



Economic Futures

Essay Competition 2021/22

3rd Placed Winning Essay

How will climate change, over the coming decades, impact the urban and rural areas of Scotland differently? How should policymakers address these differences?

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Having grown up in the Scottish Borders, Craig is really interested in how the economic impact of an event is felt differently between rural and urban areas.

How will climate change, over the coming decades, impact the urban and rural areas of Scotland differently? How should policymakers address these differences?

Introduction:

Scotland was the first government in the world to declare a climate emergency (Sturgeon, 2019). Policymakers must act in a proactive manner to ensure the risks of climate change are offset and lead the climate revolution across the world. Despite the UN (2021) stating a need to maintain global warming within reach of pre-industrial levels there are certain impacts which must have adequate mitigation methods. Certain impacts may be more heavily felt within either a rural or urban setting and therefore require more nuanced policymaking to target potential issues.

Impacts:

One potential impact of climate change is flooding, and this will bear a greater impact on the urban areas of Scotland. Scotland's urban population is concentrated in the low-lying area which constitutes the central belt (The Scottish Affairs Committee, 2016, p. 11). In addition, the James Hutton Institute (n.d.) found 68% of the coastal population to live within urban communities. PWC (cited in Green, 2016) estimate that small businesses not covered for flood damage 'would have to pay between £35,000 and £100,000 on average to repair properties' in previous storms demonstrating the high economic costs of flooding.

The temperature rises inherent with global warming will have larger impacts on urban areas where the urban heat island (UHI) effect intensifies temperature rises. The UHI effect is characteristic of densely populated and developed cities where the use of materials such as tarmac trap heat (Mackinnon, 2013). Resultantly, temperatures will be significantly higher in cities compared to rural surroundings. It is suggested the UHI effect can increase 'temperatures by nearly 5°C compared to surrounding rural areas' (Milman, 2021). The heat retention of a UHI increases residents' exposure to heat and can lead to heat-related deaths and other negative health impacts therefore putting pressure on health services.

The effect on public services may also be exacerbated by a net positive migration towards urban areas. Peri and Sasahara (2021, p. 3) note wealthier nations will experience 'larger out-migration rates from rural areas' as temperature rises. This is due to warmer temperatures reducing the income within rural areas and the population of richer nations have the means to move to cities to overcome this.

Agriculture is a key area of concern for the rural areas of Scotland. A WWF study concluded extreme weather in 2017 and 2018 contributed to losses of up to £161 million for Scotland's farmers (Ecosulis, 2019). Rising temperatures will increase the occurrence of drought but also allow disease to spread easier and degrade soils creating dire impacts. The Scotland & Northern Ireland Forum for Environmental Research (SNIFFER n.d.) predict viruses, parasites and pathogen populations will increase as a result of the warmer temperatures. Heavier rainfall and stronger winds both contribute to soil erosion (Ritter, 2018). These effects have the potential to reduce the production curve of Scottish agriculture.

Flooding will also have an impact on agricultural land with crops rather than property being the major risk. The area of best quality agricultural land at risk from fluvial flooding in Scotland is projected to increase by 26% by the 2050s and 31% by the 2080s under a +2°C at 2100 scenario (SNIFFER, n.d.).

Increased temperatures could however lead to higher yields provided the risks posed by climate change are adequately managed. There will be opportunities to grow new varieties which are unable to grow under current climate conditions (SNIFFER, n.d.). This may lead to a reduced reliance on imported food.

The tourism industry within rural areas will also be hit as natural bird population are disrupted by global warming. Temperatures within the North Sea and North Atlantic have risen due to increased emissions, and this has negatively affected the wild bird populations within Scotland (McKie, 2018). Dr Richard Nixon (cited in Stanton, 2021) states the crisis cannot be ignored and urged the Scottish Government to ‘take urgent action’. The economic impact of neglecting this area is clear as wildlife tourists have the potential to add £276 million per annum to the Scottish economy (Ewing, cited in Birdguides, 2011).

Solutions:

The rising sea levels will undoubtedly be a source of concern for those living within coastal and low-lying areas. There are however some solutions to the risks of flooding, and these need not be at an environmental cost. We can look to other nations who are currently battling flood risks to evaluate practicable solutions. The US has begun using “living” shorelines to tackle flooding by using plants which, over time, grow and become more stable (Benningdon-Castro, 2017). Using this method would also allow Scotland to achieve other environmental goals and have a strong flood defence system when the impacts of global warming increase.

In addition, localised flooding in cities can be offset by increased vegetation. Felson (cited in Benningdon-Castro, 2017) believes that green infrastructure is the best solution as it is a cheap method of mitigating the flooding risks. There are also synthetic products such as Topmix Permeable concrete which can absorb water at a rate of 4,000 litres per minute (Goodyear, 2015). This prevents the build-up of rainwater when urban drainage systems cannot cope. As an area for innovation Scotland must begin trialling methods to build a strong flood defence system to protect the nation in the future.

By leveraging the albedo effect there are feasible solutions to reduce temperatures within urban environments. When sunlight hits a dark coloured roof 52% of the summer sunlight heats the city air however a light-coloured roof can reduce this to just 8% (Smart Surfaces Coalition, n.d.). The albedo effect works by reflecting the heat energy back into the atmosphere and can easily be achieved by painting roofs white or installing white roofing materials on city centre buildings.

Another method to tackle the UHI consequences would be planting more trees. Trees can allow for temperatures 11-25°C cooler than unshaded areas and evapotranspiration can ‘reduce...summer temperatures by 1-5°C’ (U.S. Environmental Protection Agency, 2008). A major investment would need to be made now to allow trees to mature and allow for mitigation of the UHI effect in the future. Vegetation can also improve stormwater management whilst improving air quality and therefore has multiple benefits when used within an urban area (Shaneyfelt, et al., 2017). The relatively slow growing nature of trees however means the government must act now to allow full benefit when it is needed most.

Changes within agriculture will be necessary to offset the rural impact of climate change. There must be an improved data to allow farmers to make progress where needed and be able to recognise where they are contributing to mitigation of climate change risks. The Scottish Government (2021, p. 12) state ‘a challenge...for government and the sector is to ensure that if baseline data is being gathered it has a value at the farm level.’ In addition, there must be increased research and development within the agricultural area. Farmers state that research will enable them to understand methods of meeting climate change targets (The Scottish Government, 2021).

An increased understanding of the type of plants which are resilient to climate change will also ensure the longevity of successful Scottish agriculture (Scotland & Northern Ireland Forum for Environmental Research, n.d.). Understanding new, more productive varieties which grow in warmer climates can help maintain production levels. The agriculture and horticulture development board hail the benefits of integrated pest management. The ‘prevent, detect, control’ methodology will allow for reduced use of pesticides and more targeted use therefore reducing organism resistance and maintaining soil health (Pendergrast, 2021). By effectively managing the risk Scottish agriculture faces it may be possible for the industry to benefit from climate change.

To protect the wild birds within Scotland efforts must be made to slow the warming of seas and also restore habitats. Slowing global warming will be beneficial to the wider environment, and within the wild bird area will prevent further habitat loss. In addition, there must be a focus on restoring habitats in a bid to increase species numbers both on land and at sea (Agriculture and Rural Economy Directorate, 2019). Plans have already been laid out by numerous NGOs, outlined in Nutt (2020), to allow nature to regain its place within Scotland. To ensure wildlife remains an attraction to visitors, policymakers must engage with relevant NGOs to ensure adequate restoration is occurring. By acting as a leader in this field Scotland could earn acclamation for its wildlife strategy and outperform other nations.

Conclusion:

Climate change impacts must be mitigated now, and government must act to implement solutions which will be an asset into the future. With such a major issue there will be no single method to combat the effects; however, governments can implement an array of solution which have the potential to be mutually beneficial and address environmental concerns. Whilst there are many potential impacts, the desire for the government and

population to deal with the effects of climate change opens the door for effective solutions which target specific rural and urban effects of climate change.

Words: 1,489

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