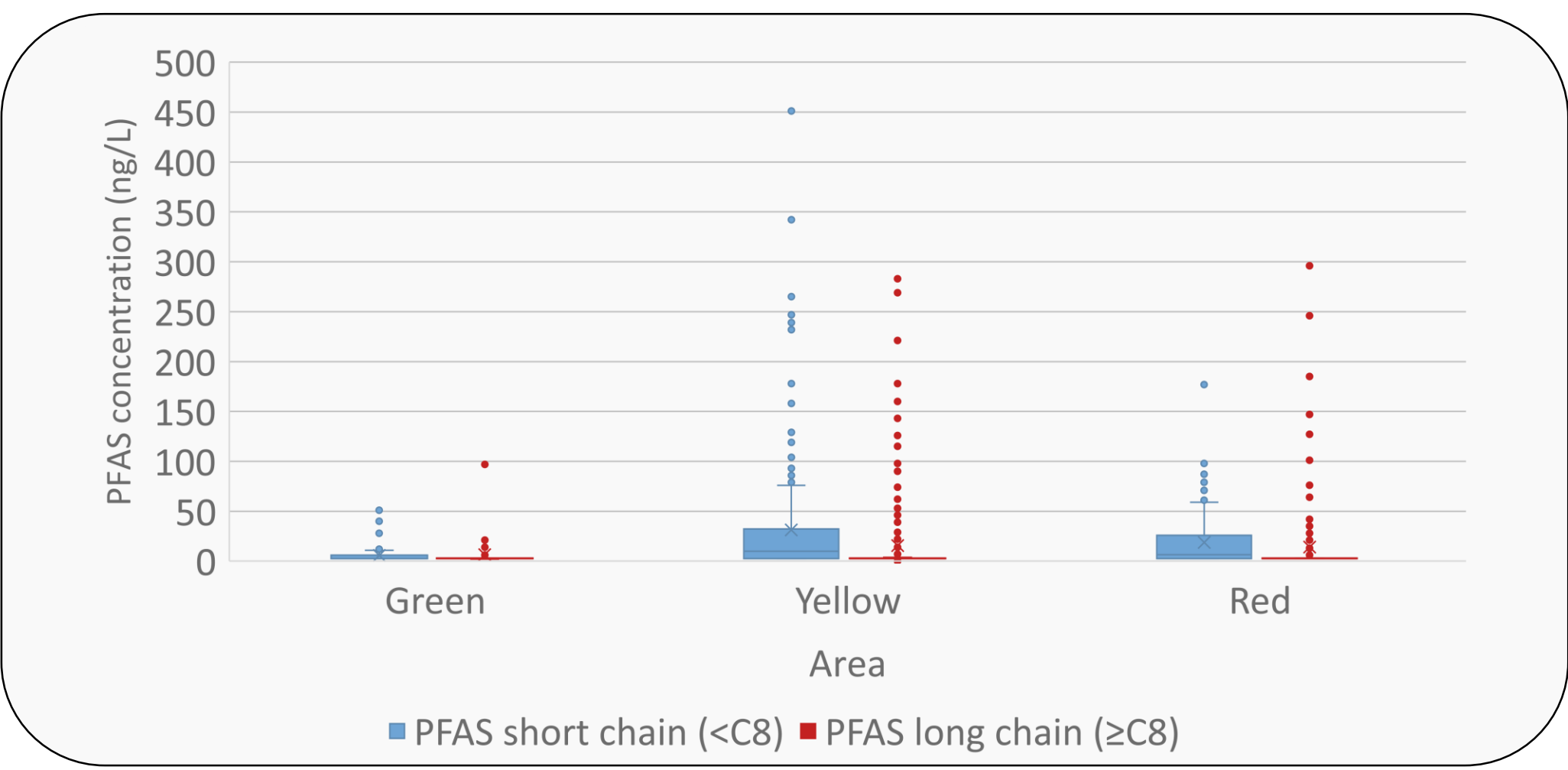


Sampling Activity

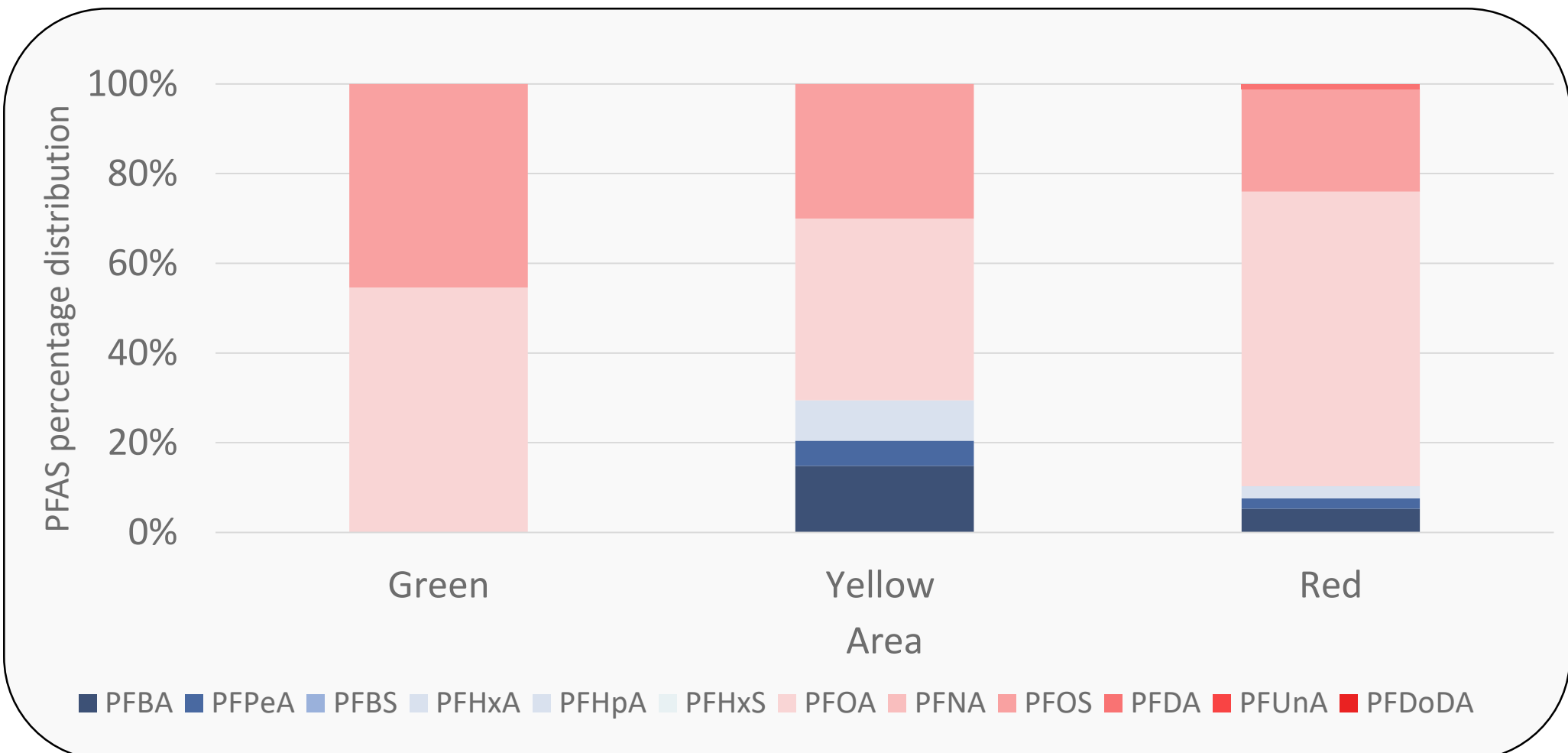
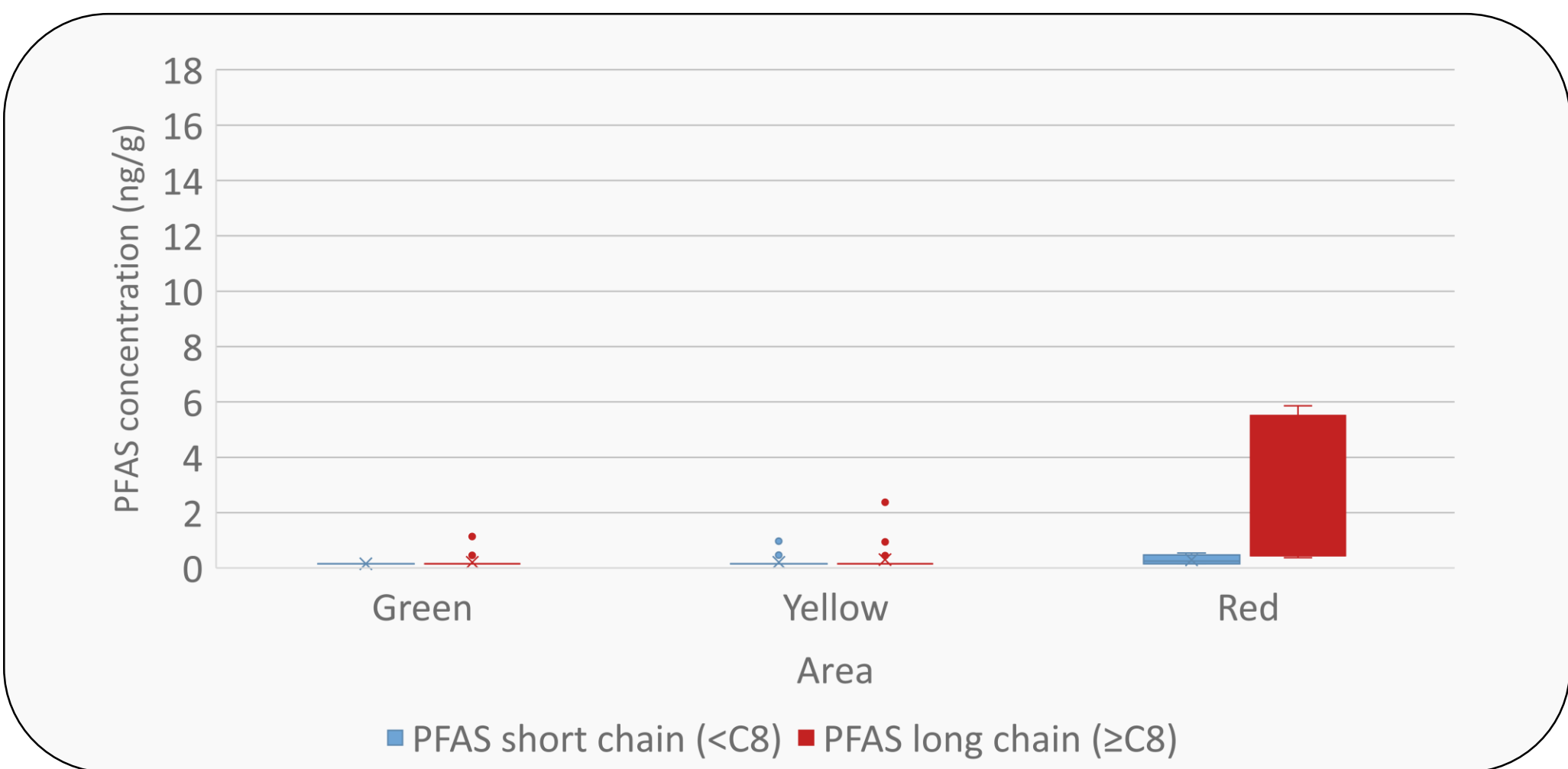
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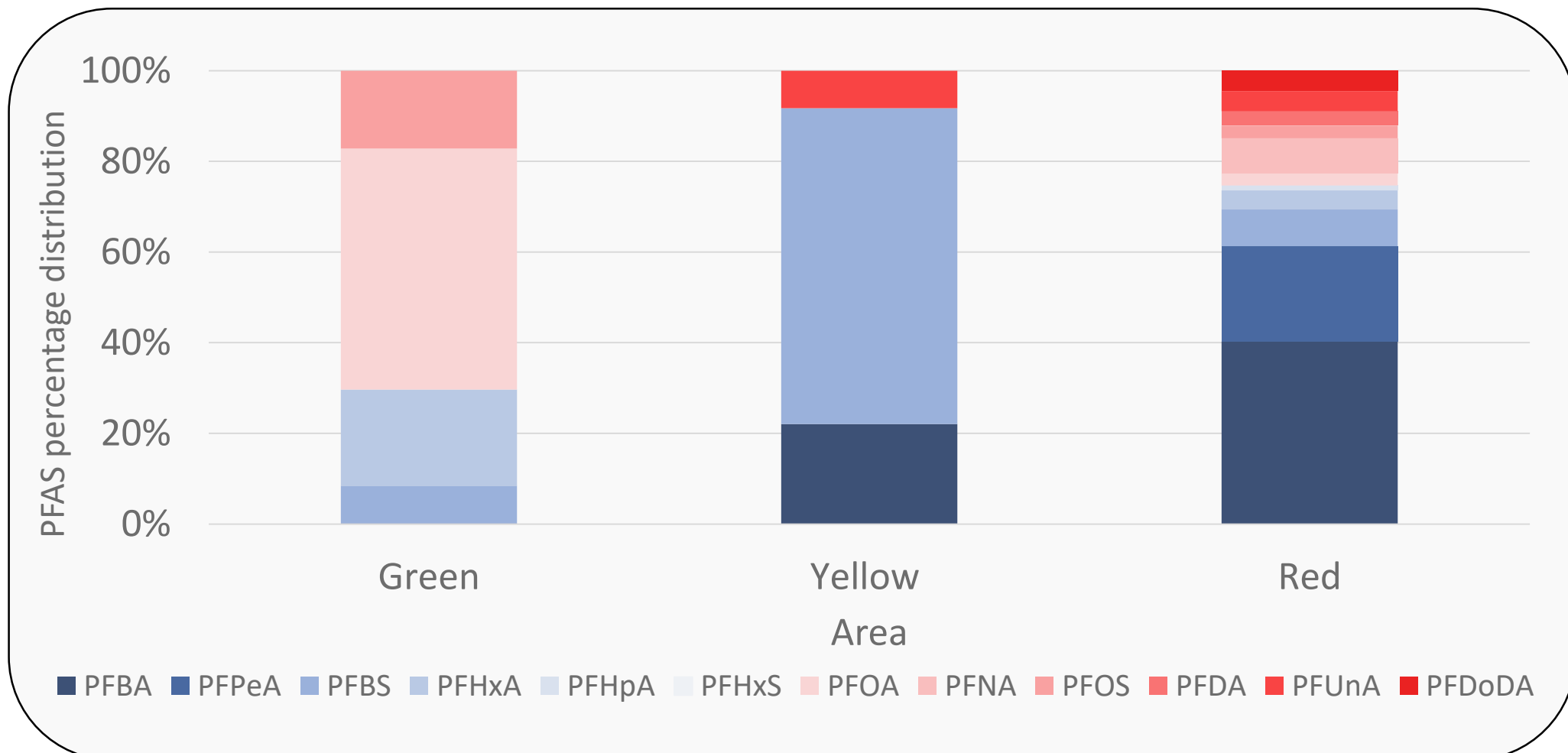
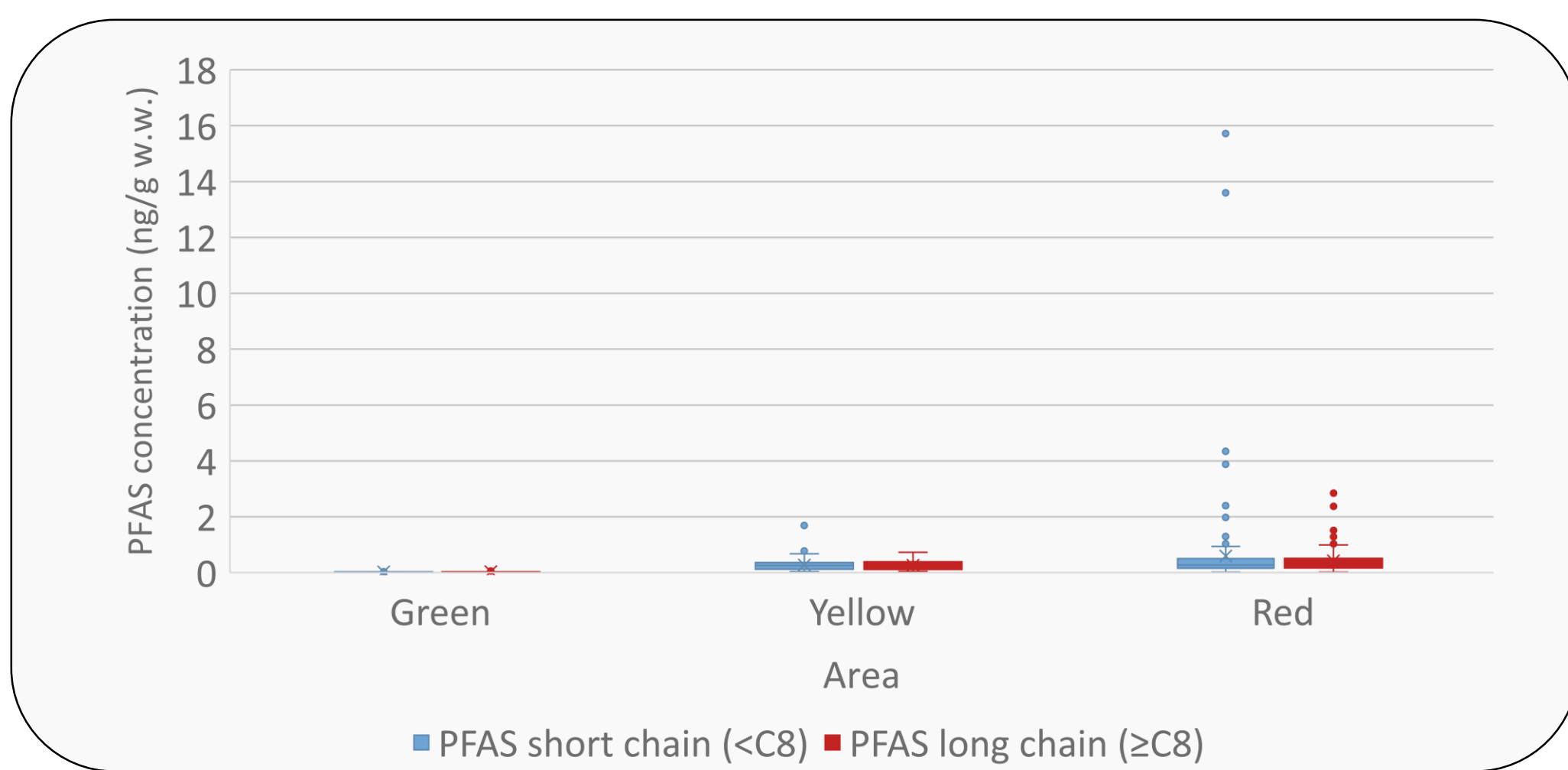
PFAS in Water



PFAS in Soil



PFAS in Plants



Conclusions

- Data presented in this poster are only partial because the monitoring program will last the next year.
- Preliminary data show that PFAS concentrations in irrigation water do not exactly match with the exposure levels of the population, because both surface and groundwaters are used for irrigation in these areas
- Nevertheless soil contamination more reflects the exposure areas, but in soil long chain PFAS prevail
- Plants, both aquatic and edible plants are not significantly impacted by the PFAS contamination, even if plants from red area present a larger number of positive results, especially for the aquatic species fragmites, which are directly exposed to the contaminated waters.
- Positive findings in edible vegetables are very few and connected risks for population are very limited.

References

- Ingelido, A.M., et al, 2018. Biomonitoring of per fluorinated compounds in adults exposed to contaminated drinking water in the Veneto Region, Italy. Environ. Int. 110, 149–159.
- Valsecchi, S., et al., (2015) Occurrence and sources of perfluoroalkyl acids in Italian river basins, Chemosphere, 129, 126-134.
- WHO, Keeping our water clean: the case of water contamination in the Veneto Region, Italy, ISBN 978 92 890 5246 7 © World Health Organization 2017.