

## **Written evidence submitted by Bio-based and Biodegradable Industries Association (SH0015)**

January 20<sup>th</sup> 2023

### **About the BBIA**

The BBIA represents UK and non UK manufacturers, developers and distributors of products, chemicals and materials that have a common identity in their sourcing (partially or totally bio-based which means derived from plant-based, renewable sources) and in their end-of-waste performance (biodegradable or compostable in various environments which could be natural – in the case of bio lubricants, in soil in the case of soil mulch films - or in industrial composting, in the case of packaging).

The BBIA was established by seven founder members in June 2015 and in 2023 comprises 35 companies which produce: biopolymers for onward conversion into products; building blocks for the chemical industry from bio-based sources that may be used in pharma, cosmetics, paints and coatings, as well as lubricants, packaging, pesticides; members also distribute and sell products in the UK market; and include associations, consultants and the Scottish IBIOIC. BBIA members represent most of the value chain in the production, conversion and treatment of compostable packaging materials and soil biodegradable materials for use in agriculture.

More details about the BBIA can be found on [www.bbia.org.uk](http://www.bbia.org.uk) including reports and research<sup>1</sup> undertaken on compostable packaging, bioplastics, biodegradability and bio-based feedstocks.

We are pleased to be able to respond to the EFRA Committee consultation on soil health and are available to provide further evidence should this be required.

David Newman  
Managing Director

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<sup>1</sup> BBIA has also been a partner in 2 EU financed research projects: under the Horizon 2020 grant for the Res Urbis project which researched into producing compostable materials using food waste as a feedstock, ending in December 2019; and in the BBI JU funding grant for Usable Packaging, a research project that began in June 2019 which ended in 2022 researching into producing compostable materials from industrial food waste such as from bakeries, wineries, pasta producers.

## **Avoidable plastic pollution to soil in the UK**

### **Introduction**

Plastic pollution to soil is an issue that increasingly has come to the attention of researchers, policy makers and citizens, as this is also a channel of plastic pollution entering our water systems. It is well known that soil pollution is equally important as water pollution. As researchers develop their knowledge of sources of plastic pollution, the debate over the impacts of poorly managed plastic waste has long gone beyond packaging and has now entered the realm of soil and food quality. Researchers are finding that soils are as contaminated as water courses with plastic fragments and that plastics enter our crops through root systems. In this context in 2021 the United Nations FAO delivered a long-awaited report on the pollution caused by agricultural plastics<sup>2</sup> to which we will refer in this document.

Our focus is on the pollution of soils with plastics and materials delivered through waste management systems.

This short paper lays out the issues and proposes solutions using already existing alternatives and systems that can avoid some of this contamination.

There are avoidable and currently unavoidable sources of plastic pollution to soils.

### **Currently difficult to avoid**

From to a study released in 2020 by DEFRA<sup>3</sup> we already know that microplastics from the wear and tear of tyres are entering our water courses. A 2022 report from Suez<sup>4</sup> shows that some 63,000 tons of microplastics are estimated to leak into the environment from tyres. Whilst the focus on both reports is on water courses, it is clear that pollution passes across and is deposited on soil too, especially near roads.

To avoid such pollution, a redesign of tyres is required. In many EU countries, national EPR systems for tyres operate to avoid dumping in the environment.<sup>5</sup> Such a policy would be intelligent here too.

### **Avoidable**

A 2017 research from the CEH<sup>6</sup> illustrates that plastic and microplastic contamination of soils is likely to be as great if not greater in volumes than plastics entering water courses. A BBC report published in 2023<sup>7</sup> illustrates this again and lays down how microplastics are entering our food systems through soil upon which sewage sludge has been spread. As sewage sludge contains notable quantities of microplastics (from for example, waste water from washing machines), concerns now arise among

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<sup>2</sup> <https://www.fao.org/3/cb7856en/cb7856en.pdf>

<sup>3</sup> <https://www.gov.uk/government/news/tyre-particles-are-contaminating-our-rivers-and-ocean-study-says>

<sup>4</sup> <https://www.mrw.co.uk/news/suez-warns-tyre-wear-contributing-to-microplastic-pollution-06-04-2021/>

<sup>5</sup>

[https://www.researchgate.net/publication/332477930\\_Extended\\_producer\\_responsibility\\_for\\_waste\\_tyres\\_in\\_the\\_EU\\_Lessons\\_learnt\\_from\\_three\\_case\\_studies\\_-\\_Belgium\\_Italy\\_and\\_the\\_Netherlands](https://www.researchgate.net/publication/332477930_Extended_producer_responsibility_for_waste_tyres_in_the_EU_Lessons_learnt_from_three_case_studies_-_Belgium_Italy_and_the_Netherlands)

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[https://www.researchgate.net/publication/313358945\\_Microplastics\\_in\\_freshwater\\_and\\_terrestrial\\_environments\\_Evaluating\\_the\\_current\\_understanding\\_to\\_identify\\_the\\_knowledge\\_gaps\\_and\\_future\\_research\\_priorities](https://www.researchgate.net/publication/313358945_Microplastics_in_freshwater_and_terrestrial_environments_Evaluating_the_current_understanding_to_identify_the_knowledge_gaps_and_future_research_priorities)

<sup>7</sup> <https://www.bbc.com/future/article/20230103-how-plastic-is-getting-into-our-food?ocid=ww.social.link.linkedin>

the scientific community that these are no longer simply “contaminants” but are “pollutants” ie with impacts upon human health.

The sources of plastics in soil are multiple but some result from the direct use in farm applications of plastics that (after use) leave fragments. The agricultural sector, due to the substantial use of plastic materials in different applications, has been identified as an important vehicle of plastic pollution. These include soil mulch films; tree guards; clips on vines/fruit trees/bushes; bale wraps. Whilst soil mulch and bale wraps are generally collected after use, when stripped out of soil or when unwrapping bales, they leave fragments that accumulate year after year in the same fields. According to Agriculture Plastic Environment this can be up to 68% by weight<sup>8</sup> and when mulch film is removed from the soil it can remove up to two times its weight in top soil<sup>9</sup>. The same 2021 European Commission report stated there was no evidence that recovered mulch film was being recycled. Tree guards and clips are generally left to nature. They may take years or decades before oxidising and degrading and may leave microplastics residues for long periods. The UNFAO report specifically concentrated upon these and it is highly important the Committee takes this report into consideration among its evidence and echoes its recommendations.

The BBC reported<sup>10</sup> in February 2021, on how soil is polluted<sup>10</sup> with fragments of plastic left after the extraction of some 45,000 ton/annum of plastic soil mulch films used by farmers to protect crops. Confidential industry sources report that around 3000 tonnes of plastic tree guards are used across the UK annually and remain *in situ*, breaking down into microplastics over time.

A second source is derived from spreading to land compost, digestate and as mentioned above, sewage sludge, all used as at least partial substitutes for chemical fertilisers (as they contain considerable plant nutrient value on a readily and/or slow release basis depending on material type and physical form). Composts, separated digestate solids and sewage sludge cake (aka biosolids) also supply substantial amounts of organic matter, which is important for sustaining soil health or restoring its health where soil organic matter has been depleted.

However, the collection of some wastes entering compost and biogas plants (especially food waste) generally contains large volumes of plastics which, when shredded and extracted, leave fragments in the final output, compost or digestate.

We estimate that the equivalent of 150 plastic<sup>11</sup> carrier bags per tonne of compost/digestate could be spread to soil in the UK based upon current permitted maximum contamination levels under PAS100 (for compost) and PAS110 (for digestate). Annually, at least 2.9 MT compost is produced, 70 % of which is used in agriculture and field-scale horticulture, while the 7.5 MT of digestates are almost all used in agriculture. The EA is working with industry to revise the Compost Quality Protocol and AD Quality Protocol and has indicated changes including tightening of limits they set on maximum allowable plastic content in composts and digestates, which should be supported by the Committee<sup>12</sup>.

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<sup>8</sup> <https://environment.ec.europa.eu/system/files/2021-09/Agricultural%20Plastics%20Final%20Report.pdf>  
(reference 48 p32)

<sup>9</sup> <https://environment.ec.europa.eu/system/files/2021-09/Agricultural%20Plastics%20Final%20Report.pdf>  
(figure 2-9 p22)

<sup>10</sup> <https://www.bbc.co.uk/future/ bespoke/ follow-the-food/ why-foods-plastic-problem-is-bigger-than-we-realise.html>

<sup>11</sup> [https://www.gov.uk/government/publications/waste-quality-protocols-review/waste-quality-protocols-review?ct=t\(EMAIL\\_CAMPAIGN\\_4\\_2\\_2020\\_12\\_15\\_QP\)](https://www.gov.uk/government/publications/waste-quality-protocols-review/waste-quality-protocols-review?ct=t(EMAIL_CAMPAIGN_4_2_2020_12_15_QP))

<sup>12</sup> <https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities/3-bespoke-wastes-suitable-for-biological-treatment>

The Committee should also have concerns with the Government's current favoured output for food waste recycling, whole digestate from biogas plants; however it is applied it has been shown by WRAP in the DC Agri studies<sup>13</sup> and more recently by a 2020 study<sup>14</sup> sponsored by DEFRA, the Scottish and Welsh Governments, WRAP, WRAP Cymru, ZWS to result in long-term harm to soil life. Specifically, this includes increased earthworm mortality. Earthworms are a key indicator of soil health, and essential for the production of topsoil. In addition to the UK work on earthworms, a 2019 study<sup>15</sup> from Holland showed how the slit injection of manures led to soil desiccation. In turn, this negatively affected the earthworm population and as a consequence the local avian population and biodiversity suffered as a consequence of having less food available.

All of these studies used 'low emission spreading techniques'. So the issue is not the spreading methodology, the issue is whether to allow the spreading of digestates. We believe this needs to be urgently reviewed. In addition to creating detrimental impacts on soil and local biodiversity, the same three studies also all indicated that the spreading of whole, food waste derived digestates leads to soil compaction.

Such an activity is banned in several EU countries where whole digestate from food waste has to be composted, along with garden waste, prior to spreading to soil. This avoids the negative environmental outcomes listed above. Alternatively the treatment of food waste in dry AD installations (rather than wet AD present in the UK) has similar positive impacts upon the outputs. Neither practice is widespread in the UK and we now have a window of opportunity to change this before food waste collections are rolled out to the whole UK population.

Action: For Government to mandate that, by 2027 the use of whole digestate from food waste on soil is unlawful and should be subjected to a composting or similar stabilising process prior to spreading.

### **Health impacts**

We now know for certain that plastics entering our soils break down into microplastics and through root systems and animal grazing, enter our food chain<sup>16</sup>. We also know that plastics accumulating in soils have a negative effect on soil health, structure, fertility, microbial activity and plant growth<sup>17</sup>. We know further that accumulation is increasing and without changes to BAU, will continue to grow. We are finding evidence, as yet tenuous, that microplastics entering our food chain may have disruptive impacts on human endocrine systems.<sup>18</sup> An innovative and precautionary principle should be applied in order to find the best solutions, aiming to increase protection of human, animal health and the environment.

### **Solutions to avoid plastic pollution of soil**

Contamination of soils from avoidable sources can be solved by making upstream changes that require virtually zero Government spending on infrastructure.

1. Soil mulch and bale wraps, tree guards and clips in farming can be produced (as the BBC pointed out) from materials that are certified to biodegrade in soil. The UK has an international standard of reference, the BS EN 17033 approved in 2018 for exactly this

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<sup>13</sup> <https://wrap.org.uk/resources/report/digestate-and-compost-agriculture-dc-agri-project-reports>

<sup>14</sup> <https://onlinelibrary.wiley.com/doi/abs/10.1111/sum.12615>

<sup>15</sup> <https://besjournals.onlinelibrary.wiley.com/doi/abs/10.1111/1365-2664.13356>

<sup>16</sup> <https://www.sciencedirect.com/science/article/pii/S0013935120305703>

<sup>17</sup> <https://www.mdpi.com/2076-3298/7/5/38/pdf>.

<sup>18</sup> <https://www.ciel.org/plasticandhealth/>

purpose. Soil biodegradable materials cost more than traditional plastics due to small scale use and production. By mandating the introduction of soil biodegradable materials (over a period of say five years) production would rise and prices fall. This is a recommendation of the UNFAO report.

Action: for Government to verify the feasibility of mandating the use of soil biodegradable film mulch and bale wraps using the standard BS EN 17033 certified by independent bodies, as point of reference.

2. Compost, digestate spread to soil. The EA is imposing upon waste operators new, stringent limits to plastics in non-packaged biowastes entering their treatment facilities and requiring waste pre-treatment at composting and AD facilities to remove plastics so that any in the biowaste fed into the biological phase(s) of treatment are 'As Low As Reasonably Practicable'; this should reduce their concentrations in output grades/types that are fit for use on land or in media in which plants are grown and help to increase yields of usable/marketable outputs. This is to be supported.

We recommend that when legislation for England mandate enters into force in 2024 which requires that local authorities must separately collect household food and garden waste and businesses must separately collect their food waste, the food wastes are collected using only compostable liners or repurposed lightweight carrier bags certified to the standard BS EN 13432 (which was published as a British Standard in the UK in 2000 and has been included in End of Waste rule sets within UK countries). Such use is law in Spain, Italy, Korea and various states in the USA now with other countries expected to follow suit. This would lead to a dramatic decontamination of food waste entering treatment and therefore going into outputs. Such a mandate requires Government legislation within the framework on the Resources and Waste Strategy and is a solution which DEFRA are studying.

Action: DEFRA to include the obligation for the collection of food waste for treatment in composting and anaerobic digestion to be with independently certified compostable bags according to the standard BS EN 13432. The same obligation, in terms of bags or sacks, should apply to garden waste where households do not have space to store garden waste in bins. (This standard is material-type agnostic so, for example, compostable paper sacks for garden waste are available and amongst product types that would fit this proposed requirement.)

3. Sewage sludge. This is more difficult to resolve. In some EU countries sewage sludge cannot be spread to soil (eg Switzerland and the Netherlands) but must be incinerated because of the contaminants it contains (the Netherlands in fact export much of theirs to the UK). One solution is to mandate the use of microplastic filters on all washing machines<sup>19</sup>, which would give a positive outcome not just for soils but also for water courses. Another is to stop the spreading of sewage sludge to soil until contamination levels fall. This will place a financial burden on water companies.

Action: Government to investigate the feasibility of mandating the installation of microplastic filters on all washing machines sold in the UK post (for example) 2023.

Farmers, our supposed custodians of soil health, can contribute by moving away from the use of traditional plastics where collection and re-use are very difficult, as they are in many applications and as the UNFAO report recommends; retailers can mandate that products derived from UK farms must

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<sup>19</sup> <https://www.sciencefocus.com/news/microplastics-laundry-filters-dramatically-reduce-fibres/>

not use traditional plastic soil mulch to grow them and pay farmers the extra this will cost them in the short term; farmers can also contribute to this by growing the feedstocks needed to produce innovative materials that can then be used back in their planting.

Lastly, we wish to the committee to be aware of terminologies. When we talk about “biodegradability” we mean products that comply with international or European standards that set pass/fail criteria for a clearly defined after-use biodegradation context and which are independently certified by an accredited certification body.

For packaging products this means certified to EN13432’s<sup>20</sup> criteria for industrial compostability; for soil biodegradability this means the EN17033<sup>21</sup>.

Sadly, too many generic claims are made around “biodegradability” by companies selling traditional plastics that have additives in them, for which no international or European standards exist that set pass/fail criteria, no field trials have ever proven biodegradability, and which are banned in many jurisdictions because they are accused of making “false consumer claims”. It is therefore of the utmost importance that rigorous application of international standards (to which the UK adheres) are made in determining material choices.

We suggest reading and taking into account the publication dated December 2022 from the European Centre for Norms (CEN) and British Standards Institution number CEN/TR 17910 which lists and identifies the standards for biodegradability of plastics.<sup>22</sup>

Action: for Government to state that the use of the terminology “biodegradable” is unlawful unless subject to certification by a reputable certification authority, and adhering to one of the standards listed in CEN/TR17910.

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<sup>20</sup> <https://www.en-standard.eu/bs-en-13432-2000-packaging.-requirements-for-packaging-recoverable-through-composting-and-biodegradation.-test-scheme-and-evaluation-criteria-for-the-final-acceptance-of-packaging/>

<sup>21</sup> <https://www.en-standard.eu/csn-en-17033-plastics-biodegradable-mulch-films-for-use-in-agriculture-and-horticulture-requirements-and-test-methods/>

<sup>22</sup> <https://standardsdevelopment.bsigroup.com/projects/2022-01625#/section>