
THE
PLASTICS
IN OUR
SOIL

Author: **Timothy Alden**

Agricultural plastic waste is an often-overlooked issue that has a detrimental impact on our environment and puts our health at risk. The microplastics generated from agricultural practices end up in the soil, potentially entering the food chain. While the full impact of microplastics on human health is yet to be uncovered, their pervasiveness and initial indications paint a worrying picture. Understanding and addressing this problem in agriculture is therefore crucial for ensuring the safety and sustainability of our food sources. However, there is a lack of data on the scale of the problem. ***Rainer Borg*** *and* ***Dr Margaret Camilleri Fenech*** *carried out a study in Malta to rectify this locally.*

When Rainer Borg set out to conduct a study on plastic waste in hotels as part of his M.Sc. In Sustainable Development, COVID-19 was raging, and the hospitality industry was largely shuttered. However, with his supervisor, Dr Camilleri Fenech, an opportunity emerged to explore a little-studied but crucial area – plastic waste in agriculture. The use of plastic in agriculture, called 'plasticulture', is relatively unknown as the quantities of plastic waste are assumed to be low enough to avoid notice. However, with growing awareness around microplastics, this area deserves heavy scrutiny. Thus, Borg's research, recently published as an article in the journal *Sustainability*, breaks crucial new ground for Malta.

'Plasticulture is totally ignored on a policy level, and our strategies do not address it,' states Camilleri Fenech. 'As part of Borg's research, Environment and Resources Authority (ERA) was interviewed about the feasibility of a collection and recycling program for plastic waste in agriculture, but ERA stated that the lack of data and perception of low volumes means there is no push for solutions.'

Aside from stakeholder interviews, the study employed waste audits to identify the waste being produced and the quantities involved. The audits included in-depth questions that provided data on a range of issues.

The scale of the problem is in part hidden by different methods of disposal. Burning plastic produces clouds of black smoke rising from fields, accounting for most of the 4–10 reported legal breaches by farmers annually. However, there is little visual evidence left behind when farmers bury their plastic waste. Furthermore, there is also the practice of ploughing plastic directly into the soil, accelerating the process of breaking it down into microplastics.

PLASTICULTURE UNMASKED

By studying the amount of plastic waste related to specific crops, Borg was able to identify which crops were most plastic-intensive. Tomatoes, strawberries, and potatoes exhibit the highest plastic usage among crops. In contrast, olive trees, despite being equally cultivated, have lower plastic requirements. This difference may stem from olive trees' adaptability to the semi-arid climate of the Maltese Islands, which reduces their need for irrigation. Their perennial nature results in less intensive cultivation compared to seasonal crops.

> *There was an encouraging amount of support from farmers for some kind of policy solution. Farmers were willing to acquire knowledge about appropriate methods of waste disposal. The conclusions of the study are quite practical.*

Borg also identified and categorised the most abundant kinds of agricultural plastic waste, finding that irrigation pipes were the most common, followed by plastic mulching, packaging containers, plastic crates, fertiliser bags, and low tunnels. The irrigation pipes were linked to high water consumption on site, creating a clear correlation between the water intensity of any particular crop and the plastic generated. Finally, Borg also analysed farmer behaviour; 38% of the interviewed farmers indicated that they plough plastic into the soil or incinerate their plastic waste.

THE POLICY PROBLEM & OPPORTUNITY

Many farmers interviewed during the study expressed surprise regarding the harmful effects of their waste disposal practices, being unaware of the potential impact of microplastics, for example. While the lack of data presents a fuzzy picture regarding the prevalence of the problem, it is clear that a policy solution should be explored, especially as the prevalence of plastic waste seems to be increasing. Incinerating waste leads to the release of particulate matter, carbon monoxide, sulphur dioxide, and other pollutants. Borg notes that other by-products include heavy metals, dioxins, and furans.

'There was an encouraging amount of support from farmers for some kind of policy solution. Farmers were willing to acquire knowledge about appropriate methods of waste disposal. The conclusions of the study are quite practical,' Camilleri Fenech adds.

Any successful policy must have a decent amount of buy-in from those affected, and Borg's questions addressed potential approaches and attitudes from farmers. Almost 100 respondents expressed willingness to alter their disposal practices, compared to the 39 respondents only considering a change, while 17 outright said that they were not interested in any changes at all. When inquiring into the barriers farmers encounter to properly dispose of their waste, most had no problem with properly storing the waste until it might be collected by the government. However, for those farmers without the capacity to store their waste, the importance of a collection scheme was clear. Were the government to provide storage facilities, it would encourage farmers to use a recycling program.

Nonetheless, respondents were not keen on transporting waste to a collection centre, and unsurprisingly, they were not enthusiastic about having to pay a surcharge to fund a recycling program. On the other hand, farmers were more open to a program with a cost component that would reimburse farmers who deliver waste to a collection centre, with more than 100 respondents answering positively.

When asked whether farmers should be incentivised or disincentivised to change their behaviour, Camilleri Fenech indicated that she leans more towards incentives to change farmer behaviour:

'We should give them alternative materials to plastics. Plastic waste collection should also be incentivised, or at least facilitated, so that farmers do not just leave their plastic in the fields. Malta has to build the infrastructure for it, but this problem is prevalent not just in Malta, but throughout Europe. Farms tend to be concentrated in particular geographical areas, and this is the same in Malta. This centralisation should help with the collection of plastics, because resources can be concentrated.'

IN SEARCH OF SOLUTIONS

Establishing a national collection scheme for agricultural plastic waste is no easy task. Implementing one would require a careful touch that does not further erode the competitiveness of Malta's farming economy, which as the study itself highlights, is under threat, not least due to farmers ageing without enough young farmers to replace them.

Nonetheless, ignoring the problem is not a wise option, regarding the potential threat of microplastics to human health. Camilleri Fenech thinks that finding a solution holds a lot of promise. In the study, it is noted that in countries where national collection schemes have been introduced, collection rates tend to rise by about 75%.

What might be next in the pursuit of awareness of plasticulture? Camilleri Fenech answers, 'Given the funding, I would like to do a documentary. It could cover the available data – there are studies by European universities. With increased awareness, we can get a push to collect further data. At the moment, a huge policy void is waiting to be filled.'

If Malta's policy documents and strategies begin to address the problem and data is collected, then perhaps Malta may serve as a case study for success in dealing with agricultural plastic waste.

Products that generate the most plastic waste

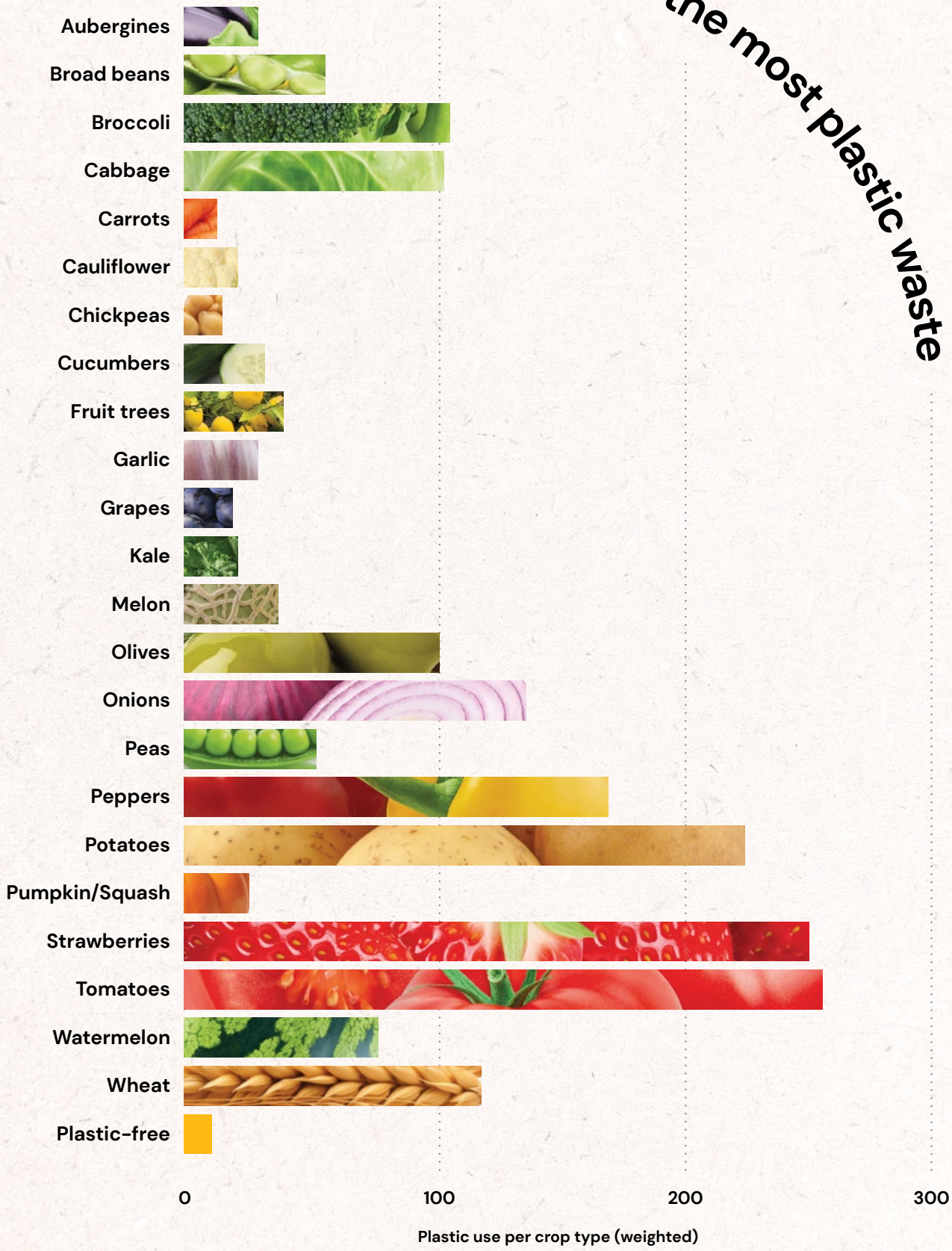

Illustration adapted for **THINK** *Magazine from Borg (2024)*