

Climate Change and Ageing

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Abstract

Climate change and an ageing population are crucial policy challenges which need to be addressed to ensure a safe, secure, equitable and sustainable future. Older people want to be part of the solution and to provide advice and guidance on what could be done to address climate change. Older people are especially vulnerable to some of the negative impacts of climate change. They form a large and growing group in society that needs an explicit policy response to minimize risk and vulnerability. There is an urgent need to exploit synergies between climate change policies and policies aimed at older people and to avoid overlaps and contradiction. This article briefly reviews the policy that can produce significant gains in quality of life for older people and at the same time contribute to reducing carbon footprints.

Keywords: Climate change, Ageing, Ecological footprint, Older people, Adaptation policies.

Introduction

Population ageing and climate change are the two most pressing issues now a days, yet there have been little attention given to the relationship between the two or the role of the built environment in eliminating intensifying effects. Heat waves pose the most immediate threat to public health and ageing. Older people, because of a range of physiological, psychological and socio-economic dispositions, are more vulnerable to the impacts of climate change and extreme weather events. Climate change and an ageing population are crucial policy challenges which need to be addressed to ensure a safe, secure, equitable and sustainable future. Despite there being a vast amount of literature dealing with the effects of global climate change on one hand and the repercussions of population ageing on the other, very little study exists addressing

the compounding impact resulting from these occurring simultaneously. The purpose of this paper is to bridge the knowledge gap between the impacts of climate change, the vulnerabilities of older people and how the built environment can influence levels of resilience through adaptation.

A Changing Climate

Climate change is defined as a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended duration, typically decades or even longer (IPCC 2007). Climate change is anticipated to result in an increase in average temperature. The Intergovernmental Panel on Climate Change (IPCC) predicts an increase of 1.8-4.0 °C(3.2-7.2 °F) by the end of the century.

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Besides, the world's population is predicted to grow, and with it, primary energy demand and emissions output globally are also expected to rise. Recent analysis by the International Energy Agency (IEA) estimated that between 60–80% of the world's energy use currently emanates from cities and urbanized areas (IEA 2008) reflecting the fact that 50% of the world's population now reside in these environments (OECD2009). By 2050 the OECD forecasts, based on the current trend of urbanization particularly in the developing economies, that this percentage will increase to 70%, while in developed economies 86% of the population will be living in cities (OECD 2010). In terms of climate change, continued urbanization (again predominately within the developing economies) will increasingly shift the world's reliance from CO₂ neutral energy sources (biomass and waster) to CO₂ intensive energy sources, leading to continued growth in greenhouse emissions from cities (OECD 2008).

Consequences of Global Climate Change

In addressing the impacts of global climate change, the Copenhagen Accord set the target of limiting global temperature increases to two degrees Celsius relative to pre industrialized temperatures. However, even a two-degree increase in global temperatures will result in significant impacts that are likely to disrupt ecological and social networks alike. At a global scale, such impacts will include (IPCC 2007):

- melting of the polar ice sheets resulting in sea level rise;
- disruption to food supply and water resources;
- damage to physical infrastructure;
- increased public health risks; and
- modified global biogeochemical cycles, as well as oceanic and atmospheric circulation patterns.

Many of the world's largest cities (and therefore concentrations of economic activity and production) are located in coastal areas, historically linked to sea-port development, and will therefore also be vulnerable to sea level rise and storm surge; and represents unprecedented risk to livelihood, property and urban infrastructure within the developed economies (OECD 2010).

Climate change has direct as well as indirect effect on individual health. Direct impacts include injuries and death caused by extreme weather events such as flooding, bushfire and cyclones⁶ (Greenough et al., 2001). Indirect impacts include

changes in incidences of chronic disease and illness, resulting from changes in temperature, food and water supply, pollution levels as well as the habitat of vectors impacting disease transmission (Haines et al 2006, Bernard and Ebi, 2001). The consequences of climate change to human health are likely to be significant, (DARA, 2010) predicating a 145% increase in human mortality rate between 2010 and 2030 directly attributable to climate change. The Global Humanitarian Forum (2008) estimates that approximately 300,000 deaths per year are caused by weather-related disasters and gradual environmental degradation due to climate change and that this figure will rise to 500,000 by 2030. In addition, many of these health impacts will particularly affect those with pre-existing health conditions or weakened immune and metabolic resistance as a result of age, meaning those who are very young and older will likely be more vulnerable (McMichael and Woodruff, 2006)

Contributor of Climate Change

Changing climate with accelerated warming of global temperatures is directly attributed to human activity (IPCC 2007). The majority of the world's scientists now agree that it is at least 90 per cent certain that human emissions of green house gases (GHGs) rather than natural variations are warming the planet's surface (IPCC,2007). During the 20th century, the world population grew approximately fourfold, accompanied by a 12-fold rise in worldwide emissions of carbon dioxide (Haines et al., 2006) primarily due to fossil fuel use and land use change. Similarly the rise in methane and nitrous oxide within the atmosphere has been the result of increased agricultural production (IPCC 2007). In an increasingly globalised, industrialized and interconnected world, human activity continues to drive environmental degradation. The rate and scale of human-induced global environmental change is so noteworthy that it now constitutes a novel geological era in the Earth's history called the Anthropocene (Zalasiewicz et al., 2011; Steffen et al., 2011).

Concept of Ecological Footprint

An individual's pattern of consumption changes eventually reflecting wealth, age, health and social needs. The biggest environmental impacts of day-to-day individual actions are associated with housing, food, energy and individual travel (Gronco and Warde, 2001, Spangenberg and Lorek, 2002). These activities generate waste and polluting emissions that are a major cause of environmental degradation and contribute to global climate

change (Zacarias-Farah and Geyer-Allely, 2003).

Since the 1970s, humanity's Ecological Footprint has doubled. In 2008 the Footprint exceeded the Earth's biocapacity (the area actually available to produce renewable resources and absorb carbon dioxide) by more than 50 per cent. It would take 1.5 years for the Earth to produce the resources humanity consumes in a single year. This 'ecological overshoot' is largely attributable to the carbon footprint, which has increased eleven-fold since 1961. Carbon emissions in particular together with food demand, are the major drivers of the escalating Footprint (WWF, 2012).

Ageing and Climate Change

Climate change is expected to have adverse effects on natural and human systems. Older People may be physically, financially and emotionally less able to deal with the effects of a changing climate compared with the rest of the population. The insecurity and heightened exposure to certain threats caused by a changing climate are compounded in old age by reduced capacities for coping independently. Older people can be considered as potential contributors to, and casualties of, climate change and potential campaigners to deal with the crisis.

Global Ageing

Ageing is a fact of life. The reality is that ageing is the progressive functional decline or a gradual deterioration of physiological function over time, including a decrease in reproduction, until death (Partridge and Mangel., 1999). The world is ageing rapidly and will continue to do so over the coming century. The contribution of those aged 55-plus rose from 12 per cent of the world's population (approx. 300 million) in 1950 to 16 per cent in 2010 (1 billion). By 2050 there will be a dramatic increase in the number of over 55s who will represent nearly a quarter (just over 2.5 billion) of the global population. Ageing is an accomplishment of progress and enhanced health systems, however, people also retain noteworthy vulnerabilities as they age.

Classification of old age group:

Baby boomers have a higher carbon footprint compared to other age groups. The term baby boomer is used here to refer to individuals aged 50–64 years. They are re-inventing old age basing it on new consumption and leisure orientated lifestyles, where travel and cosmopolitanism are key features (Leach et al., 2007). They are highly car dependent, with car use representing 71 per cent of all trips made by this group. On average

baby boomer individuals have a carbon footprint of approximately 13.5 tonnes, and emit 1.5 to 2.5 tonnes more CO₂ per year than any other age group (Haq et al., 2007).

Car trips represent 68 per cent of all trips for seniors (those aged 60-69 years of age) (DfT, 2005). Like the baby boomers, they enjoy travelling. Seniors have the second highest footprint compared to other age groups. A senior has a carbon footprint of approximately 12.1 tonnes of CO₂ per year.

Elders (aged 75 plus) share many of the characteristics of the seniors. They are aware of their own mortality and the concept of death. They are coping with increasing care needs and declining health. They have the highest climate impact per pound spent compared to all other age groups. Their CO₂ emissions from energy use in the home are 40 per cent higher than the national average. This is partly due to smaller household occupancy and the fact that older people tend to remain at home with a high demand for warmth. As people get older they reduce their CO₂ emissions from transport. This reflects a decline in their physical mobility and rising dependence on public transport. Those aged 70-plus undertake 10 per cent of trips by bus and 60 per cent by car compared to 4 per cent and 71 per cent respectively for those aged 50-59 (DfT, 2005).

Vulnerability of older people to climate change

As people grow older they are increasingly faced with declining health and physical strength, disability, loss of income and bereavement. The impacts of climate change such as high temperatures, storm damage, as well as meager access to public services due to severe weather events may create a threat to the quality of life of older people. Some threats are linked to life stage such as decline in health and physical strength, disability, loss of income, loss of a spouse or members of a social network. Thus, healthy lifestyles, coping skills, strong family and social ties, dynamic interests and of course, savings and assets, will all help in ensuring that people's reserves are and stay strong in later life.

Conceptualising vulnerability to climate change

The IPCC Third Assessment Report defines vulnerability to climate change as "a function of the character, magnitude and rate of climate variation to which a system is exposed, its sensitivity and its adaptive capacity" (IPCC 2001).

Functional age results from measuring performance on a range of measures or tasks which reflect various social, biological and psychological aspects (Hayslip and Panek, 1993). How an

individual will cope with climate-related threats will be determined by their functional age and life stage. Vulnerability is the threshold between successfully adapting and coping with climate events and not being able to do so. Vulnerability of older people to the effects of climate change arises from a combination of personal characteristics and interactions between exposure, sensitivity and coping capacity when faced with a specific climate related threat. Exposure level, likelihood and extent of the risk and the diverse coping capacities will all decide the severity of the outcome (Schroder-Butterfill and Marianti, 2006).

Effects of Climate Change on Older People

Climate change will affect key areas which have particular relevance in determining the quality of life of older people: health, social services, housing, transport and cost of living.

Extreme Weather Events

Climate change will likely affect the frequency, severity and duration of extreme weather events such as tropical cyclones including storm surge, flooding and severe storms, as well as alter the geographic regions affected by them. Extreme weather can be defined as “meteorological events that have a significant impact upon a local community or ecosystem” but which are also “a departure from what is considered the norm” (Greenough et al., 2001). Extreme weather events have their potential to destroy and damage buildings and infrastructure. These events also pose significant public health risks, not only through traumatic death or injury during the event, but also indirectly as a result of the disruption to social and ecological systems, which will occur during the post-disaster recovery phase.

1. Health

The physical and social well-being of older people will be affected directly and indirectly from a changing climate. Older people, especially women aged 75-plus, those living on their own or in a care home, are at particular high risk of being affected during a heat wave as well as those with chronic and severe illness including heart conditions, diabetes, respiratory or renal insufficiency, Parkinson’s disease or severe mental illness. Individuals who have Alzheimer’s, a disability or being bed bound may be affected due to their inability to adapt behavior to keep cool. In addition, environmental factors (e.g. living in a top floor flat) and over exposure (e.g. doing work out doors) can increase the risk of being affected (NHS, 2007a; 2007b; 2007c). Regulation of the body’s temperature can

be impaired in the elderly and chronically ill, and those who may take certain medications.

Older people are often more vulnerable to infectious disease, and as environments change, so will ailment patterns and incidence. Further, the changing climate and environment is rising prevalence of non-communicable diseases (NCDs) such as diabetes, heart disease, cancer, obesity, sensory-organ disease as well as dementias.

An expected 24 per cent of the global disease burden (healthy life years lost) and 23 per cent of all deaths can be attributed to environmental aspects. Diseases which are greatly influenced by changes to the environment include: diarrhoea (e.g. due to unsafe drinking water and poor sanitation and hygiene); lower respiratory infections (e.g. from indoor/outdoor air pollution); ‘other’ unintentional injuries (e.g. work place hazards, radiation and industrial accidents); and malaria (e.g. changes inland use and drainage) (WHO, 2007).

Long-term increases in temperature variability may increase the risk of mortality in different subgroups of susceptible older populations. High temperatures can result in changes in air quality with an increase in ground level ozone levels further threatening human health (Menz and Welsh, 2010; McMichael et al., 2012).

2. Disruption to local food supply

Disruption to local food production as a result of drought or other climate-induced causes impacts on the cost of food and the availability of fresh supplies. The major concern for older persons living on limited income is their ability to maintain an adequate diet in the face of escalating food supply induced by supply shortages.

3. Transport

Transport is important issue for people in old age. It provides an essential link to friends, family and the wider community. It is also provides a lifeline to maintaining independence. A lack of mobility can avert older people from participating in social activities and lead to low morale, depression and aloneness. Difficult driving conditions due to snow and ice would decrease but the number of days when driving is difficult due to rain and storms would increase (DfT, 2004).

4. Cost of Living

Cost is a significant factor determining people’s ability to travel as often as they wish. Climate change is likely to influence economic output via the availability of commodities essential for economic growth, such as water, food and energy. The climate

will become an increasingly important determinant of the cost of goods and services. The Stern Report on the economics of climate change concluded that the cost of extreme weather (e.g. as storms, floods, droughts, and heat waves) could reach 0.5 – 1 per cent of world gross domestic product by the middle of the century, and will keep rising as the planet warms (HM Treasury, 2006). This may result in inflation due to the higher prices of fuel, food and raw materials. Inflation is of particular concern to people in retirement, even in a relatively mild form. It reduces purchasing power when living on a fixed income.

Household transport costs may rise as private cars are a significant source of GHG emissions. Preventing climate change will require individuals to drive less often, and for shorter distances. Even without policies to reduce car use, rising oil and energy prices will make driving more expensive.

Coping Capacity

Coping capacity is how adaptable an individual is to dealing with the impact of climate change. This is linked to climate sensitivity. However, the importance placed on certain values may vary with ethnic background (Bajekal et al., 2004). Factors which older people value in later life include:

- Quality of neighbourhood: living in a home and neighbourhood that is safe, pleasant with good access to local amenities (e.g. shops, public transport, green space);
- Social networks and community: having social relationships which offer good help and support; material conditions having enough money to meet basic needs and participate in society;
- Health and well-being: having good health and mobility, retaining independence and control over life, engaging in hobbies and leisure activities (solo), having a positive psychological attitude and accepting conditions which cannot be altered (Gabriel and Bowling, 2004; Bajekal et al, 2004).

Coping capacity will be fashioned and further exacerbated by inequalities, social inequality, disempowerment and access to key important services (ODPM, 2006). Therefore, healthy lifestyles, acquisition of coping skills, strong family and social ties, active interests and, of course, savings and assets, all will assist in ensuring that people's reserves are, and remain, strong in later life (Grundty, 2006).

Reducing Older People's Vulnerability to Climate Change

Appropriate policies are needed to encourage people to reduce their personal contribution to environmental change during their life course, to protect older people from environmental threats, and to mobilize their wealth of knowledge and experience in addressing environmental problems. In order to highlight the issues we need to develop the evidence on which policy makers can formulate appropriate age-friendly mitigation and adaptation policies. Some of the important issues are discussed below.

1. Reducing the environmental footprint of an ageing population: Promoting greener attitudes and behaviors and influencing individual lifestyle choices across the life course are measures that can and should be used to reduce the future and current environmental footprint of older people.
2. Protecting older people from environmental change: There is need of policies that reduce the environmental vulnerability of older people and that focus on each part of the dynamic process that creates vulnerability. These comprise policies that make sure people reach later life with adequate reserves (e.g. coping skills, strong family and social ties and savings and assets), reducing the challenges they face in later life, and providing adequate health and social protection.
3. Mobilizing older people in environmental protection: Seniors' knowledge of the local environment, its vulnerabilities and how the community responds allows them to play a key role in reducing the environmental impact of disasters. In particular, their acquaintance of coping mechanisms can be critical when developing local disaster risk reduction and adaptation strategy. This will require additional funding, recruitment and retention strategies, especially for older people from minority communities and older people who are at risk of social exclusion.
4. Climate change proof homes for older people: There should be continued investment to ensure the highest standards of energy efficiency to reduce fuel bills and CO₂ emissions. In order to reduce CO₂ emissions from the housing sector and tackle fuel poverty, it is essential that the homes of older people are climate change proofed as quickly as possible and that this is done for existing homes as well as new build.

5. **Enrich local accessibility:** The aim of public policy should be to enhance local access possibilities because of its role in sustaining health and in ensuring that community life can continue in a relatively low risk environment should transport systems and mobility be disrupted by climate change. Every local authority should use the opportunity of 'Local Area Agreements and Multi Area Agreements' to re-focus its activities and budgets specifically towards delivering safer, stronger and healthier communities for older people. A major program of local accessibility enrichment and modal shift is taking into account best practice on walking, cycling, public transport and land use planning. The ability to move around a local home area and to access local shops, post offices and medical facilities is central to maintaining health and social interaction. A highly accessible local system is far better adapted to climate change than a centralized system based on assumptions of car ownership and longer distance travel.
6. **Leadership on older people and climate change:** Leadership is required to address the challenge of growing old in a changing climate and to ensure a safe, secure, equitable and sustainable future for older people. Central government should establish an 'Older People and Climate Change Group' that brings together older people's organizations, key stakeholders, the voluntary sector, government agencies and academia to develop a national policy framework that sets out cross sectoral interventions and policies to advance the quality of life of elder people. Environmental volunteerism and civic engagement can play a key role in building local community resilience to address environmental challenges such as climate change. It can provide opportunities for better integration in later life and confer benefits both to the individual and community.
7. **Home energy use:** A key factor which influences levels of CO₂ emissions in later life is the energy efficiency of homes. The over 50s people spend an increasing proportion of their income on fuel as they get older and spend more time indoors. Many energy conservation measures such as cavity wall, loft, and hot water cylinder insulation, draught proofing, installation of efficient boilers, and fitting heating controls, enable significant reductions in CO₂ emissions as well as improving the quality of homes and reducing energy bills. It is essential that atmospheric GHG concentrations are stabilized at a maximum of 450 parts per million (ppm) of CO₂ equivalent (some would argue that 350 ppm is required) to avoid irreversible and extremely damaging climatic changes. This would require all developed countries to cut emissions by at least 80 per cent from 1990 levels by 2050. Linking energy efficiency schemes with benefit entitlement provision and integrating schemes can create useful improvements within the existing framework.
8. **Healthier and independent lives:** An integrated and preventative approach to health and social care for older people will ensure that they can enjoy healthy and active ageing. Local health and social care providers need to work more closely to build on services already provided and ensure people are aware of basic entitlements to help them lead healthy, independent lives. This requires an improvement of health and social care services and easier access to use them.
9. **Stronger Communities:** Supportive neighborhoods and a sense of community can provide additional assistance to vulnerable older people. Local authorities can contribute to building social cohesion and community capacity through the Local Strategic Partnership (LSP).
10. **Personal Carbon Trading:** Personal carbon trading is being considered as a measure to reduce carbon emissions and tackle climate change. Personal carbon trading needs individuals to run their own CO₂ emissions. The concept suggests a national emissions cap would be set and carbon credits would be allocated across the population. A personal carbon allowance would be used to purchase particular goods and services (e.g. electricity, gas or transport fuel). Those who need more carbon than their allocated allowance would need to trade with those using less. Overtime the overall emissions cap (and thus each individual allocation) could be reduced in line with national or international agreements (DEFRA, 2008).

Conclusion

Growing old in the twenty-first century will bring with it the unique challenge of changing weather and climate and the impact this will have on all aspects of life. In order to effectively manage the effects of climate change it will be necessary to confront and integrate social dimensions in climate adaptation planning. Social dynamics will determine the vulnerability to climate related threats and the level of resilience of different social

and demographic groups. An understanding of the social factors which contribute to older people's vulnerability and resilience to climate change can strengthen the capacity of government and agencies to prevent and minimize the impact of climate change on this demographic group. There is a need to focus on reducing the vulnerability of older people to climate change by improving their adaptive capacity and resilience. Providing a more evidence-based understanding of the consequences of an ageing population and environmental change can support the formulation of appropriate age-friendly mitigation and adaptation policies that understand the factors that contribute to older people's vulnerability to environmental change and the restrictions that prevent them from developing adaptive capacity.

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