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This proposal is written to the UK Government by an independent consultant. This proposal is tailored to England because agriculture and food are devolved areas of government, but as the tax system is UK-wide, the recommendations for policies 1 and 2 are applicable to the other devolved governments [1].

# STRATEGY FOR THE SUSTAINABLE AGRICULTURE TRANSITION:

## REDUCING ANIMAL PRODUCTION AND CONSUMPTION IN THE UK

## Key Points

- A reduction in livestock production and consumption is critical for the sustainability transition in the UK, but there are no explicit policies towards this goal.
- Current policies provide some support towards a diet and farming shift but do not have specific measures to capitalize on current trends of reducing animal product consumption.
- Three recommended policies will utilize leverage points to create a positive tipping point away from animal consumption and production:
    - **Public procurement of plant-based foods** to increase demand and shift social norms.
    - New **agricultural subsidies for conversion away from livestock farming** to build on current nature restoration schemes.
    - A gradually increasing **animal product consumption tax** to create cost-parity with plant-based alternatives and unsustainable animal products.

PIXABAY / PEXELS

# CONTEXT

## Agenda Setting

### The environmental and health impacts of animal products

A broad dietary shift away from meat and dairy and towards plant-based diets is widely supported in the sustainability literature because livestock farming is responsible for most of agriculture's environmental impacts, which itself is a major driver of the environmental crisis [2]–[4] (Figure 1). Livestock farming uses around 80% of global agricultural land and creates more than 50% of food emissions, but animal products (APs) only provide about 20% of global calories [3]. This inefficiency results from livestock grain feed which diverts crops from human consumption but returns only about 10% of the calories as energy from meat [5]. This is a global problem but is especially prominent in the UK. About 40% of UK arable land grows animal feed, redirecting crops such as oats, wheat, and corn away from humans [6]. Livestock farming doubly harms human health; besides the health effects of climate change and pollution increasing respiratory disease [7], eating too many APs contributes to cardiovascular disease and some cancers [8]. For human and planetary health, a shift is needed.

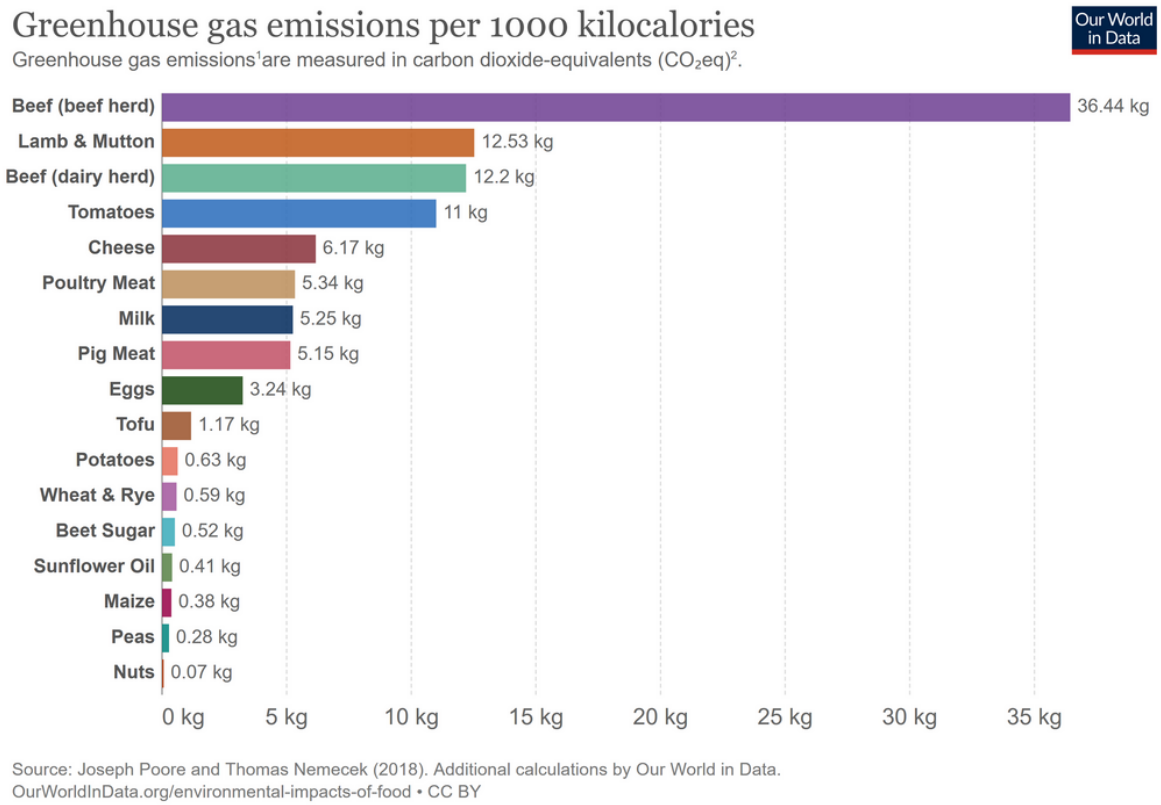



Figure 1: Carbon emissions per 1000 calories of several food products. Animal products have a much higher footprint than plant-based foods in not only carbon emissions but also land use, water use, and nutrient pollution. [10]

## The UK livestock economy

UK agriculture is rooted in livestock farming: in 2016, 55% of people working in agriculture were working on livestock farms (cattle, sheep, pig, poultry, dairy, and mixed), mostly grazing livestock [11] (Figure X). Because 17% of English farmland is uplands* not conducive for traditional crop farming (Less Favourable Areas, LFA), using livestock to convert grass into food and income has been the preferred option for these areas [12]; however, livestock is not limited to only LFAs. 57% of sheep and 80% of cattle in 2021 in England were raised on non-LFA land [13]. Further, livestock is the least profitable farming in the UK. Under EU agricultural subsidy pre-Brexit, all farmers were paid directly per hectare. Grazing livestock and mixed farms were the most dependent on subsidies with more than 91% of their income coming from subsidies [11] (Figure 3). Since Brexit and the 2020 UK Agriculture Policy, these direct payments are being phased out [14], thus livestock farmers need new options for economic success.

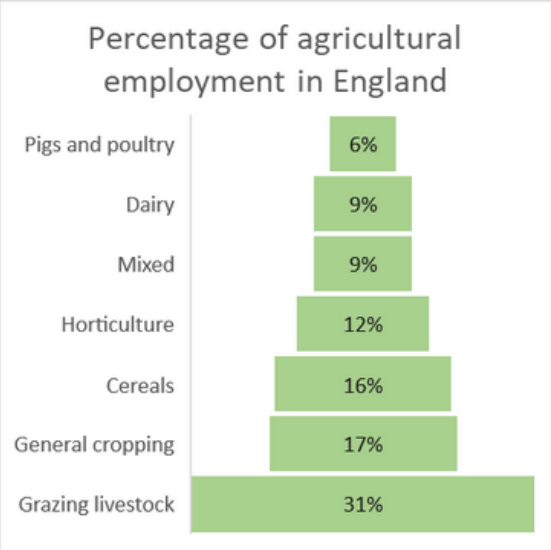
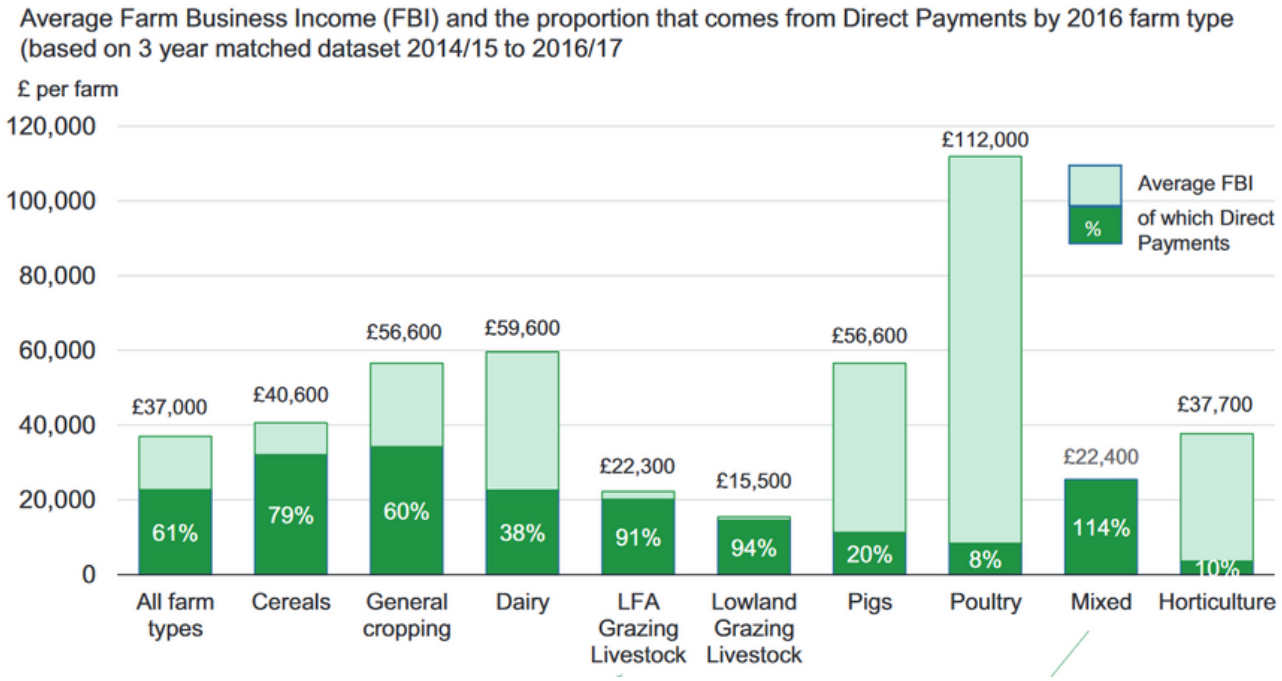



Figure 2: 55% of the 302,000 people working in agriculture work in livestock in England [11].

Figure 3: The average farm income and the proportion that came from basic subsidies pre-Brexit. The average farm got 61% of its income from subsidy, but livestock farms were more dependent [11].




* Note that this figure is much higher in other countries of the UK – as much as 88% of Scottish agricultural land is LFA [12]

## The beginning of a transition

- **Change is needed:** The Committee on Climate Change (CCC) calls for a 20% shift away from animal products by 2030 and 35% by 2050 to meet Net Zero [16].
- **Citizens support it:** UK Citizens' Climate Assembly recommended a 20-40% decrease in meat consumption and measures by the government to support the transition [17].
- **It's already beginning:** From 2008 to 2019, meat consumption decreased by 16.7% for the average British consumer [18], and plant-based alternative consumption increased from 7% to 13% [19]. Livestock numbers have also been declining since the 1990s [9].

The plant-based transition is happening, and policy is needed to accelerate it and ensure it is equitable for producers and consumers [20].

## A positive tipping point

Dietary and farming transition has potential for a positive tipping point, where a rapid shift could occur towards plant-based food [21]. The Food and Land Use Coalition posits that when certain conditions are met for plant-based alternatives (PBAs), the tipping point will be triggered [22]. These are shown in Table 1, with equivalent producer tipping points proposed. These policies will aim to create these conditions; a system diagram illustrates the feedback loops and points of influence (Figure 4).

| Consumer diet tipping point for plant-based alternatives [22] | Equivalent Producer tipping point for plant-based agriculture |
|---|---|
| Cost parity of plant-based products with animal products is achieved | Cost parity of alternative agricultural products with livestock is achieved |
| Equivalent or better performance with animal products | Equivalent or better economic performance with livestock |
| Alternatives are accessible while unsustainable meat becomes inconvenient and unavailable | Alternatives are easier to farm while livestock becomes harder and more inconvenient |
| Social norms shift away from meat | Social norms shift away from livestock |
| Consumers are capable and knowledgeable about plant-based alternatives and the impacts of their choices | Producers are capable and knowledgeable about alternative methods and the impacts of their choices |

Table 1: Tipping point conditions for producers and consumers.

# CURRENT POLICY

## Policy Formulation

There are several policies already in development towards a food transition on the consumer side described in the government's Food Strategy [23]. First, there is public investment by UK Research and Innovation in research and commercialization for alternative proteins which will help improve the performance and cost of these products [24]. Further, regulatory guidelines are under consideration for alternative foods to increase access, as well as a standardized eco-labelling methodology that will help consumers understand food impacts [23]. These policies are laying the groundwork for a shift in demand by improving PBAs and consumer education, but do not have the explicit goal of decreasing animal consumption, something that the CCC recommends addressing [9].

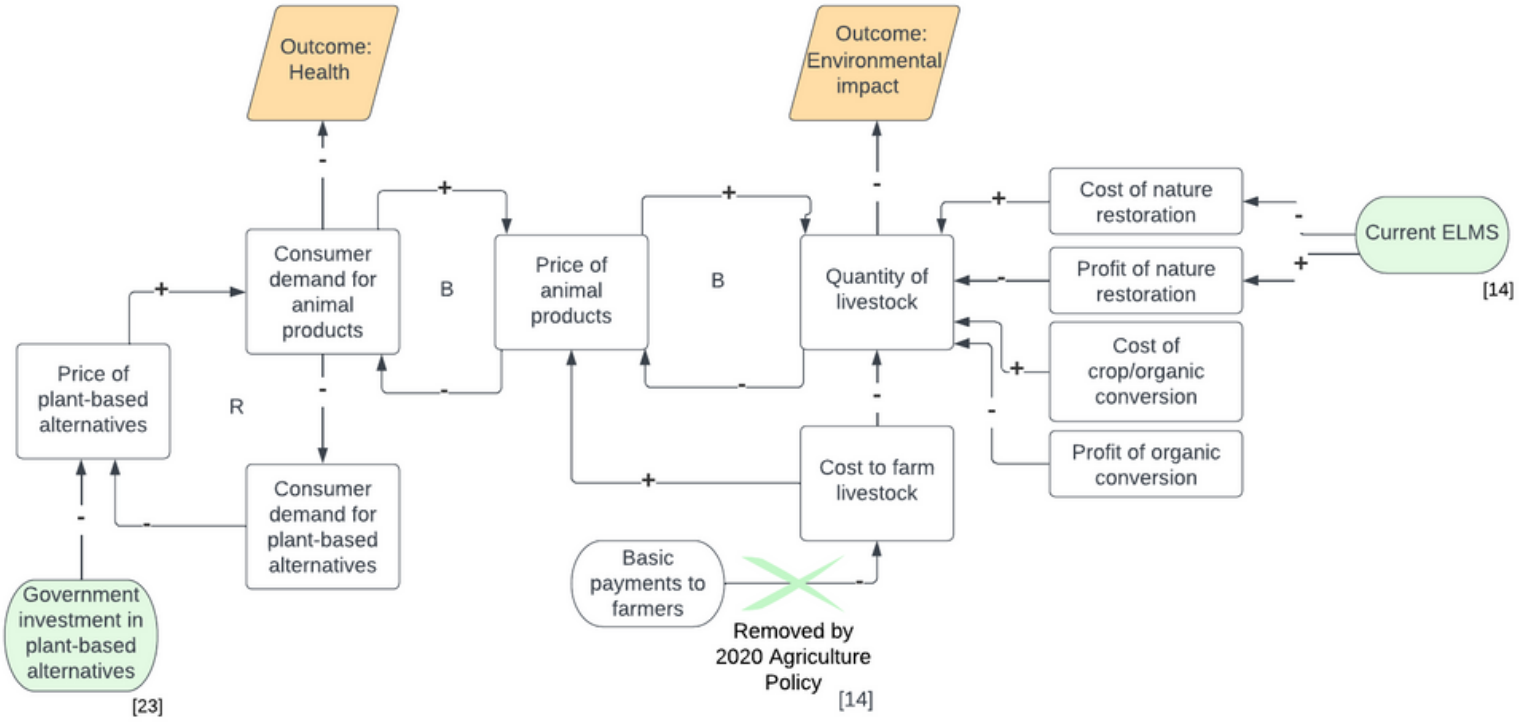



Figure 4: System map relating consumption and production of animals with current policies in green and outcomes in yellow, created by author. (R = Reinforcing feedback loop, B = balancing feedback loop) The removal of basic payments will increase the cost to farm livestock, thus increasing the price of animal products and decreasing the quantity of livestock. Current ELMS increase the profit of nature restoration, providing an economic option for farmers to decrease their livestock quantity. These will act on the balancing feedback loop, further increasing the price of APs. Finally, the government investment in PBA research and commercialization will decrease the price of PBAs, increasing consumer demand, and beginning to activate the reinforcing feedback loop as economies of scale are created.

On the producer side, there is similarly progress but no specific efforts to reduce livestock. The post-Brexit 2020 Agriculture Policy is phasing out basic payments to farmers [14]. This removes the basic subsidies that kept livestock farmers profitable and supported the price of meat and dairy, a step endorsed by the literature to decrease the availability of falsely cheap meat and dairy [25], [26]. The policy also introduced Environmental Land Management Schemes (ELMS) whereby farmers can be paid for managing land so that it produces public environmental benefits [14]. Some ELMS are conducive towards a transition away from livestock, but do not specifically address it, and sometimes even encourage adding livestock [27] (see Table 2). The most important aspect for the livestock transition is that ELMS provide an economic route for livestock farmers on marginal land to be paid for nature restoration [14]; this can decrease their economic dependence on livestock. Though these schemes could have the desired effect of raising the price of APs by decreasing the number of livestock, the current agricultural policy does not act directly to support farmers' transition away from livestock. Current policies are placed on the system map (Figure 4).

| | | |
|---|---|---|
| Example ELMS that support transition away from livestock | Excluding livestock from moorland | Conversion to organic management of grassland |
| | Removing livestock at certain times of year from grasslands | Restoring and managing degraded peatland |
| | Restoring or creating upland wood pasture and parkland | Restoring forestry and woodland to lowland heathland |
| | Upland livestock exclusion | Creating successional areas and scrub |
| Example ELMS that encourage livestock | Adding cattle to the Isles of Scilly | Grazing cattle on moorland and upland peat |
| | Wetland grazing | Enclosed rough grazing |

Table 2: Example ELMS that support nature restoration or less livestock vs. those that subsidize livestock [27]

MINKU KANG / PEXELS

# POLICY PROPOSAL

Policy Formulation

## Our approach

This portfolio of policies and their interactions will aim to shape the food market in the UK and create a positive tipping point towards plant-based foods [22], [28], [29]. To avoid offshoring emissions by reducing domestic supply but not demand and importing APs (or vice versa and exporting APs), both supply- and demand-side policies are recommended [9], [25], [30]. This policy also takes a holistic approach, as focusing only on emissions through a carbon tax could shift high-emissions consumption like beef towards chicken, which does not improve other health and environmental impacts [25], [29]. Finally, this policy will aim to support farmers with detail and certainty from the outset, which has been missing in previous agricultural policy transitions [31].

What this policy proposal will not recommend are outright limitations on livestock or AP consumption as implemented in China and proposed in the Netherlands, which led to disproportionate economic impacts and unrest [32], [33]. This policy also does not focus on behavioral nudging policies such as physical product placement in stores as the evidence for efficacy in changing diets is mixed [34], though they could be added in the future.

## Component 1: Plant-based public procurement

Public procurement is recognized as a policy tool to shape markets [35]. The first proposed policy component is adding requirements for plant-based food to the Government Buying Standards for Food and Catering Service (GBSF) as well as associated guidelines for schools and hospitals. A 50% plant-based requirement is recommended, which should be increased over time (see figure timeline). Publicly procured food is highly visible, including at NHS facilities, schools, council and government buildings, and within the armed forces. The government purchases £2 billion in food annually [36]. This will not only increase the demand for PBAs shown in Figure 5 and incentivize development but will also normalize PBAs [37], contributing to the tipping point by activating two reinforcing feedback loops of decreasing price and increasing demand. Additionally, creating a reliable market will help producers move away from livestock; in a comparable scenario of conversion to organic crop farming, one of the most influential factors for farmers to switch is expected revenue and demand [38]. Public procurement of food can change producer practices; for example, in Sweden, public procurement of organic food was found to increase organic farming area (along with subsidies for conversion, which will be addressed in component 2)[39]. Public procurement, according to UK food industry experts, is a politically

feasible and potentially high impact intervention [25], and modification of food procurement standards was supported by 77% of the Citizens' Climate Assembly [17]. In fact, several local councils like Exeter, Oxfordshire, Lewisham, and Faversham have recently taken steps to increase plant-based foods in schools and council catering [40]; this should be intensified with the national GBSF.

## Component 2: Livestock Transition Schemes

The second component of this policy is a scheme of two new ELMS that will support farmers to transition away from the sunsetting industry of intensive livestock farming, funded by the animal product tax (component 3). The first scheme is subsidy to overcome startup costs and convert to crop farming where feasible. Though a minority of livestock farmers have LFA land that is not conducive to traditional crops, there are a number of viable options depending on their landscape (see Table 3). Crop farming is also historically less dependent on subsidy for revenue (Figure 3), helping the most vulnerable farmers economically.

| Landscape | Proportion of agricultural land in England | Alternatives to livestock |
|---|---|---|
| Uplands | 17% (LFA land) [13] | Agroforestry: Agriculture alongside trees, which can improve the land for other crops or be an income source through timber or fruit [41]. The uplands would be naturally forested up to about 600m of altitude without grazing, so trees are suited to the conditions [12]. |
| Low peatlands | 83% (Non-LFA land) [13] | Paludiculture: Agriculture on wet peatlands, which sequesters carbon. Potential crops include reeds for thatching as most profitable due to the demand within the UK which is currently mostly imported [42], or sphagnum moss for horticulture substrate [43]. |
| Arable land | | Traditional crops |

Table 3: Alternatives to livestock for different landscapes.

The second new scheme is a conversion and continuation scheme for organic livestock. Though schemes exist for conversion and continuation of cropland and grassland, there are none for livestock [44]. Organic livestock reduces the number of livestock and impacts because it requires a minimum amount of grazing and limits grain feeding, thus reducing the stocking density and

total impact [45], [46]. This scheme will also help subsidy-dependent livestock farmers; economic analyses show that destocking to only the number of animals that can be supported with natural grazing and no external inputs like grain feed or fertilizer is the most profitable way to raise grazing animals [12]. Conversion to organic has also been shown in France to increase economic efficiency on dairy farms, especially those transitioning from intensive grain-based systems towards pasture systems [47]. While this scheme allows retention of some livestock in the UK, at the right level animals can improve nutrient recycling on a farm [48].

Subsidies have been shown to be the most influential factor for famers to change their methods; in the past, conversion and continuation subsidies for organic farming in the UK and Europe were most effective at converting farms [49], [50]. The second most important factor is the expected price and demand for products [38], which is addressed by the other recommended policies. While subsidy schemes must be well defined to ensure that public money produces the intended outcome [51], they are highly politically feasible in the UK. The Citizen Climate Assembly widely agreed that support for farmers to transition to more sustainable practices was a priority [17]. In combination, the Livestock Transition Schemes (LTS) will decrease livestock production by providing farmers with viable alternatives and support to overcome costs of conversion. From a systems perspective, this will increase the price of meat, helping lower consumer demand (Figure 5). The increased price in meat will further help support farmers raising fewer animals less intensively [25].

## Component 3: Animal product tax

The final policy component is a consumption tax on animal products. This will target the tipping point by ensuring that PBAs become cheaper than APs, shifting purchases (Figure 5) [21]. Tax is often used as a policy tool to shift citizen behavior, but to different effects; for example, tobacco taxes do not decrease smoking because price has almost no effect on demand for a product when there are no alternatives [52]. However, there are alternatives to APs, and demand for meat in the UK is sensitive to price, where higher prices lead to lower demand** [53]. Though an AP tax has been considered in many countries but rarely implemented so far [54], modelling shows that raising prices does decrease consumption. For example, raising all dairy milk prices to current organic milk prices led to a decrease in dairy consumption versus the present trajectory in the UK [55], and raising beef prices by 40% decreased consumption by 13% worldwide [56]. Taxes on unhealthy foods or ingredients have been tested around the world. Taxes implemented in isolation (e.g., the saturated fat tax in Denmark) can fail because consumers shift to cheaper options with the same taxed ingredient or increase purchases from abroad [29], which is why the proposed tax will be implemented in conjunction with

** i.e., meat has an elastic demand, while smoking generally does not.

other policies. Systemic reviews of food taxes also indicate that 10-20% tax levels are effective at shifting purchases, with larger taxes having larger effects [57]. An important consideration of any food tax is that it will affect low-income people more, as food expenditure makes up a proportionally more of their budget[58], [59]; however, the basket of existing and proposed policies to ensure that alternatives become cheaper, preventing a net increase in their food costs if they shift consumption. Additionally, monitoring effects and adjusting the tax accordingly is recommended [58]. Overall, price manipulation is seen as highly effective by experts [60] and is politically acceptable especially when, as in our proposal, proceeds are ring fenced for public benefit [25]. Two-thirds of the Climate Assembly supported taxes towards changing consumer behavior away from high-emissions foods [17].

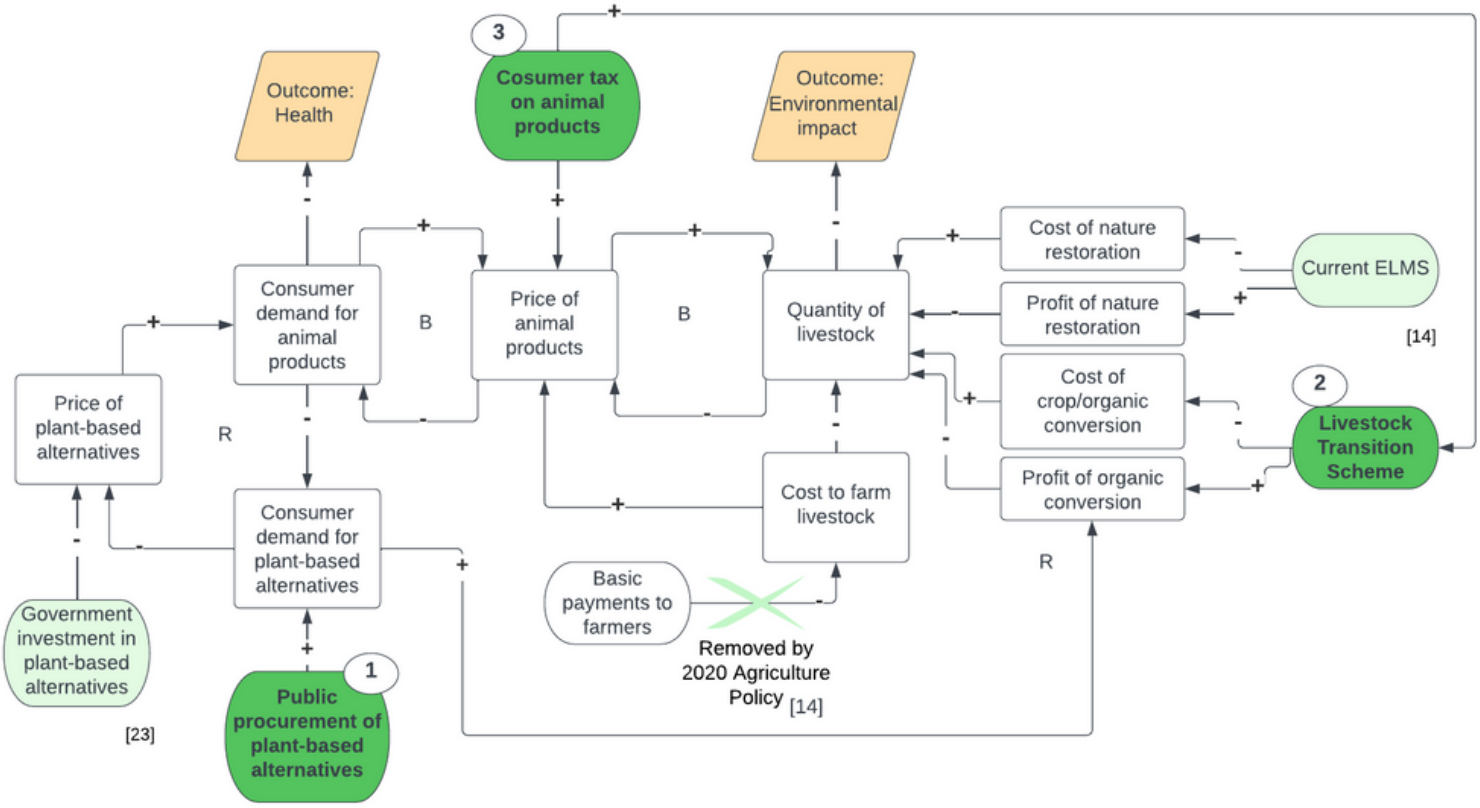



Figure 5: Proposed policies on system map created by author. (R= reinforcing feedback loop; B = balancing feedback loop.) Public procurement will accelerate the reinforcing feedback loop of decreasing cost of PBAs and decreasing AP demand. Though this could decrease the price of APs through the supply-demand feedback, other factors such as the AP tax and costs of production should keep it sufficiently high. The Livestock Transition Scheme will reduce the costs of crop/organic conversion, decreasing the quantity of livestock, and increasing the cost of APs through the balancing feedback. Finally, the AP tax will increase the prices of APs. This could increase the quantity of livestock through the balancing feedback, but the other factors such as the cost to farm livestock should keep the total quantity decreasing.

# STAKEHOLDERS

## Forming Opinions

There are many stakeholders in the proposed policy because of the strong British agriculture sector and the universal nature of food. Risks and opportunities for each group are described in Figure 6. In summary, there may be strong opposition from farmers, processors, and consumers if affordable alternatives (to eat and to produce) are not available. Consultations with stakeholders are recommended before policy implementation.

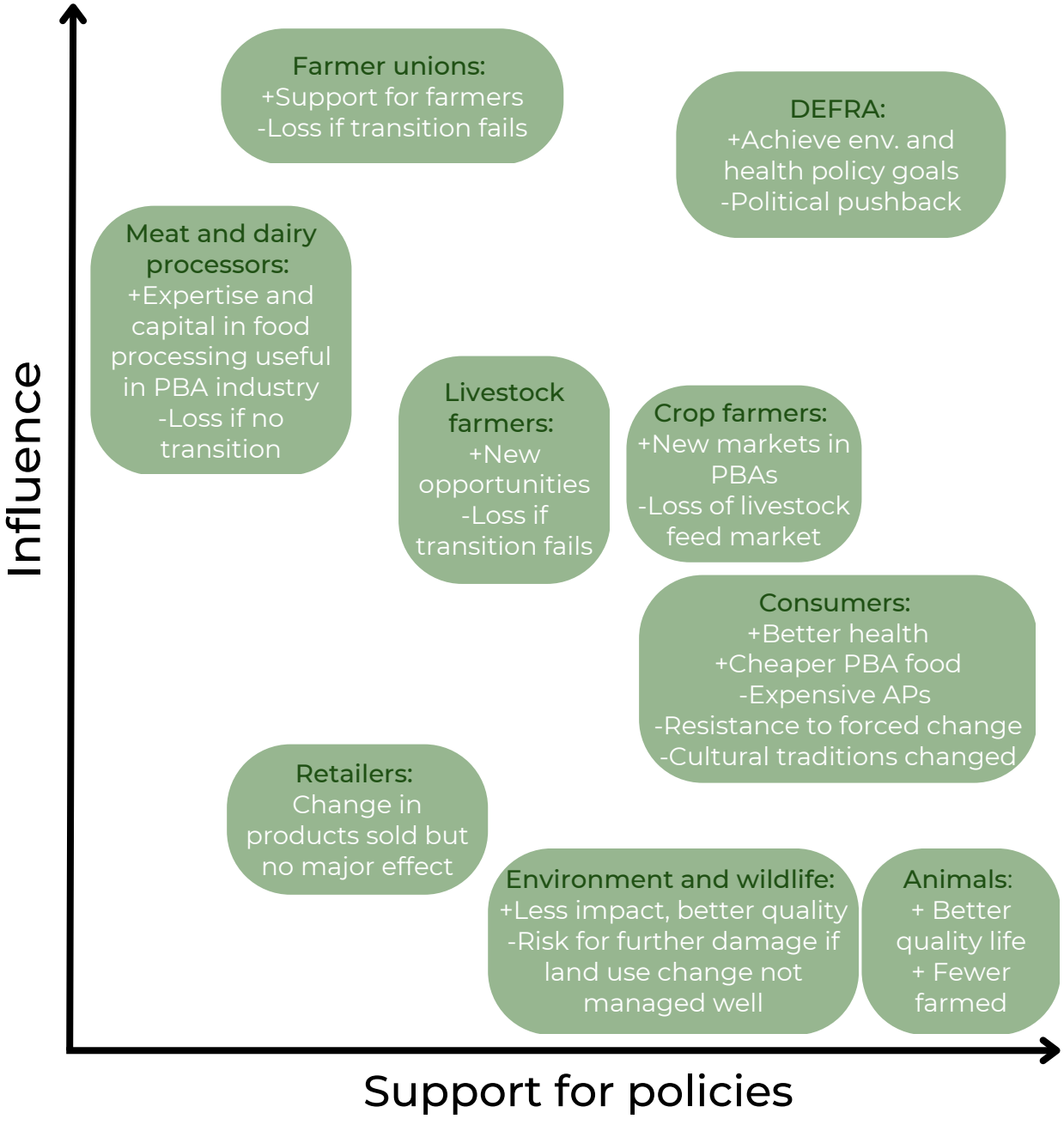
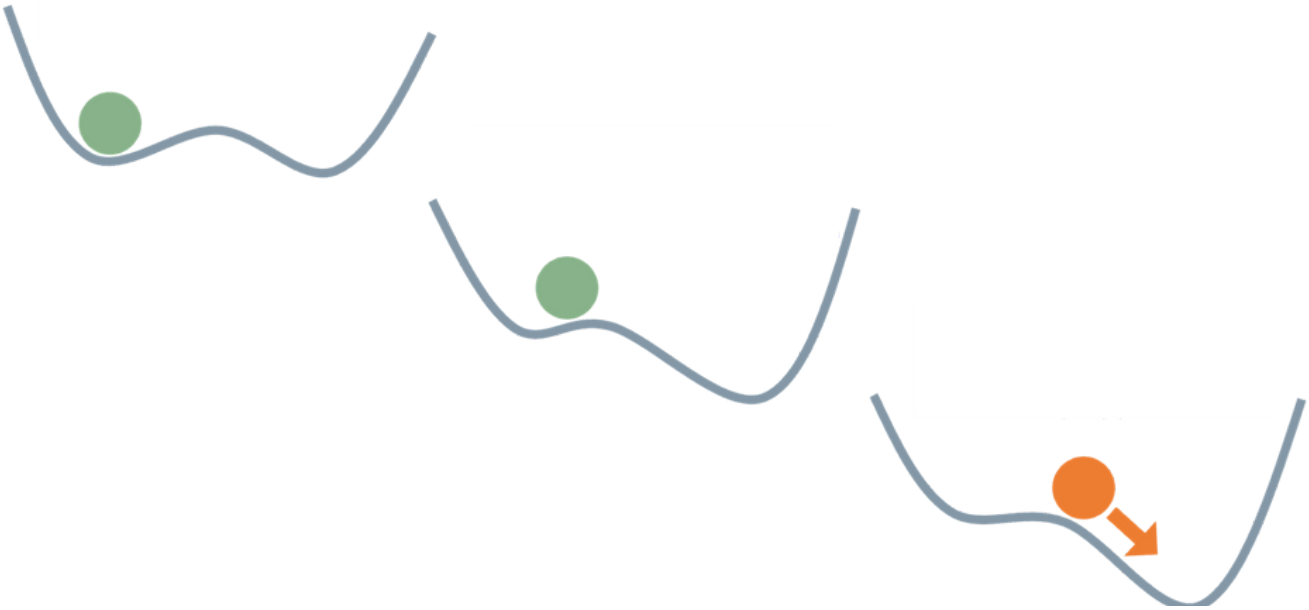



Figure 6: Stakeholders in proposed policy mapped by likely support for policy and influence on policy, along with potential risks and opportunities (Diagram by author).

# TIMELINE

## Implementation and monitoring

This is a long-term policy; however, it is important to have short-term goals as well as monitoring and adjusting as necessary. The policy timeline is illustrated in Figure 7. Further policies may be added as necessary, including public education campaigns, bans on advertising for animal products, or eventually stricter regulations on farming.



**2024-25**
- Begin AP tax at low rates
- 50% PB public procurement
- LTS begin

**2026-27**
- Increase AP tax
- 75% PB public procurement
- Increase participation in LTS

**2028-29**
- Monitor and increase AP tax
- 100% PB public procurement
- Adjust LTS as needed

**2030+**
- 30% reduction in AP consumption
- Monitor and adjust policies
- Set goals for further decreases

Figure 7: Timeline of proposed policy (Tipping points illustration adapted from [22])

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MIKE B / PEXELS