**Met Office/MoJ climate data hack – Group 2A – Food Security.**

**Research Topic** – Innovative ways to use non-typical food growing space for food production and prisoner learning/wellbeing in the context of climate change and food resilience

**Options:**

1. Aquaponics system for fish and vegetable production with optional inclusion of wormeries or insect larvae production (using food waste) for fish feed.
2. Full replacement of all ornamental planting onsite with edibles – herbs, fruits, trees plus onsite composting of food waste to provide organic feedstock

**Aquaponics**

**Summary:** Micro-scale aquaponics production could be sited in an urban environment either indoors or outdoors. Benefit of indoors is lower electricity consumption in heating water, but grow lights would be needed for vegetables.

Micro-scale solutions will only provide a very modest amount of food, but could be scaled once proven to be a reliable technique. A unit could be expected to provide fish and vegetables for 4 people. However the learning and wellbeing benefits are considerable through learning about the growing conditions for a variety of products and the benefits of a systems thinking approach.

The system can be supplemented with a wormery for nitrate production or in fact insect larvae production as fish feed using onsite food waste (itself a significant undertaking). Energy for the system would ideally be sourced from solar panels, a bank of which should provide most of the energy for the system.

Climate change will make this system lower energy due to lower heating requirements – this infact is the most variable input (heating requirements for water temperature), which would make an area of protected growing conditions preferable.

Key Reference: <https://www.sciencedirect.com/science/article/pii/S0144860921000376>. Some rough guidance in inputs and outputs are as follows:

* Cost - £1k upwards for basic infrastructure – feed and energy costs will be extra
* Space requirement – 4m2 minimum, though more growing room is beneficial (e.g. 30m2)
* Water use – 50-60L/kg of produce
* Food Output (annual – with 32m2 unit) – 60kg fish, 250kg vegetables
* Energy requirements – highly variable with external conditions – circa 2-40kWh/kg produce.
* Key challenges – these systems are sensitive to change and require careful management

**Composting and Edible Ornamentals**

**Summary:** A simple switch out solution of ornamental planting to edible perennials (mixture of herbs, shrubs and trees). This would have the benefit of providing learning opportunities, herb/fruit harvest for prisoner engagement / diet. Added is the switch from seasonal planting schemes to perennials leading to a cost saving. Time saved here could be spent on the management of an onsite composting operation to deal with foodwaste from the canteens.

Creation of more established ornamental beds (of edibles) will have many advantages in the context of climate change: soil stabilisation, prevention of run-off, building cooling, carbon sequestration.

The composting of onsite food waste is highly achievable. Initially units are circa £20k with a space requirements of around 30m2 (outdoors). Licencing is limited to EA exemptions if compost is not leaving the site and this compost can be used to feed the edible plants. This operation would need a dedicated team to provide a long term management of the machine as they are vulnerable to changes in feedstock or internal/external conditions.

Engagement and learning opportunities are most significant in terms of the life cycle of nutrients from canteen to plants and back to canteen and the different growing conditions for different species.

Key Reference (I can connect with colleagues in former role): <https://www.thetelegraphandargus.co.uk/news/15613439.getting-close-up-with-nature-on-campus/>