feasta
The Foundation for the Economics of Sustainability

31 August 2017

River Basin Management Plan Consultation,
Water and Marine Advisory Unit,
Department of Housing, Planning, Community and Local Government,
Custom House,
Dublin 1.

Re. River Basin Management Plan Submission from Feasta
(the Foundation for the Economics of Sustainability)

Dear Sir/Madam,

The most notable item in the report is Figure A (p13, shown below) - *Significant Pressure; Frequency of significant pressures on at risk river and lake water bodies*. This clearly shows agriculture as being a disproportionately higher significant pressure on our water bodies than the next three pressures combined. Thus if even only these agricultural pressures were to be addressed, this would have a very significant bearing on the overall health of our waterways.

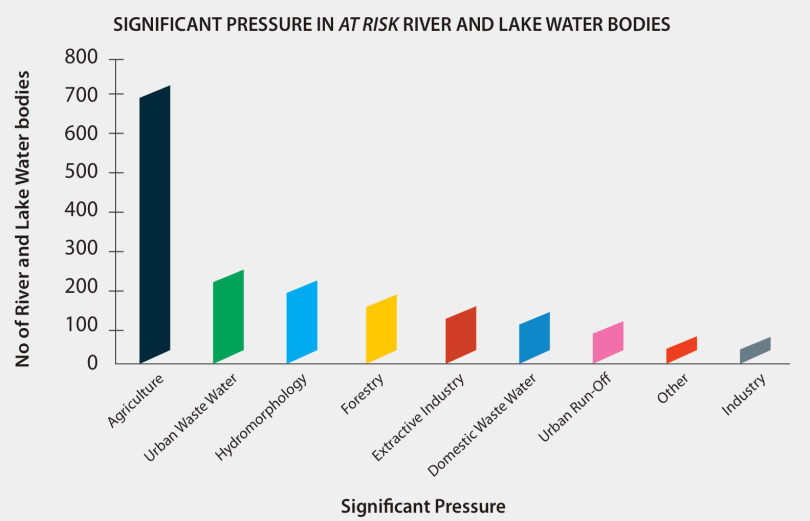

Figure A: Frequency of significant pressures on at risk river and lake water bodies

One notable point that is often missed in the discussion around water quality and agriculture is that our farms and wider landscape and the soil itself need not necessarily be a source of pollution, but can instead be managed with care so that they play an active role in water filtration, hydrological balance and catchment protection. Natural aquatic habitats are remarkably good at recovery once the pressures are removed, so the potential for recovery of even high status waters is very possible.

Two specific suggestions for a more holistic landscape management approach that could bring about this positive change are tree planting as part of our farming practice and composting as a way to build soil humus.

Tree planting

By introducing planted buffer zones along all drain and stream margins, we can limit the runoff of silt, agri-chemicals and nutrients. Grasses and riparian vegetation can provide an effective filter for surface runoff and tree roots provide a filter below ground *en route* to the watercourse[1]. Although reintroduction of buffer zones reduces the land area available for farming, economically there are many ecosystems services that riparian buffer zones provide and these services should be paid for as part of our wider landscape management in the same way that we pay for other farm services such as provision of milk, beef and crops. For example, riparian buffer zones not only filter water, but also provide hydrological regulation within the landscape. While climate change has played a significant role in the occurrence of flooding in Ireland in recent years, this has been exacerbated by the progressive loss of wetlands, riparian buffer zones, woodlands and soil humus that have become a part of modern farming. By reversing these losses we can provide greater catchment protection, not only for water quality and habitat enhancement, but also flood control and water supply regulation.

Along with riparian buffer zone creation, tree and hedgerow planting along the contours of sloping lands greatly assists with the uptake of rain water into the soil. Indeed tree planting generally helps to prevent flooding, filters the water through the soil and leads to overall catchment protection and enhancement. The Pontbren study in Wales offers a working example of farm and landscape management that can be profitable, beneficial for water quality and actively constructive in flood control. By excluding sheep from grazing lands, a 5-fold increase in infiltration rates was observed whereas by excluding sheep and also planting with deciduous trees, a 67-fold increase was measured, as compared with improved, grazed grassland[2].

Tree planting need not reduce the profitability of our farms, nor necessarily greatly reduce the area available for food production. In many parts of the world trees form part of the overall agricultural landscape, with benefits for water quality, carbon sequestration, livestock and food production. Tree intercropping (interspersing crops with tree planting), silvopasture (grazing the land beneath trees) and multistrata agroforestry (making use of different layers within a diverse forest system for production of nuts, fruit or other useful outputs) are all methods that can be employed in Ireland to introduce trees within our agricultural landscapes and thus create the conditions for soil building and wider catchment protection and enhancement. (See Toensmeier and Bayuk for more information on this[3].)

Soil Building

By composting all animal manures generated within the farmyard, rather than working with liquid slurry, farms can essentially eliminate slurry pollution and generate humus-rich compost for use on the land. Humus-rich soils provide better drainage on poor soils, better moisture holding capacity on light soils, prevent nutrients being washed out of the soil into groundwater and surface water, and make these nutrients more readily available for plant uptake.

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1 Haycock NE, TP Burt, KWT Goulding and G Pinay (1996) *Buffer Zones: their processes and potential in water protection*. Quest Environmental, Hertfordshire, UK.

2 Keenleyside, C (2013) *The Pontbren Project - a farmer-led approach to sustainable land management in the uplands*. COED CADW Woodland Trust, Wales.

3 Toensmeier E and K Bayuk (2017) *The Drawdown Project – A comprehensive plan to reverse climate change*. (interview with M Harland) In: Permaculture International. pp56-59. Hampshire, UK.

Hand in hand with this is the requirement to move from artificial nitrogen applications to compost based nutrient applications since an excess of nitrogen in the soil liberates soil carbon and erodes the humus base. Soil ecosystems are amongst the most diverse on earth, hosting c.25% of all of the species on the planet[4]. However, when fertiliser is added to soil it reduces the nitrogen fixing bacteria and leads to an increase in nitrogen consumers. This results in an increase in decomposition of organic matter and humus. The reduced pore space and loss of moisture holding capacity that results from this leads to greater leaching of water and nutrients from the soil. Reduced soil oxygen levels further exacerbate the breakdown of the soil ecology. This increases soil acidity, leading to further breakdown of organic matter. Soil aggregates become reduced as the biodiversity within the soil becomes eroded leading to further erosion of the soil by rainwater. The reduced topsoil quantity and quality further reduce soil biodiversity and this perpetuates a negative cycle whereby more artificial nitrogen appears to be necessary[5]. However by using composts as the nutrient source, carbon is added along with the nitrogen, and a virtuous cycle of soil building, increasing biodiversity and greater groundwater and surface water filtration can begin to occur.

Another method of soil building is to close the loop on the food we eat (removing nutrients and carbon from the soil) and our own excreta by composting and recycling humanure to agricultural lands (returning those same nutrients and carbon to the soil). Carbon sequestration from humanure composting is approximately twice as effective as the composting of sewage sludges, and is safer in that it has the potential to significantly reduce the recirculation of heavy metals to agriculture from municipal and grey water sludges[6]. Not only would this increase soil carbon and the humus content of our soils as described above, but would also potentially help to eliminate two other significant pressures on our waterways, namely urban wastewater and domestic wastewater.

One of the challenges for our soils is that artificial nutrients are essentially subsidised by cheap fossil fuels. Hand in hand with this we rely on fossil fuels for energy and heating rather than an indigenous biomass industry. Thus it is our recommendation that along with the above measures, government introduces Feasta's Cap and Share[7] proposals as a way to address not only atmospheric carbon excesses, but also as a way to indirectly benefit landscape management and thus the health and quality of our river catchments.

It is our proposal that government incorporates the above measures into the next round of water framework directive works in order to shift the focus from Irish agriculture as a net environmental problem, to Irish agriculture as a world leader in ecologically sustainable methodologies and practices.

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4 European Commission (2010) The factory of life – why biodiversity is so important. European Commission, Luxembourg.

5 McKenny J. Artificial Fertility: *The Environmental Costs of Industrial Fertilizers.* In: Kimbrell A (ed. 2002) *The Fatal Harvest Reader – the tragedy of industrial agriculture.* Foundation for Deep Ecology, Ca, USA.

6 Harty F (2016) *Closed Loop Agriculture for Environmental Enhancement: Returning Biomass and Nutrients from Humanure and Urine to Agriculture*. Feasta – The Foundation for the Economics of Sustainability, Cloughjordan.

7 Johnson M, M Harfoot, C Musser, T Wiley, H Pollitt, U Chewpreecha and J Tarafdar. (2008) *A Study in Personal Carbon Allocation: Cap and Share*. Comhar – Sustainable Development Council, Dublin.