**Document 1**

**UK Health Security Agency**

**Health Effects of Climate Change (HECC) in the UK: 2023 Report**

**Chapter 9**

**Climate Change and Food Suppply**

**2.1.2 Risks of climate change for domestic food production**

Climate change is projected to have a positive effect on food production in the UK in the short to medium-term, with drier and warmer days and nights benefitting the yields for crops such as wheat (24). Global heating presents the opportunity of growing new crops, including new varieties of fruit that thrive in warmer climates, while preventing reduction in yield losses due to frost (21). It enables longer growing seasons, likely to lead to greater yields for a variety of domestically produced crops. There may also be positive impacts on animal agriculture, with lower winter feed and energy costs from livestock housing resulting from warmer winters (25).

However, towards the end of the century climate change impacts such as heat, floods and drought will have reached a tipping point and – without the introduction of sufficient adaptation measures, such as climate resilient varieties – will result in major reductions in UK crop yields (26). Moreover, some extreme climate events including heatwaves and extreme rainfall may outweigh the projected benefits of gradual climate change over a much shorter timeframe in various locations in the UK, with climate vulnerable crops and livestock products likely to be most affected. The ‘Third Climate Change Risk Assessment’ (CCRA3), published in 2022, acknowledges the climate change risks to UK domestic food supply (26). While the risk to domestic production is currently scored in the assessment as ‘medium’, the CCRA3 outlined that it is expected that this risk will increase to ‘high’ by 2050 if no adequate action on climate change adaptation and mitigation is taken (26).

The impact of extreme weather events and sea-level rise has already affected the UK’s domestic food supply in recent years, with UK farmers reporting heat, drought, and flooding (often accompanied by soil erosion and run-off) as major threats to their businesses (27). For example, the heatwave and drought in 2018 led to shortages of domestically produced cereals, carrots, potatoes and livestock fodder (28).

Furthermore, under a middle-of-the road emissions scenario, coastal flooding and erosion are projected to reduce the UK land surface classified as ‘high quality farmland’ from an average of 38% during the period 1961 to 1990, to 11% by 2050 (21). This will disproportionately affect clay soils which are highly suitable for the cultivation of many shallow-rooted vegetables.

Several additional risks, including increased occurrence of pests due to altered environmental conditions, may aggravate climate change impacts on UK production in the years to come. These may include changes to the seasonality of helminth parasites, liver fluke and other parasites that can reduce productivity and increase livestock disease (25). Furthermore, the measures taken to reduce the above risks, such as the (increased) application of pesticides may increase exposure to residues including carcinogenic substances, which pose additional public health and ecological concerns (29, 30). Climate changes and extreme weather events may also affect the quantity and quality of pasture available for grazing livestock, and in summer there is likely to be an increased risk of heat stress for animals which will reduce their productivity (25). For crops, there are risks from a warmer climate leading to the UK becoming more habitable to pests that are currently not indigenous, as well as a danger of reducing habitats for beneficial species including pollinators and pest regulators. However, the evidence for much of these relationships is uncertain (31). Finally, whilst CO2 has a well-documented role in plant photosynthesis, evidence suggests it may also alter plant chemistry which could lead to a substantial decrease in nutritional composition of plants and their harvestable parts. More evidence is needed to quantify the effect this may have on population health, especially for subpopulations around the world that are already facing food insecurity problems, but it is an important issue to consider in the development of future food system strategies (32, 33).

**Emphasis in red added**