



Global Ageing and Environmental Change
Attitudes, Risks and Opportunities

Gary Haq, Carolyn Snell, Gloria Gutman and David Brown

*Let us take care of the children, for they have a long way to go.
Let us take care of the elders for they have come a long way.
Let us take care of those in between for they are doing the work.*

African Proverb

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ABBREVIATIONS AND ACRONYMS

BRIICCS	Brazil, Russia, India, Indonesia, China and South Africa
COTA	Council Of The Ageing
CO ₂	Carbon dioxide
DEFRA	UK Department for Environment, Food and Rural Affairs
EFILWC	European Foundation for the Improvement of Living and Working Conditions
MS	Microsoft
NHS	National Health Service
RSVP	Retired and Senior Volunteers Programme
UK	United Kingdom
UN	United Nations
US	United States
USA	United States of America
WWF	Worldwide Fund for Nature

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EXECUTIVE SUMMARY

Global ageing and environmental change bring together two key policy challenges which need to be addressed to ensure a safe, secure, equitable and sustainable future. Growing old in the twenty-first century will bring with it the unique challenge of a changing global environment with variable climate and weather patterns which will impact on all aspects of life.

In order to effectively manage the impacts associated with environmental change it will be necessary to confront and integrate social dimensions in adaptation planning. This requires a better understanding of the effects a changing environment will have on older people at the local, regional, national and international level and in different geographical and socio-economic contexts.

By 2050 there will be an unprecedented increase in the number of people aged 55-plus representing nearly a quarter of the global population.

The interaction between an ageing population and the environment poses significant challenges and opportunities for public policy. However, policy makers at the international level have given little attention to the effects global environmental change will have on this demographic group.

Many older people are socially, economically and politically active but are often excluded from the debates on sustainable development.

Older people are a diverse group and some are physically, financially and emotionally less resilient in coping with the effects of environmental change than others. The insecurity and heightened exposure to environmental threats are compounded for some older people by their reduced capacity for coping independently in later life.

A subset of older people can be disproportionately affected by natural disasters, climate-related weather events and levels of pollution, especially in the developing world where basic health and social care is often absent.

This study reviews the key issues relevant to global ageing and environmental change. It examines older people not only in terms of their vulnerability to environmental threats but as contributors to environmental sustainability.

In order to better understand the interaction of this diverse group with the environment, we can examine older people as potential contributors to, and casualties of environmental change as well as champions to tackle the problem.

Older people are more likely to vote compared to younger people. Their views can be influential for public policy and the acceptability of environmental protection measures. In order to take advantage of this growing resource it is important to gain an insight into older people's perceptions, knowledge and attitudes to environmental issues as well as the barriers that might prevent them from taking action.

In order to determine the perceptions and attitudes of individuals aged 55 and over to environmental issues a web-based survey was conducted in the period 1 February - 30 April 2012.

The aim of the survey was to gather data regarding a number of different environmental attitudes and behaviours. These included: the priority given to the environment compared to other social issues; perceptions about environmental problems; knowledge and concerns about climate change; environmental action and barriers to action.

A total of 1,028 individuals from Australia, Canada, UK, USA and Sweden completed the survey.

Participants were asked to indicate the three most important environmental issues in their region, and nationally/globally. Over 50 per cent of respondents selected national/global level climate change. The second two most commonly chosen global issues were stability of water and energy supply. At the regional level, climate change, stability of energy supply and loss of wildlife habitat were the three most commonly chosen problems.

Participants were asked to rate how they thought environmental problems would have changed by 2050. A total of 43 per cent of the sample believe that environment problems will have got a lot worse, compared to 6 per cent who believe they will have got a lot better.

The survey asked specific questions regarding climate change. For example, respondents were asked about a number of consequences of climate change that are predicted to occur, and about environmental issues that are often confused with climate change such as ozone

depletion. Over 40 per cent of respondents considered the hole in the ozone layer as a 'most likely' consequence of climate change, despite the two environmental issues having no relationship.

Participants were asked to rank their degree of concern with regard to the potential consequences of climate change. Over 25 per cent of respondents said that they were 'very much' concerned about the effects of more frequent severe floods and storms. A total of 60 per cent of respondents said that they were 'not at all' concerned about the impact of climate change on their holidays. There were also a relatively low number of respondents who were 'very much' concerned about the impact of climate change on their safety and security (13 per cent), and on their health (14 per cent).

A high proportion (59 per cent) of participants said that they were 'very likely' to take action with noticeable differences between countries. Participants were also asked questions about what would encourage them to take action. They were first asked whether knowing their ecological and/or carbon footprint would encourage them to make different choices to reduce their personal impact on the environment. The majority (85 per cent) of respondents partly agreed or strongly agreed that knowing their ecological and/or carbon footprint would encourage them to take action.

Participants were then asked about whether/how the over 55s might play a role in helping to address environmental problems. A total of 80 per cent of respondents identified changes in personal behaviour as one of the areas that the over 55s might play a role in, 70 per cent identified 'participating in local/community action' and 67 per cent indicated 'lobbying government'. This contrasts with just 10 per cent who thought that individuals in this demographic group do not have a specific role to play.

Participants were then asked about barriers to taking action, The most frequently chosen options related to lack of support or incentives from government. Access to information and guidance about how to respond to environmental issues were most commonly reported, with nearly half of all respondents selecting these options, compared to only a quarter who selected the 'I do not need any assistance or support' option.

While the survey was open to people from all countries not surprisingly, substantial numbers of respondents were only obtained from the five countries where the partners were based or had strong links and where major efforts were made to recruit study participants.

The survey was also biased due to it being web-based and thus, accessible only to those who are computer literate and have access to a computer.

Despite these limitations, the survey results provide an insight into older people's attitudes to the environment across five countries and they show that individuals from this demographic group are concerned about the environment.

From the evidence presented here, it is clear that there is a need to raise awareness of the effects a changing environment will have on an ageing population in both the developed and developing world at the local, regional, national and international level. We also need to understand the unique geographical and socio-economic contexts of the older people-environmental change interaction as well as to determine the costs and benefits for society.

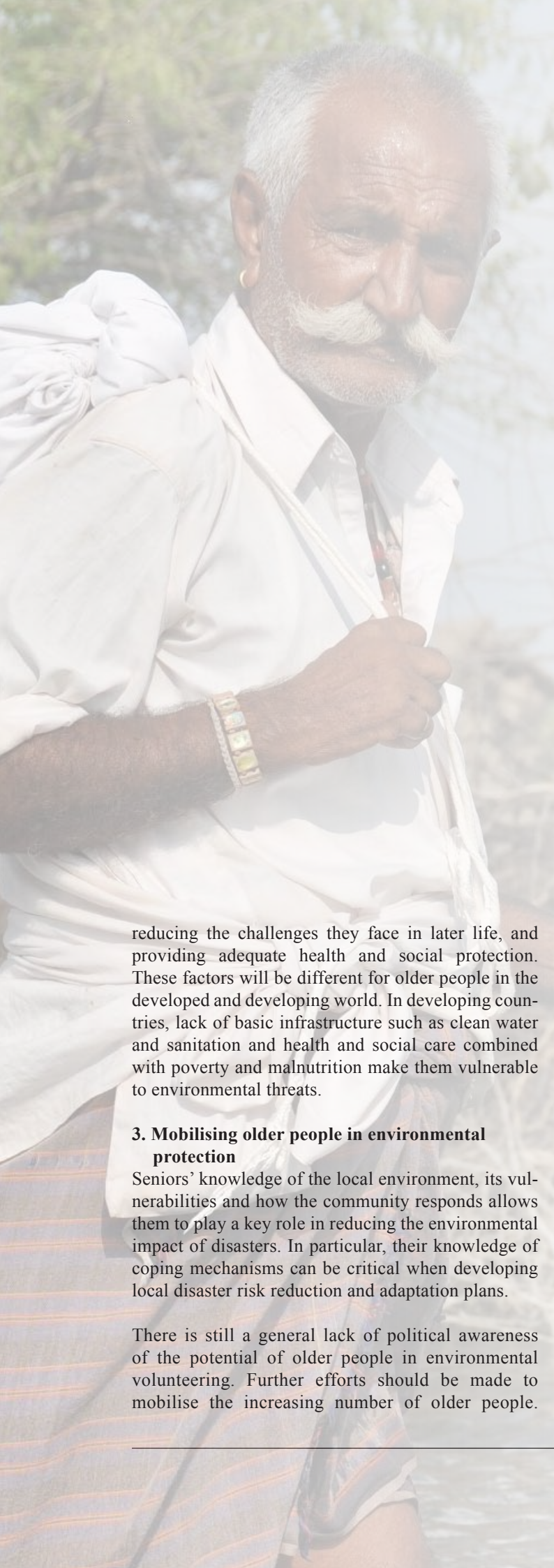
In order to highlight the issues we need to develop the evidence on which policy makers can formulate appropriate age-friendly mitigation and adaptation policies. This will require a deeper appreciation of older people's attitudes to the environment. Appropriate policies are needed to encourage people to reduce their personal contribution to environmental change during their life course, to protect older people from environmental threats, and to mobilise their wealth of knowledge and experience in addressing environmental problems. The study highlights three key action areas for policy makers:

1. Reducing the environmental footprint of an ageing population

Promoting greener attitudes and behaviours 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. This is particularly important at a time when many rapidly developing countries are seeing an increase in a high consuming middle class who will eventually grow older. There is an equally important need to engage older people using appropriate peer-to-peer approaches which could provide more credibility.

2. Protecting older people from environmental change

We need policies that reduce the environmental vulnerability of older people and that focus on each part of the dynamic process that creates vulnerability. These include policies that ensure people reach later life with sufficient 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. These factors will be different for older people in the developed and developing world. In developing countries, lack of basic infrastructure such as clean water and sanitation and health and social care combined with poverty and malnutrition make them vulnerable to environmental threats.

3. Mobilising 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 knowledge of coping mechanisms can be critical when developing local disaster risk reduction and adaptation plans.

There is still a general lack of political awareness of the potential of older people in environmental volunteering. Further efforts should be made to mobilise the increasing number of older people.

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. Appropriate advice and information and communication channels are needed to engage and inform these subgroups of older people. In addition, barriers to volunteering for older people such as insurance restrictions, health and safety regulations, and lack of access for disabled people need to be removed.

Our social and economic policies need to be shaped by a shared understanding of the ageing of our society and global environmental change. We can adapt to each of these separately, but that risks seeking solutions in one area that might impact adversely on the other. For example, we might drive up the cost of fuel in order to restrain usage but impose in consequence, on our older population, an inability to keep adequately warm and price them out of the car-using public when that might be their only option to get out and about. Likewise, we might develop more technologies to sustain older people living independently at home today, but fail to appreciate the hazards of hotter summers, storms and high winds, and flash floods and power failures which could negate the value of those technologies.

Policies therefore need to be 'age proofed' so that they can support older people through their life course. If we are to prevent and minimise the negative impact of environmental change on older people, there is an urgent need to better understand the interaction between global ageing and the environment and harness the contribution older people can make to addressing environmental threats, while reducing their vulnerability.

More evidence-based research is required to enable a better understanding of the unique geographical and socio-economic contexts of the older people-environmental change interaction. This is particularly the case in the developing world where older people are faced with multiple health, social, economic and environmental challenges without the necessary resources or technology to support them.

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.



1 INTRODUCTION

The global world population is ageing. By 2050 there will be an unprecedented increase in the number of people aged 55-plus representing nearly a quarter of the global population (UNPD, 2010). The rise in the numbers of older people is happening more rapidly in developing countries where 60 per cent of the world's older people currently live, particularly in Asia and Africa (HelpAge International, 2012a).

An ageing population has wide-ranging implications for environment, economy and society. Changes in age structure together with an expanding population, rapid urbanisation and levels of consumption are all placing pressure on the global environment (UNPD, 2010). This presents challenges in eradicating poverty, ensuring environmental justice and achieving environmentally sustainable development, especially in the least developed countries of the world.

The majority of old people will live in cities with 'urban seniors' being exposed to the health and environmental impacts of environmental pollution especially in low and middle-income countries which are experiencing a dramatic increase in levels of urbanisation, motorisation and industrialisation. Countries such as Brazil, China and Thailand are expected to have a similar proportion of older people to that of the United States. However, they will have less time to build the infrastructure to meet the needs of an older population. In these countries poverty is widespread with older people often having poor and inadequate access to healthcare. In the least developed countries many older people are also among the poorest and marginalised in society often being exposed to greater risk and insecurity due to environmental threats.

The interaction between an ageing population and the environment poses significant challenges and opportunities for public policy. However, policy makers at the international level have given little attention to the effects of global environmental change on this demographic group. Older people are a diverse group. Many older people are socially and economically active, but are often excluded from the debates on sustainable development. Some are physically, financially and emotionally less resilient in coping with the effects of environmental change than others. The insecurity and heightened exposure to environmental threats are compounded for some older people by their reduced capacity for coping independently in later life. Older people, or at least a sizable majority, therefore constitute a vulnerable group that can be disproportionately affected by natural disasters, climate-related weather events and

levels of pollution, especially in the developing world where basic health and social care is often absent.

As the world strives to recover from the global economic recession, growing old in the twenty-first century will bring with it the unique challenge of maintaining environmental quality while adapting to the effects of a changing climate. As a group, older people can be seen as potential contributors to, and casualties of, global environmental change as well as potential champions for action.

Traditionally, environmental gerontology has examined older people in the context of the built rather than the natural environment. Understanding how global environmental change and climate change will affect older people is still in its infancy. There is an urgent need to understand the older people – environmental change interaction. Recent studies have begun to examine issues of older people, sustainability and climate change (Green Alliance, 2009; Haq et al., 2007; 2008; 2010, Wright and Lund, 2000; HelpAge International, 2012a; 2012b). In addition, a deeper understanding of the social, environmental and economic dynamics that determine the vulnerability and resilience of this demographic group to global environmental change is required. This is important if a coherent international policy response is to be achieved – one that addresses the interface between global environmental change and older people and harnesses the contribution that older people can make to addressing environmental threats, while reducing their vulnerability and ensuring they reach later life with greater resilience.

AIMS OF THE STUDY

This study reviews the key issues relevant to global ageing and environmental change. It examines older people not only in terms of their vulnerability to environmental threats but also as potential contributors to environmental sustainability. In order to develop a better understanding of older people's attitudes to the environment an on-line survey was conducted in the period February to April 2012.

The survey was undertaken by an international consortium of partners keen to raise awareness and understanding of the interface between older people and global environmental change. The consortium was led by the Stockholm Environment Institute at the University of York (UK) and the Simon Fraser University Gerontology Research Centre (Canada)

and included Age UK, Community Service Volunteers' Retired and Senior Volunteer Programme (RSVP) (UK), HelpAge International and the Council On The Ageing (COTA) – (Australia).

The on-line survey aimed to understand the priority given by over 55s to the environment compared to other social issues, perception and knowledge of environmental issues, especially climate change, as well as willingness to take environmental action and perceived barriers to taking action. The survey was also made available as a paper copy in the form of an MS Word document file.

While an on-line survey has a number of advantages it is limited to those individuals who have access to a computer and are computer literate. Therefore the results are not representative of the older population of each country. In addition, while the survey was open to over 55s from any country the vast majority of the respondents were from five countries in the developed world (Australia, Canada, UK, USA and Sweden). These countries are where the research partners have their headquarters and where the survey was actively advertised.

Despite these limitations, the survey provides an initial insight into older people's attitudes toward the environment across three continents and five countries. The analysis contributes to understanding what is needed to develop appropriate policies that meet the twin challenges of an ageing population and a changing environment.

STRUCTURE OF THE REPORT

The report is divided into five chapters including this Introduction. Chapter 2 reviews issues of global demographic and environment change. This is followed in Chapter 3 by a discussion of the issues related to older people and the environment. Chapter 4 describes the methodology and findings from the survey of older people's attitudes to the environment. The report concludes with a series of recommendations in Chapter 5.



2 GLOBAL DEMOGRAPHIC AND ENVIRONMENTAL CHANGE

Population ageing is taking place around the world and is the result of a demographic transition that has seen a change from high to low levels of fertility and mortality. This is especially seen in the developed countries where increased wealth, improved nutrition and health care has resulted in more people surviving into older age and living longer.

The share 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 (see Figure 2.1). The majority of this increase will be in the developed countries although an increasing number of people are expected to live longer into old age in developing countries (see Figure 2.2). Figure 2.3 presents the percentage of over 55s as a proportion of the population (1950-2050) in the five countries represented in this study.

Global ageing is also expected to influence the scale, flow and destination of environmental migration with long-distance skilled migrants moving from environmentally challenged zones to meet the economic demands of ageing regions. This could increase the socio-economic and environmental impact on the population composition of both the host and the source countries (Harper, 2011).

In an increasingly globalised, industrialised and interconnected world, human activity continues to drive environmental degradation. The rate and scale of human-induced global environmental change is so significant that it now constitutes a new geological epoch in the Earth's history called the Anthropocene (Zalasiewicz et al., 2011; Steffen et al., 2011). The acceleration of human pressure on the Earth System has caused critical global, regional and local thresholds to be exceeded. Since these thresholds are strongly connected crossing one threshold may seriously threaten

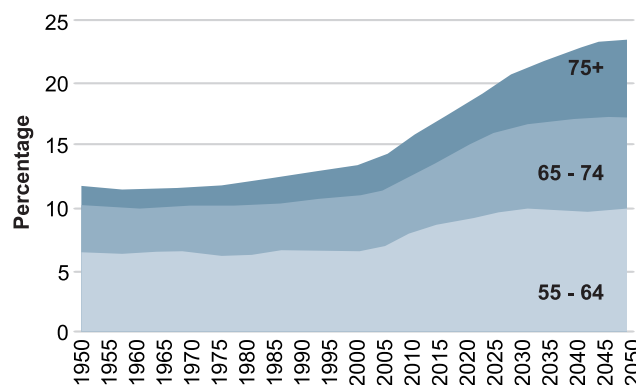


Figure 2.1: Acceleration in global ageing

Source: UNPD (2010)

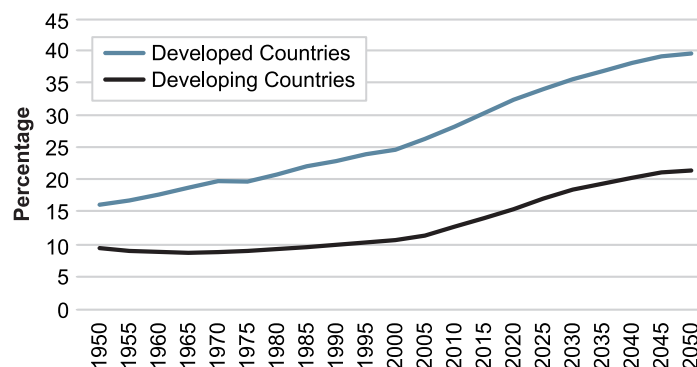


Figure 2.2: Over 55s as a percentage by Region

Source: UNPD (2010)

(a) More developed regions comprise Europe, Northern America, Australia/New Zealand and Japan.

(b) Less developed regions comprise all regions of Africa, Asia (excluding Japan), Latin America and the Caribbean plus Melanesia, Micronesia and Polynesia.

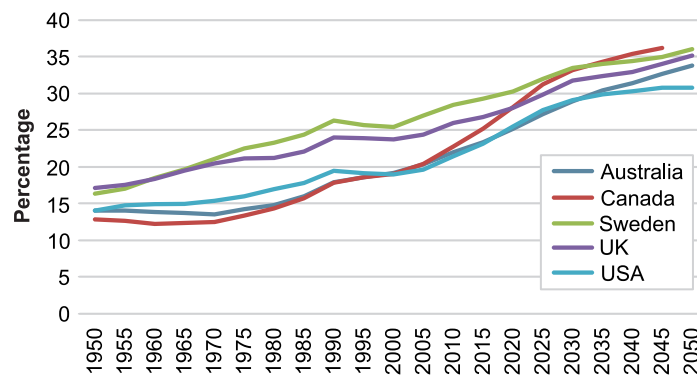


Figure 2.3: Over 55s as a proportion of the population in the five survey countries 1950-2050

Source: UNPD (2010)

our ability to stay within safe levels of the others. This could have irreversible effects on the life-support function of the planet with adverse implications for human wellbeing (UNEP, 2012). Despite improvements in environmental quality over the last four decades many regions of the world are still seriously affected by

Ecological Footprint

The Ecological Footprint tracks humanity’s demands on the biosphere by comparing humanity’s consumption against the Earth’s regenerative capacity, or biocapacity. It does this by calculating the area required to produce the resources people consume, the area occupied by infrastructure, and the area of forest required for sequestering CO₂ not absorbed by the ocean.

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 (see Figure 2.4). 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).

major environmental problems. Climate change, urban air pollution, deforestation, land degradation, marine pollution and loss of biodiversity, waste, chemicals and food and water insecurity are among the many environmental problems that remain unresolved (UNEP, 2012).

As older people make up an increasing proportion of the global population more people could be vulnerable to environmental threats although larger numbers do not automatically translate into bad outcomes. Improved environmental quality, better nutrition and better health care has resulted in more older people in the developed world remaining healthy and active in later life. Chronological age is no longer an accurate indicator of how an individual will behave or cope in old age or their vulnerability to environmental threats. Functional age provides a better measure as it defines people in terms of their abilities rather being based on how long they have been alive. Functional age is calculated by measuring performance on a range of

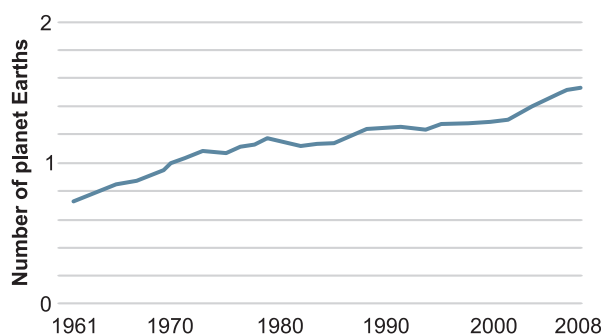


Figure 2.4: Global ecological footprint

Source: WWF (2012)

measures or tasks, performance in turn reflecting various social, biological and psychological characteristics of the person (Hayslip and Panek, 1993). How an individual will cope with environmental threats will be determined by their functional status. Older people's vulnerability and resilience will also vary depending on the geographic region in which they live and their socio-economic circumstances.

The issue of demographic ageing and environmental change has been absent from the sustainable development agenda. While there is much data on the number

of people getting old, little is known about growing old in a changing environment. This is a large knowledge gap as the demographic transition has the potential to result in major changes in the vulnerability profiles of different geographic regions. If we are to prevent and minimise the negative impact of environmental change on this demographic group, we need to better understand the interaction between population ageing and the environment in different parts of the world. This includes understanding older people's attitudes to their environment and the determinants of vulnerability and resilience to environmental change.



3 OLDER PEOPLE AND THE ENVIRONMENT

Older people are a diverse group. Some are educated, fit, active and wealthy, have access to most of the goods and services they need and desire and play a key role in caring for themselves and other family members including grandchildren. In contrast, others are poor, frail and require care and financial support. There are major regional differences, with poverty in Sub-Saharan Africa and South Asia resulting in many older (and younger) people in these areas lacking access to clean water, sanitation, nutrition and basic health care, making them highly vulnerable to environmental threats. In order to better understand the interaction of this diverse group with the environment, we can examine older people as potential contributors to, and casualties of environmental change as well as champions to tackle the problem (see Figure 3.1).

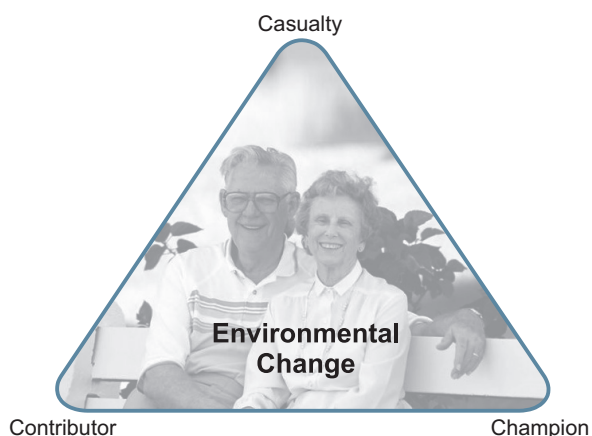


Figure 3.1: The 3 'C' approach to older people and environmental change

CONTRIBUTOR

An individual's pattern of consumption changes over time reflecting wealth, age, health and social needs. The largest environmental impacts of day-to-day personal actions are associated with housing, food, energy and personal travel (Gronco and Warde, 2001, Lorek and Spangenberg, 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).

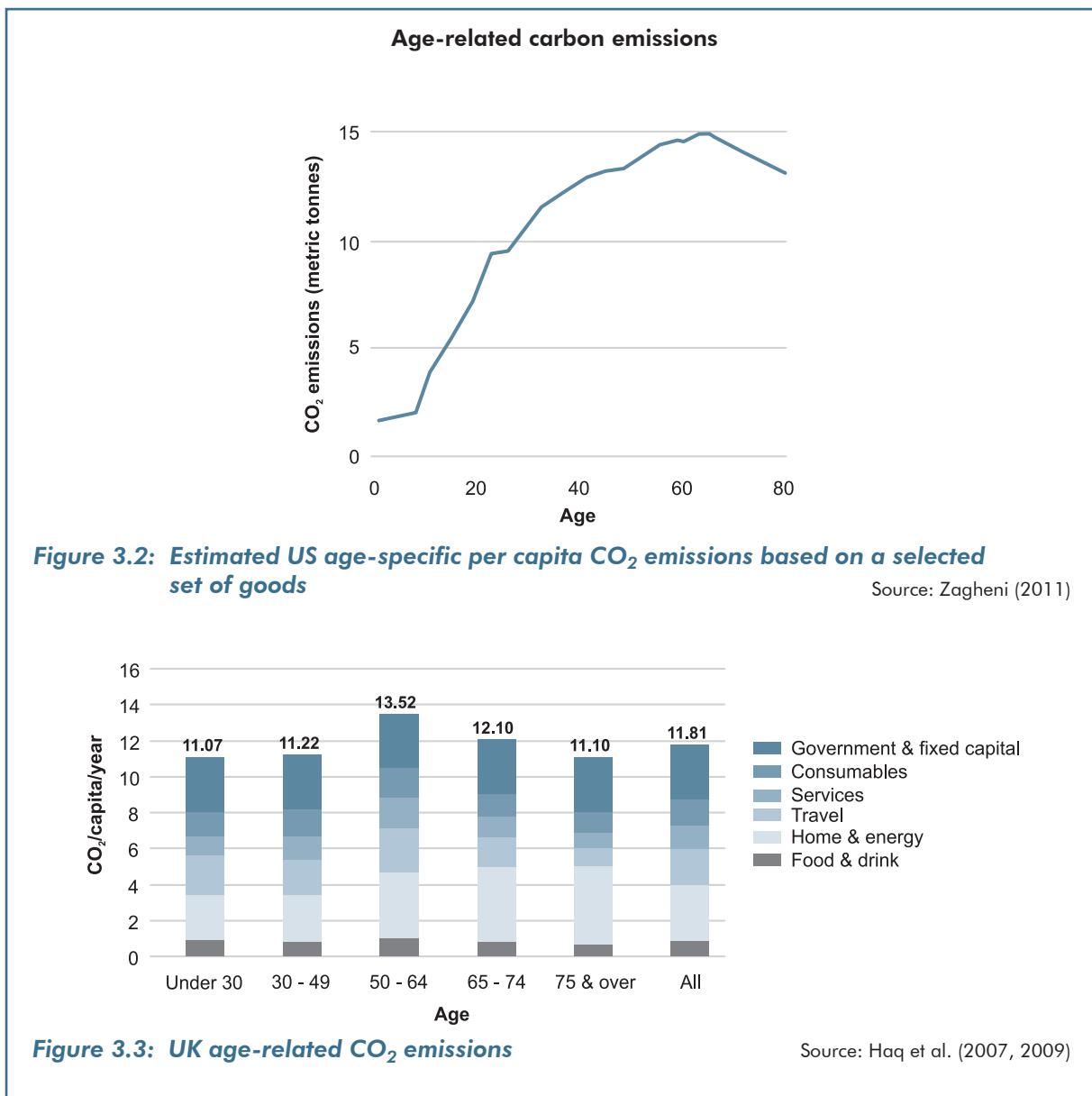
In China, India, the United States and many countries in Europe urbanisation, reduction in household size, changing lifestyles, and levels of consumption in later

life are having an impact on levels of energy use and carbon emissions (Haq et al.; 2007; York, 2007; O'Neil et al., 2010; Zagheni, 2011). In particular baby boomers in countries such as Australia, Canada, Sweden, the USA and the UK are bringing high consumption to later life. Baby boomers are the post-war generation born in the period 1946 to 1964. They are seen as having a particular impact on society not just because of their sheer numbers but also with respect to the different values and attitudes they hold. Baby boomers are re-inventing old age basing it on new consumption and leisure-oriented lifestyles, where travel and cosmopolitanism are key features (Leach et al., 2007). Many are highly car dependent and enjoy international air travel while changes in living arrangements have resulted in changes to residential energy efficiency.

Assessments of age-specific per capita carbon dioxide (CO₂) emissions demonstrate changes in household expenditure and consumption patterns over an individual's life course. Figure 3.2 presents estimates for age-specific profiles of per capita CO₂ emissions in the USA. For a set of selected carbon intensive goods (i.e. electricity, natural gas, gasoline, air flights, tobacco products, clothes, food, and cars) average emissions increase with age until people reach their late 60s after which per capita emissions decrease with age, with the consumption of energy-intensive goods decreasing at very old ages (Zagheni, 2011). An assessment of UK age-related CO₂ emission demonstrated that baby boomers have one of the highest carbon footprints compared to the rest of the population (see Figure 3.3). Key carbon intensive activities of the baby boomers included high car dependency, holidays abroad and eating out (Haq et al., 2007, 2009).

The average carbon footprint of older people in countries such as Brazil, Russia, India, Indonesia, China and South Africa (BRIICCS) are also expected to increase. These nations are experiencing rapid economic expansion and population growth and are adopting consumption patterns that mirror high-income countries. This is resulting in an increase in domestic water and energy use, car ownership, personal travel, meat and dairy consumption and waste generation (WWF, 2012). The environmental and socio-economic impact and implications of a high consuming middle class in these countries that will eventually grow old still needs to be understood and analysed.

As people live longer they are likely to require additional health and social care and medication. The high



use of medications in later life has led to concern about the bioaccumulation of pharmaceuticals in the environment and toxic effects on aquatic (e.g. rivers, lakes, streams, estuaries, seawater, groundwater and drinking water) and terrestrial ecosystems (Santos et al., 2010).

An ageing population will place demand on health and social care organisations which tend to have a significant environmental impact due to the size and nature of resources required for them to operate. For example, the overall carbon footprint of England's National Health Service (NHS) accounts for 25 per cent of all public

sector carbon emissions - approximately 4 per cent of total emissions in England (Naylor and Appleby, 2012).

Health and social care systems will have to become more resource efficient as they meet the demands of an ageing population. In future, they are also likely to be affected by increasing frequency and severity of climate-related events (e.g. floods and heat waves) which will disrupt their ability to provide services (Oven et al., 2012). This is an additional pressure on older people who are already vulnerable to the impacts of natural disasters and environmental change.

CASUALTY

The ability of older people to adapt and cope in later life is often compromised by threats from the natural environment. These environmental threats include both long-term exposure to environmental pollution (e.g. toxic pollutants in air, water or food) and sudden natural/human-induced shocks (e.g. heat waves, flooding and storms). The vulnerability of older people to these environmental threats is a result of the interaction of a number of factors that relate to exposure, sensitivity and coping capacity (Schroder-Butterfill and Marianti, 2006).

Exposure to environmental threats

Environmental threats can be natural or human-induced hazards. They include sudden shocks that place a stress on an older person's ability to cope (e.g. sudden climatic events such as hurricanes) or can occur over a long period (e.g. living in an environment with poor air quality). Figure 3.4 shows the diseases which have the largest environmental contribution. Exposure to environmental pollution can occur via a number of pathways such as inhalation, ingestion and skin contact (Geller and Zenick, 2005). The risk of exposure is further influenced by geographic location, local circumstances and type of environment - urban/rural and outdoor/indoor. There is increasing evidence to suggest that older people in developing countries are often left behind when sudden environmental shocks occur such as climate-related events. This may be due to ill health,

poor mobility and being unable to survive a long journey and a feeling of being tied to their home and land. As a consequence older people that remain behind are at significant risk of being exposed to further environmental threats (HelpAge International, 2012a).

Climate change is expected to result in a rise in average temperature that could lead to an increase in the intensity and frequency of extreme weather events such as heat waves, cyclones, floods, storm surges, heavy precipitation, and droughts. For example, flooding caused by changes in weather conditions can result in multiple threats which include the event itself, disruption and problems of recovery, and worry and anxiety of risk of reoccurrence. These threats can cause stress which together with pre-existing health conditions can have a significant impact on health and well-being of the flood victim. Due to the nature of floods being unexpected and sudden, they may occur when there is no time to have the appropriate mediating factors/care or support in place (Tapsell, 2002). Effective capacity to cope is dependent on strong education, health, political and social support systems.

In addition, older people will be vulnerable to indirect climate change-induced health risks from disruptions to ecological systems which affect food yield, production of aeroallergens (spores and pollens), bacterial growth, range and activity of disease vectors (e.g. mosquitoes) and water flows and quality (McMichael and Montgomery, 2012).

Older people and environmental threats

Comprehensive data regarding the age breakdown of fatalities is rarely available for natural disasters and human-induced environmental/climate change such as flooding, heat waves, cold waves, air pollution and storm events. However, there is increasing evidence to suggest that in such events most fatalities occur in vulnerable older people.

- 2011 Great East Japan Earthquake and the tsunami highlighted the extreme vulnerability of older people with an estimated 64 per cent of the total deaths being in older people (Sawai, 2012).
- 2005 Hurricane Katrina resulted in an estimated 1330 deaths in the wake of the disaster, the majority of deaths were in older people. In Louisiana, 71 per cent of those who died were older than 60 years; 47 per cent of this group was over 77 years old (Hutton, 2008).
- 2004 Indian Ocean tsunami had the highest death rate among the people aged over 70 – an estimated 28 per cent of this age group was killed by the Tsunami (Doocy et al., 2007).
- 2003 heat wave in France resulted in 14800 deaths in France, 70 per cent were of people aged over 75 years (Hutton, 2008).

Health impacts of selected environmental threats

An estimated 24 per cent of the global disease burden (healthy life years lost) and 23 per cent of all deaths can be attributed to environmental factors. 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 in land use and drainage) (WHO, 2007).

Environmental threats	Related health impacts
Outdoor air pollution	Respiratory infections, selected cardiopulmonary diseases, lung cancer
Indoor air pollution from solid fuel use	Chronic obstructive pulmonary disease (COPD), lower respiratory infections, lung cancer
Lead in the environment	Mild mental retardation, cardiovascular disease
Water, sanitation and hygiene	Diarrhoeal disease, trachoma, schistosomiasis, ascariasis, trichuriasis, hookworm disease
Climate change	Diarrhoeal disease, malaria, unintentional injuries, protein-energy malnutrition

The risk and harm resulting from variable climatic conditions will not be evenly distributed. In the developing world many older people live in fragile environments where changes in climatic conditions may result in water shortages and crop failure, affecting their income, livelihood and food security. Older people in poor communities will be affected by the health impacts associated with climate change. These include under-nutrition, diarrhoeal disease, extreme weather events and sea level rise. In particular, older people who have existing health complaints and who do not have the ability to access, or take, preventive action are more likely to be affected.

Long-term increases in temperature variability may increase the risk of mortality in different subgroups of susceptible older populations (Zanobetti et al., 2012). 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 and Montgomery, 2012).

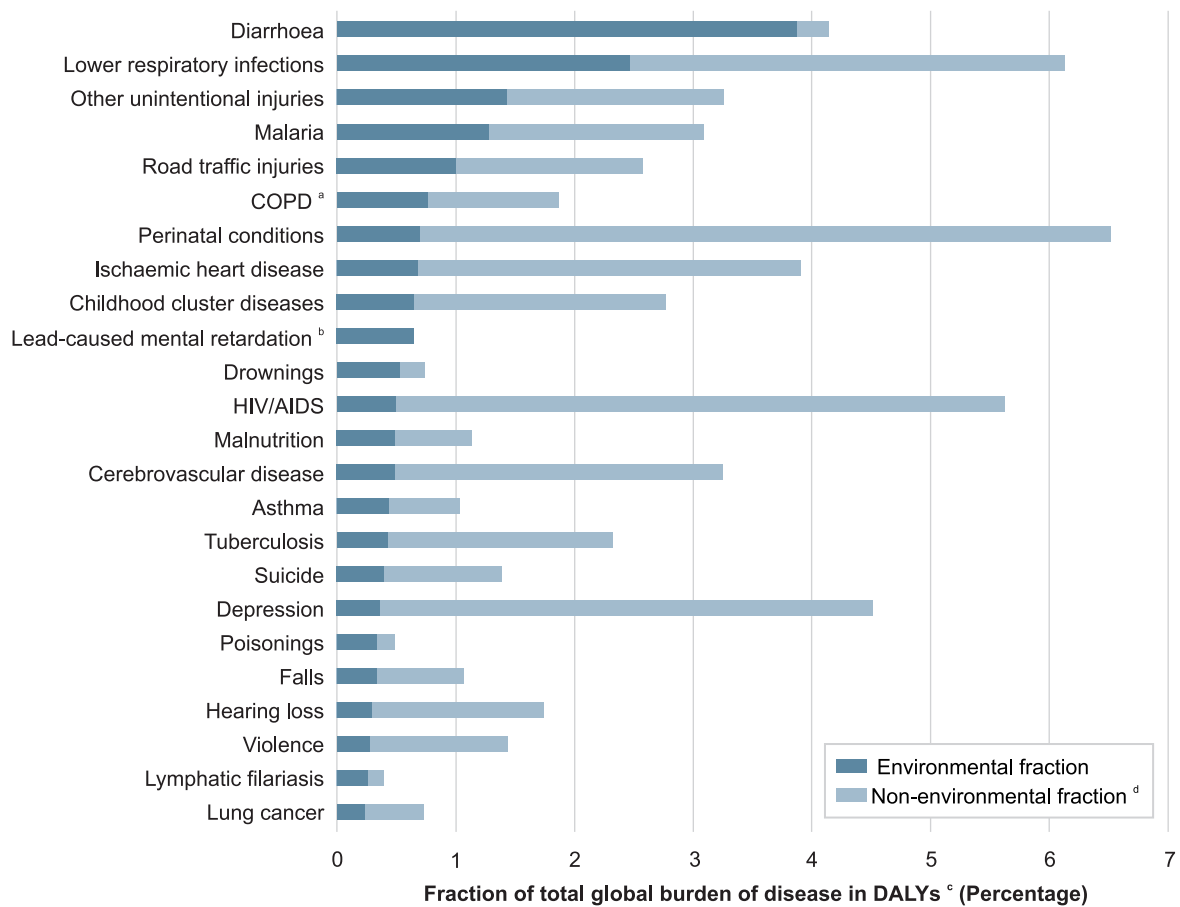
The August 2003 European heat wave saw a rapid raise in temperatures which reached 40°C which resulted in the death of an estimated 14,802 mainly elderly people in France (Bhattacharya, 2003) and 2,139 (16 per cent) excess deaths in England and Wales (Johnson et al.,

2005). The main causes of illness and death during a heat wave are respiratory and cardiovascular diseases. Older people who suffer from chronic and severe illness including heart conditions, diabetes, respiratory or renal insufficiency, Parkinson's disease or severe mental illness are particularly vulnerable. 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, 2007).

Sensitivity

An individual's sensitivity to the effects of environmental change will be determined by genetic disposition, pre-existing burden of disease or ill health, income, geographic location, family support systems, quality of public health infrastructure and access to relevant local information (see Figure 3.5).

As people grow older their biological capacity declines and they are susceptible to age-related chronic diseases, reduced mobility and strength, and impaired sight and hearing. Older people tend to be particularly susceptible to harm from toxic substances in the environment due to their depressed immune system, pre-existing burden of disease and the accumulation of toxic agents in their bodies (Peled, 2011; Sun and Gu, 2008). They may also be at greater risk due



^a Abbreviations: COPD = Chronic obstructive pulmonary disease.
^b Lead-caused mental retardation is defined in the WHO list of diseases for 2002, accessed at: www.who.int/evidence.
^c DALYs represents a weighted measure of death, illness and disability.
^d For each disease the fraction attributable to environmental risks is shown in dark blue. Light blue plus dark blue represents the total burden of disease.

Figure 3.4: Diseases with the largest environmental contribution

Source: WHO (2006)

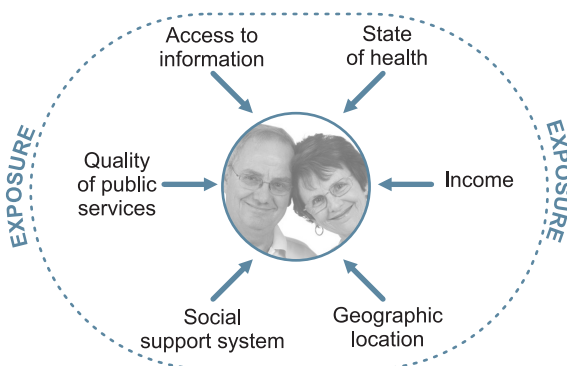


Figure 3.5: Determinants of sensitivity to environmental change

to the use of medication that affects how the body responds to external stressors.

An older person’s sensitivity is further compounded by the challenges they encounter in later life such as loss of income, loss of a spouse or members of their social network (see Figure 3.6). All these factors will determine to what extent an individual’s way of life and routine is disrupted by an environmental threat and may force them to mobilise coping resources to avoid a decline in their wellbeing (Woodward et al., 1998).

Vulnerability

Vulnerable older people are those whose reserve capacity falls below the threshold needed to cope successfully with the challenges that they face (i.e. a level that ensures a reasonable quality of life and/or avoidance of an early or ‘bad’ death). An older person’s

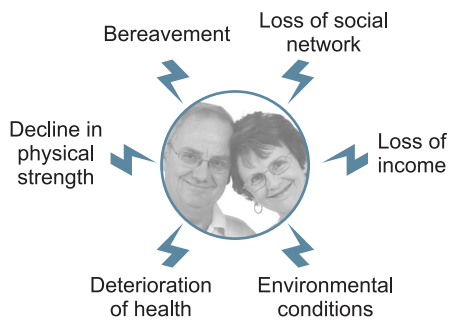


Figure 3.6: Challenges in later life

vulnerability is determined by the social, political and environmental context in which they live and exposure, sensitivity and coping capacity factors. The most vulnerable groups include the very old, those with low incomes, those with poor social ties and those with limited opportunities or capacities to exercise autonomy.

Older people are more vulnerable to the impact of environmental pollution such as air pollution (Kan et al., 2010; Peled, 2011). There is a high association between levels of nitrogen dioxide and particulate matter and heart and lung disease in older people and hospitalisation for community-acquired pneumonia (Bateson and Schwartz, 2004; Neupane et al., 2010). Long-term exposure to traffic-related air pollution increases the risk for asthma hospitalisation in older people (Andersen et al., 2012). In addition, older people are more vulnerable to gastrointestinal disease from waterborne pathogens due to changes in immune system and gastrointestinal functions that occur with ageing (Naumova et al., 2003).

Determining whether the effects of environmental change will have a bad outcome for older people will be dependent on how it affects their quality of life. In old age, people place value on a number of factors. These include:

- *Quality of neighbourhood*: living in a home and neighbourhood that is safe, pleasant, and 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 wellbeing*: having good health and mobility, retaining independence and control over life, engaging in hobbies and leisure activities,

having a positive psychological outlook and accepting circumstances which cannot be changed (Gabriel and Bowling, 2004; Bajekal, 2004).

The importance placed on certain values varies with ethnic background, cultural and geographical context (Bajekal et al., 2004).

Coping capacity

Improving the coping capacity of older people to prepare for, respond to and recover from an environmental threat reduces the extent they will be negatively affected by the direct and indirect impacts of global environmental change. This includes how quickly an individual can recover following a particular event. Older people's ability to cope with the effects of environmental change will be dependent on a combination of individual level capacities (e.g. wealth, education, skills and health), social networks (e.g. family, friends, neighbours, community institutions such as religious, voluntary groups and charities) and social protection policies (e.g. formal welfare provision such as pensions, health and social services). This will determine whether or not they suffer a bad outcome such as damage or loss of home and belongings, becoming physically weaker, economically impoverished, socially dependent, and humiliated or psychologically harmed. Coping capacity will be shaped and further exacerbated by inequalities, social and environmental injustice, disempowerment and access to basic essential services.

CHAMPION

Environmental awareness has led to a rise in local and national concern about pollution, waste and loss of green space. This comes at a time when a large number of people are entering retirement, providing an untapped reservoir of volunteers. Baby boomers in particular are entering later life in better health and with a higher level of education and financial resources than any previous generation (Pillemer et al., 2010).

Studies have shown that the older generation want to participate in efforts to reduce their environmental impact (Haq et al., 2007; Green Alliance, 2009; Brown et al., 2010). However, for some there is a lack of awareness of information sources and difficulty in accessing the appropriate information on actions that are best suited to their personal, social or economic circumstances. Available information is often perceived as being confusing and contradictory. Removal of these barriers, real or perceived, is key to both better engagement of this age sector and achieving sustained involvement (Haq et al., 2010).

Senior environmental volunteerism provides a structured means of making a meaningful contribution to society. Volunteering can produce positive benefits with regard to health and wellbeing (Lum and Lightfoot, 2005; Konrath et al., 2012) which may be increased when participating in environmental volunteering activities since volunteerism related to nature conservation and outdoor activities increases levels of physical activity and exposure to nature.

Environmental volunteerism and civic engagement can play a key role in building local community resilience to address environmental challenges such as climate change, fuel and food insecurity. It can provide opportunities for better integration in later life and

confer benefits both to the individual and community. An ageing population includes individuals with diverse economic and social resources. Their different characteristics and experiences influence opportunities and preferences for participation in voluntary activities (EFILWC, 2011). While there are already a large number of committed older volunteers in many countries there is an opportunity to mobilise the contribution older people can make by encouraging them to tackle environmental issues. However, if senior environmental volunteering is to reach its full potential then cultural, income, health and practical barriers will need to be removed and discrimination, negative perceptions and attitudes will need to be dispelled and challenged (Gill, 2006).



4 OLDER PEOPLE'S ATTITUDES TO THE ENVIRONMENT

Older people are more likely to vote compared to younger people (Goerres, 2007). Their views can be influential for public policy and the acceptability of environmental protection measures. In order to take advantage of this growing resource it is important to gain an insight into older people's perceptions, knowledge and attitudes to environmental issues as well as the barriers that might prevent them for taking action.

A web based survey was conducted in the period 1 February - 30 April 2012 to determine the perceptions and attitudes of individuals aged 55 and over to environmental issues. The aim of the survey was to gather data regarding a number of different environmental attitudes and behaviours. These included:

- the priority given to the environment compared to other social issues
- perceptions about environmental problems

- knowledge and concerns about climate change
- environmental action
- barriers to action.

The target group was informed about the survey via a number of communication channels e.g. seniors organizations and networks (see Table 4.1). The survey was also promoted through articles in newspapers and using social media (Twitter, Facebook and Blog). Individuals were requested to complete the survey on-line or using a copy of the survey in MS Word document form.

A total of 1,258 individuals from twenty-four countries began the survey, although as with many web-based surveys there were instances of non-completion and drop out (e.g. Crawford et al., 2001). Once missing data were removed from the sample there were on average 1,100 responses (varying by question). Whilst

Table 4.1: Recruitment method, number of respondents and percentage of sample by country

Country	Recruitment method	Number	Percentage of sample
Australia	Promotion and link on the COTA Victoria website, eNews letter (Victoria only), seniors newspaper article, emails to the COTA Victoria Seniors Environmental Network, promotional article in national 'One COTA' Magazine, circulation round other COTA branches, hard copies posted to those unable to complete the survey online.	240	23
Canada	Press release circulated by Simon Fraser University Gerontology Research Centre to the following national and provincial seniors' organizations: Canadian and Ontario Pensioners Concerned, the Council of Senior Citizens Organizations of British Columbia, Federal Super Annuates Association, Canadian Association of Retired Persons, Third Age University at St Thomas University, and to the Suzuki Elders (a small local organization dedicated to environmental issues). Also sent to the Seniors' Healthy Living Secretariat, Ministry of Health Province of British Columbia, with a request to publicize the survey on the Seniors' portal. The University's media and public relations office sent the press release to all of its usual news recipients – local, national and international newspapers, radio and TV stations.	225	22
Sweden	Press release to the Swedish Media and coverage in national newspaper.	120	12
United Kingdom	University of York Press Release and contact made to International English Newspapers. Press release circulated to the University of Third Age Network internationally, through Age UK networks, promotion through social media (e.g. Twitter and Facebook), feature in HelpAge publication 'ageways', feature in Department for Work and Pensions Later Life Newsletter, feature in CSV/RSVP publications (volunteering organisation), feature in Mature Times, SixtyPlus Surfers Website.	272	26
USA	Press release to state newspapers and promotion via Third Age Networks	171	17
Total		1,028	100.0

the survey was open to respondents from any country, the majority (1,028) were from Australia, Canada, UK, USA and Sweden - the five countries in which the consortium had partners and actively advertised the survey, and the results presented here are based on these five countries.

Australia, Canada, UK and USA were selected as English speaking countries with a similar liberal socio-political tradition (e.g. see Cerny, 1997; Cerny and Evans, 2004; Hulse, 2003). Sweden, quite different in terms of its main language and nature of state, was included because of its strong link with the University of York's Stockholm Environment Institute, to provide a contrast to the other four countries, and to act as an European comparator to the UK. Among the five main participating countries, the highest response rate was from the UK, and the lowest from Sweden (see Table 4.1).

Table 4.2 shows the socio-demographic characteristics of the respondents from the five main countries. It is noteworthy that over 43 per cent of this sample has a postgraduate degree and approximately 60 per cent of the sample is female.

The over-representation of individuals with high levels of educational attainment and women means that the sample is likely to over-represent those that:

- Have some contact with the seniors' networks used to promote the survey
- Follow the media (both old and new forms)
- Have an interest in the environment
- May have strong views on the topic (given that this is a self-selecting sample)
- Have access to the internet and computer literacy
- Are able to read and write in English.

Given the slight variations in sampling methods, and small national sample sizes the survey results do not provide a representative sample of older people from the five different countries. However, the results are an essential first step towards understanding environmental attitudes and behaviour of this under-researched demographic group. The data analysis does

Table 4.2: Socio-demographic characteristics of respondents from the five main countries

Variable	Category	Frequency	Percentage
Level of education	School education	110	12
	Vocational education	91	10
	Degree	329	35
	Higher degree	404	43
	Total	934	100
Employment status	Working full time	220	23
	Working part time	170	17
	Retired	588	60
	Total	978	100
Age group	55-59	236	23
	60-64	237	23
	65-69	261	26
	70-74	146	14
	75-79	78	8
	80-84	42	4
	85 +	17	2
	Total	1017	100
Gender	Male	391	39
	Female	619	61
	Total	1010	100

not attempt to make generalisations to national populations, but instead attempts to identify trends within the sample. The analysis presented below focuses on key findings, presenting overall concerns and perceptions about the environment and climate change, willingness and ability to take action, barriers to action, and forms of support that might encourage positive action. The charts are presented using percentages to enable easy comparison between categories. A chi square test was performed on any cross-tabulated data. This is a test of association between two variables. All cross-tabulations presented are significant at the 95 per cent level of statistical significance.

RESULTS

General concern and perceptions

Six statements originally used in the British Social Attitudes Survey (Jowell et al., 1994, Taylor, 2011) were adapted and used to test environmental values. Respondents were asked to indicate their level of agreement with each statement (i.e. strongly agree, agree, neither agree nor disagree, disagree, strongly disagree or don't know).

The first two questions were originally used in 2000 and aim to assess levels of 'environmental cynicism' i.e. scepticism about environmental dangers and threats (see Park et al., 2001). The remaining four questions were originally designed to test 'modern materialistic' beliefs, i.e. that the economy and science should be

placed ahead of environmental concerns (Witherspoon, 1995). These six questions were considered appropriate for this survey as they provide an indication of environmental values generally, and also attitudes towards scientific evidence, the role of technology, and the economy more specifically.

Figure 4.1 presents overall responses to the first five questions, which are deliberately provocative in nature. These have elicited the strongest responses with between 70 and 80 per cent of respondents strongly disagreeing or disagreeing with the statements. The sixth question related to economic growth, which is less strongly worded, elicited a far more mixed response with only 17 per cent strongly disagreeing with the statement, compared to 21 per cent strongly agreeing with it. This perhaps reflects the challenging economic circumstances that many of the countries that are included in the sample are currently facing.

There are some differences in responses by country, for example, for the 'scepticism' testing statement '*many of the claims about environmental threats are exaggerated*' the highest levels of disagreement are in Australia (79 per cent), Canada (87 per cent) and the USA (81 per cent) compared to the UK (59 per cent) .. With regard to the second 'scepticism' statement '*there are more important things to do in life than protect the environment*', once again, Australians (84 per cent) and Canadians (87 per cent) have the highest levels of disagreement. For the first of the 'post materialist' statements '*Modern science will solve our environmental problems with little change to our way of life*' agreement levels were well below 10 per cent for all four English speaking countries, and disagreement levels ranged from 72 per cent (UK) to 88 per cent in Canada.

For the second of the 'post materialist' statements, most Australians (79 per cent), Canadians (85 per cent) and Americans (76 per cent) in the sample disagree or strongly disagree with the statement '*people worry too much about human progress harming the environment*'. This is in contrast to respondents in the UK (approximately 20 per cent) who agree or strongly agree with the statement .

A similar trend for the statement '*we worry too much about the future of the environment and not enough about prices and jobs today*' was observed with a large majority of those in Australia (84 per cent), Canada (90 per cent), the USA (80 per cent) disagreeing or strongly disagreeing with the statement.

1. **Many claims about environmental threats are exaggerated**
2. **There are more important things to do in life than protect the environment**
3. **Modern science will solve our environmental problems and with little change to our way of life**
4. **People worry too much about human progress harming the environment**
5. **We worry too much about the future of the environment and not enough about process and jobs today**
6. **In order to protect the environment this country needs growth**

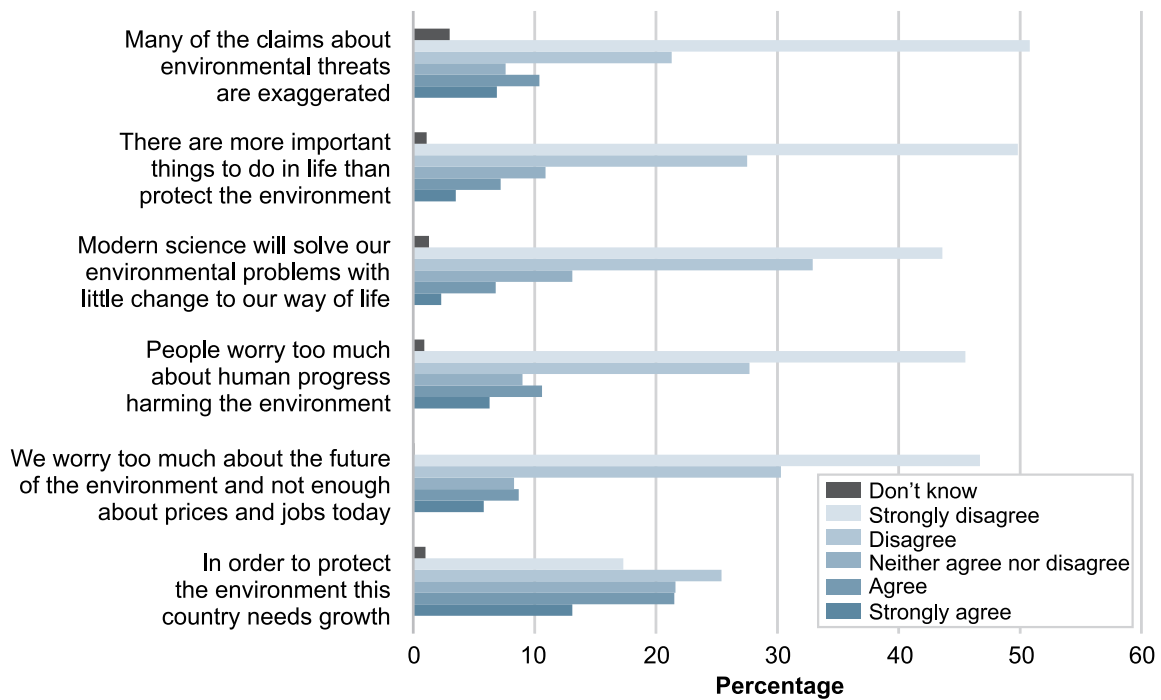


Figure 4.1: Overall response to the six attitudinal questions

For the statement ‘in order to protect the environment this country needs economic growth’ there were substantial differences in the results from Australia (28 per cent) and Canada (22 per cent) compared to the UK (40 per cent) USA (42 per cent) and Sweden (51 per cent) who agree or strongly agree with the statement. Overall the findings are different than those for the other questions, with higher levels of agreement with the statement expressed across all countries.

Participants were then asked to indicate the three most important environmental issues in their region, and nationally/globally. The results indicate that at the national/global level climate change was the most

commonly chosen environmental problem with over 50 per cent of respondents choosing it (see Figure 4.2). The second two most commonly chosen global issues were stability of water and energy supply. At the regional level, climate change, stability of energy supply and loss of wildlife habitat were the three most commonly chosen problems.

Participants were asked to rate how they thought environmental problems would have changed by 2050. Table 4.3 shows that 43 per cent of the sample believe that environment problems will have got a lot worse, compared to 6 per cent who believe they will have got a lot better.

Table 4.3: Concern for future generations

‘How do you think environmental problems will have changed in 2050? Will they have...’	Percentage	Frequency
Got a lot better	6	60
Got a little better	14	141
Remained about the same	10	102
Got a little worse	16	165
Got a lot worse	43	434
Don’t know	11	116
Total	100	1018

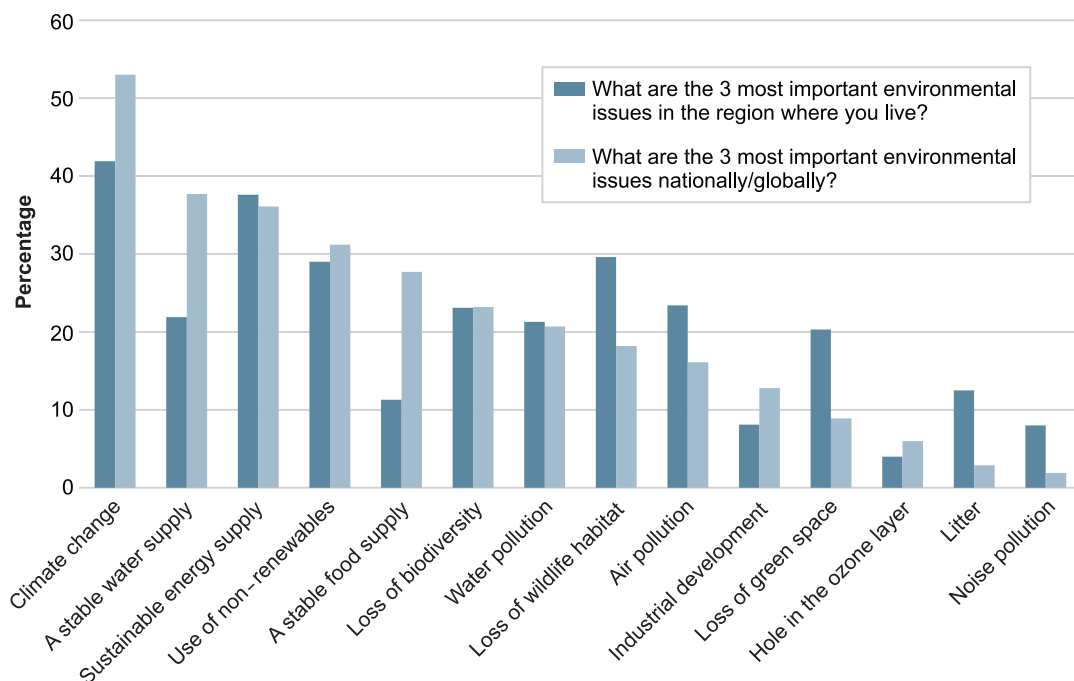


Figure 4.2: Comparing concerns about environmental problems at different spatial levels

CLIMATE CHANGE

The survey asked specific questions regarding climate change with a number of questions designed to test knowledge taken from a 2006 UK DEFRA survey of public attitudes to climate change. For example, respondents were asked about a number of consequences of climate change that are predicted to occur, as well as about environmental issues that are often confused with climate change such as ozone depletion. Figure 4.3 shows that over 40 per cent of respondents considered the hole in the ozone layer as a ‘most likely’ consequence of climate change, despite the two environmental issues having no relationship.

Participants were then asked about how concerned they were about the potential consequences associated with climate change. Firstly, they were asked to rank their degree of concern. Over 25 per cent of respondents said that they were ‘very much’ concerned about the effects of more frequent severe floods and storms (see Figure 4.4).

Secondly, they were asked how climate change might impact on various aspects of their lives including their health, holidays, security, and the economy. Figure 4.5 shows that 60 per cent of respondents said that they were ‘not at all’ concerned about the impact of climate change on their holidays. There were also relatively low number of respondents who were ‘very much’

concerned about the impact of climate change on their safety and security (13 per cent), and on their health (14 per cent).

Participants were also asked to rank how concerned they were about the impact of climate change in their country, and the results are presented in Figure 4.6.

Taking action

Participants were asked a number of questions concerning their willingness and ability to take positive environmental action. Table 4.4 shows a high proportion (59 per cent) of the sample said that they were ‘very likely’ to take action with noticeable differences between countries.

Whilst over 70 per cent of Australians and Canadians said that they were very likely to take action, under 50 per cent of Swedes, British and American respondents gave this response.

Participants were also asked questions about what would encourage them to take action. They were first asked whether knowing their ecological and/or carbon footprint would encourage them to make different choices to reduce their personal impact on the environment. The majority (85 per cent) of respondents partly agreed or strongly agreed that knowing their ecological and/or carbon footprint would encourage them to take action (see Table 4.5).

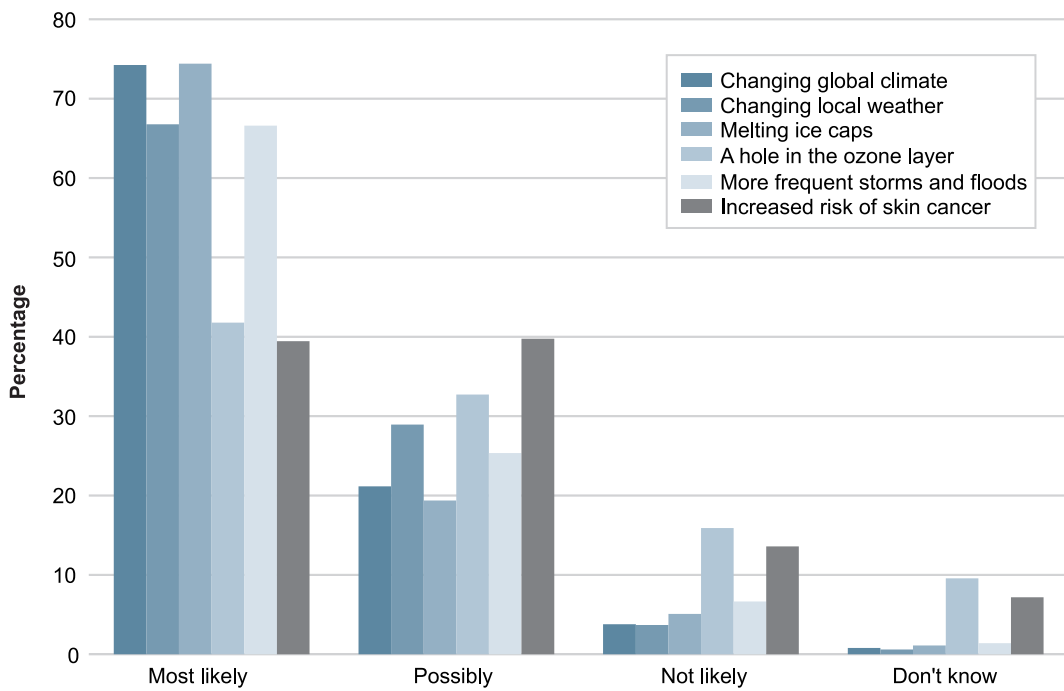


Figure 4.3: Consequences of climate change

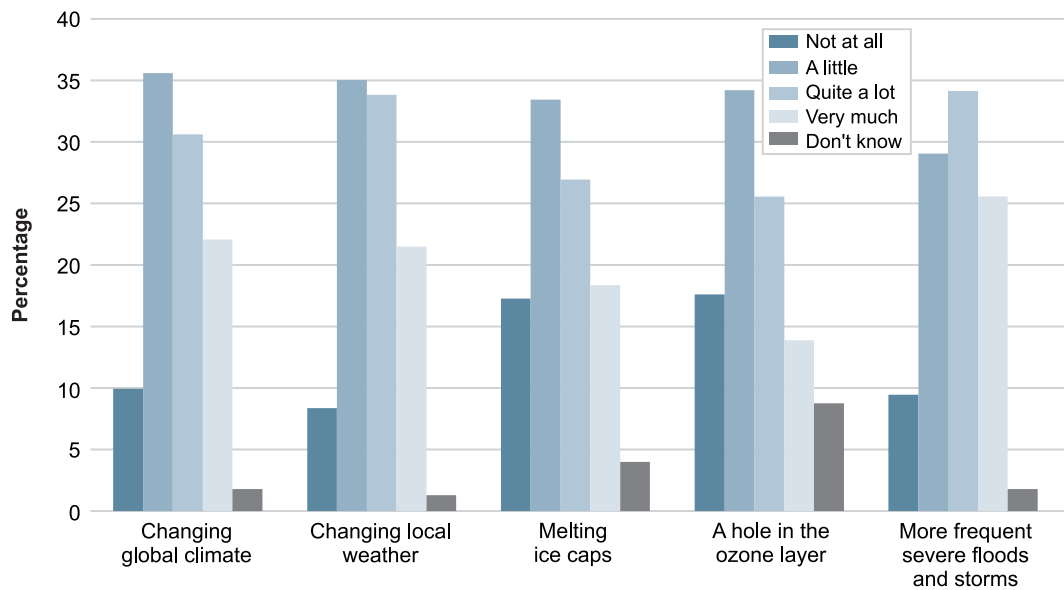


Figure 4.4: 'How concerned are you that the following possible effects of climate change will have an impact on your life?'

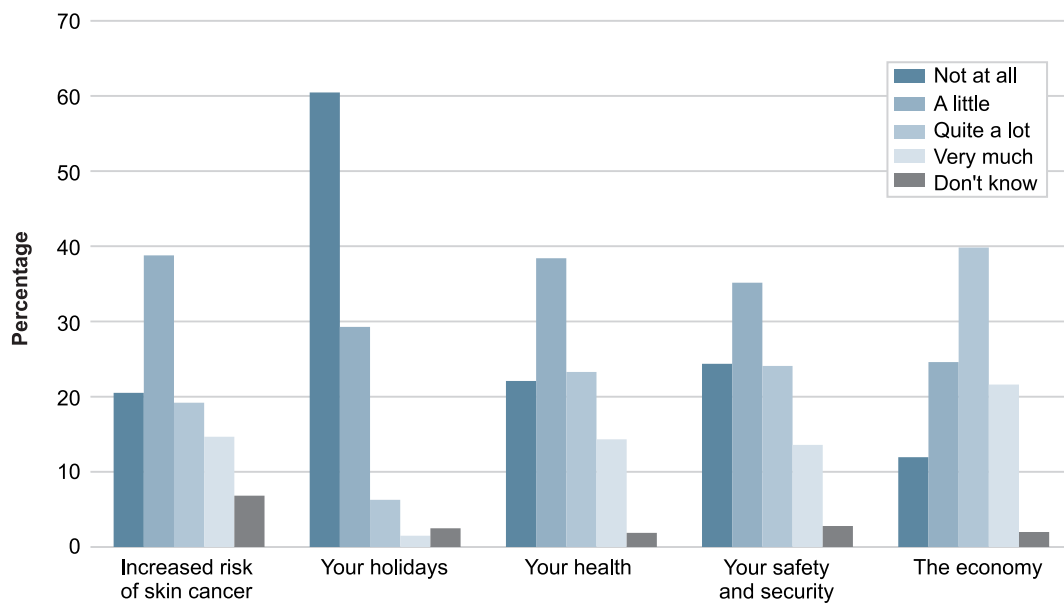


Figure 4.5: 'How concerned are you about the impacts of climate change on the following ...?'

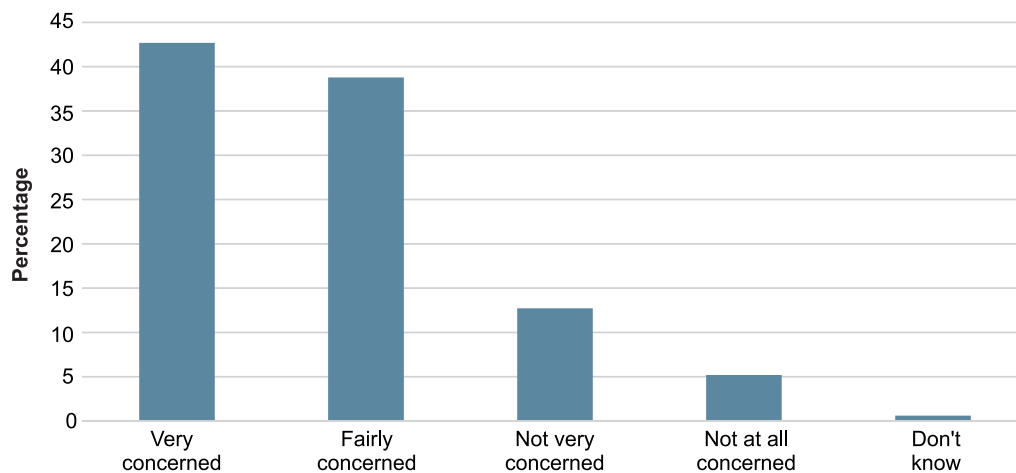


Figure 4.6: 'How concerned are you about the impacts of climate change in your country?'

Participants were then asked about whether/how the over 55s might play a role in helping to address environmental problems. Figure 4.7 shows that 80 per cent of respondents identified changes in personal behaviour as one of the areas that the over 55s might play a role in, 70 per cent identified 'participating in local/community action' and 67 per cent indicated 'lobbying government'. This contrasts with just 10 per cent who thought that individuals in this demographic group do not have a specific role to play.

Participants were then asked about barriers to taking action, and were asked to identify any barriers from the following list:

- Lack of knowledge
- Lack of appropriate information on which to base decisions
- Lack of support or incentives from government (regional, local, federal and central)
- Lack of support from friends or family

Table 4.4: Likelihood of taking environmental action

'How likely is it that you personally will take action in the next six months to limit your impact on the environment, including any action that you have already taken?'	Percentage	Frequency
Very likely	59	597
Fairly likely	24	241
Fairly unlikely	6	65
Very unlikely	7	73
Don't know	4	38
Total	100	1014

Table 4.5: Knowing my ecological/carbon footprint

'Knowing my ecological and/or carbon footprint would encourage me to make different choices to reduce my personal impact on the environment.'	Percentage	Frequency
Strongly agree	48	462
Partly agree	37	360
Partly disagree	5	53
Strongly disagree	7	68
Don't know	3	26
Total	100	969

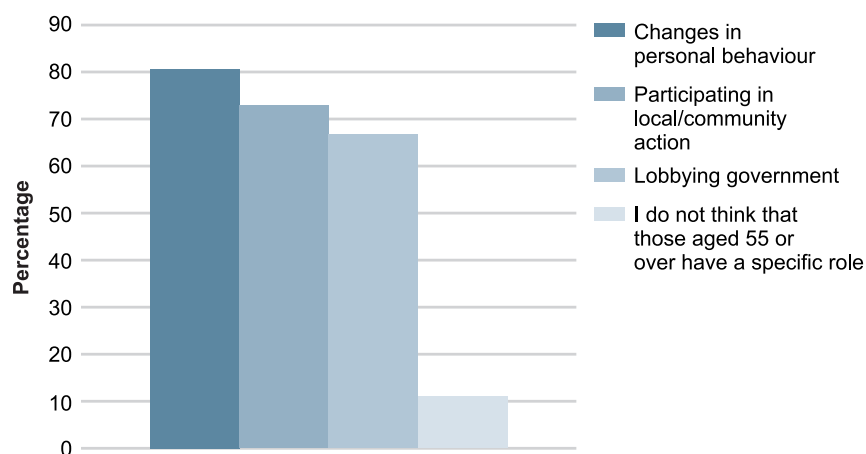


Figure 4.7: The role of the over 55s

- Lack of money
- Poor health or mobility

The most frequently chosen options related to lack of support or incentives from government (see Figure 4.8).

Leading on from this respondents were asked to identify what forms of support would help them to take action. These are presented in Figure 4.9.

Access to information and guidance about how to respond to environmental issues were most commonly reported, with nearly half of all respondents selected

these options, compared to only a quarter who selected the ‘I do not need any assistance or support’ option.

When these results were examined in more detail with a cross-tabulation/chi square test, no statistically significant relationship was found between country and those requiring more information or advice, or those saying that they do not require any support or guidance. However, the relationship between country and those requiring more guidance or incentives was statistically significant. In each country ‘incentives’ were the most frequently chosen, with results fairly similar across the four English-speaking countries.

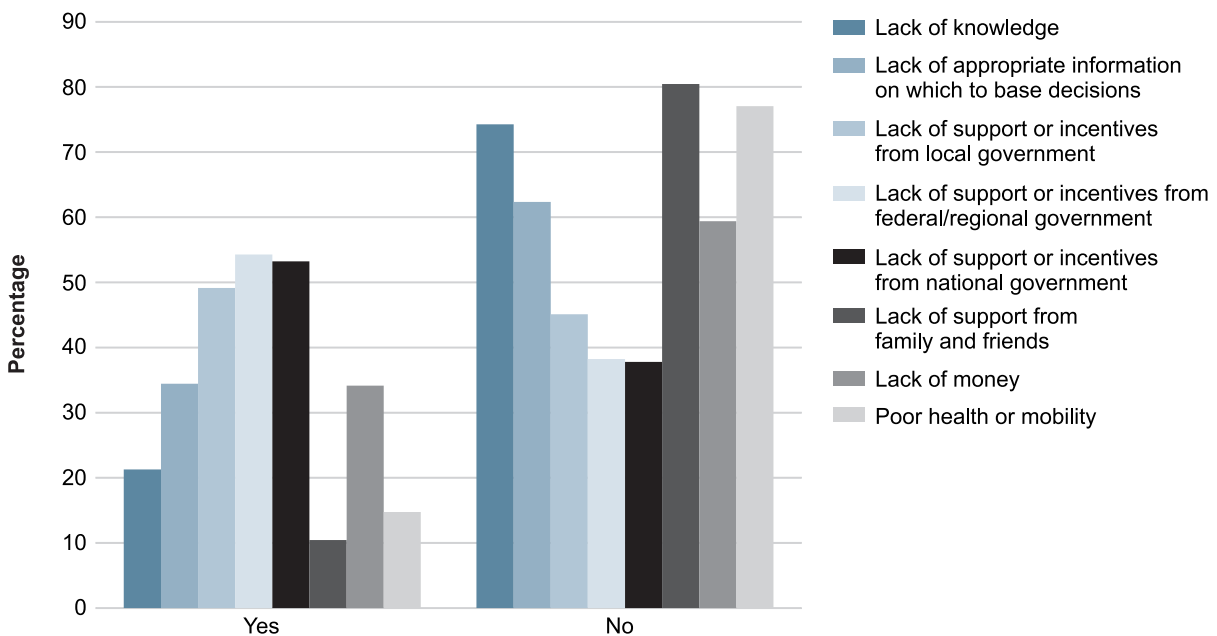


Figure 4.8: Barriers to action

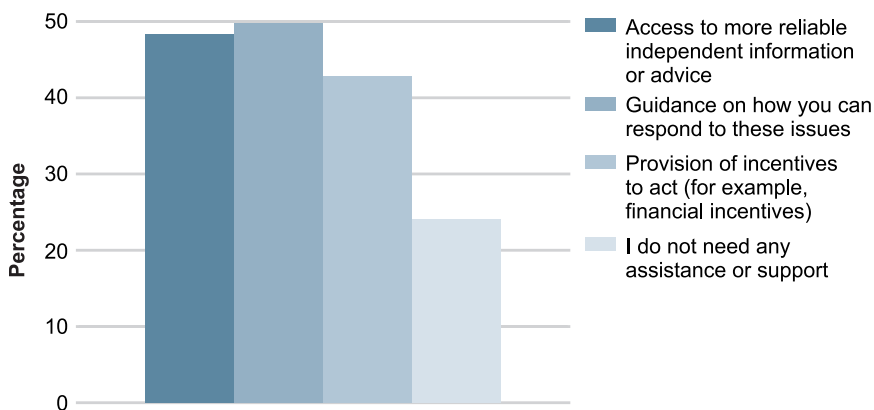


Figure 4.9: Type of support required

DISCUSSION

While the survey was open to people from all countries not surprisingly, substantial numbers of respondents were only obtained from the five countries where the partners were based or had strong links and where major efforts were made to recruit study participants. The survey was also biased due to it being web-based and thus, accessible only to those who are computer literate and have access to a computer.

Despite these limitations, the survey results provide an insight into older people's attitudes to the environment across five countries and they show that individuals from this demographic group are concerned about the environment. They are particularly concerned over the threat of climate change (53 per cent) and the availability and security of day-to-day water (40 per cent) and energy (36 per cent) resources rather than more traditional pollution and development issues. However, despite climate change being one of the main environmental issues of shared concern, respondents expressed low or varying levels of concern on how this issue will impact on their way of life or the country where they live. There was a relatively low level of concern about how climate change will impact their safety (only 13 per cent of respondents were 'very' concerned) or their health (14 per cent). Given the specific vulnerabilities

older people face with a changing climate, respondents seem to underestimate the safety, security and health impacts. This may be due to a lack of awareness and/or understanding of the potential impacts and the perceived risk to themselves and suggests a need for a concerted effort to protect a potentially vulnerable group from the effects of environmental change.

Respondents were pessimistic about the state of the planet future generations will inherit with a substantial proportion (43 per cent) believing environmental issues will have deteriorated significantly by 2050 compared to a very small proportion (6 per cent) who felt they will have significantly improved. Do the findings demonstrate a lack of faith in current environmental policies and a perception that is too late to make a difference? We cannot say but the data highlight a high level of pessimism despite policy attempts to improve environmental problems. However, it is important to note that nearly half of the survey respondents indicated that they needed more information and guidance about how to respond to environmental issues. Additionally over 40 per cent of respondents suggested that incentives (financial or otherwise) would encourage them to act. These findings could be interpreted as suggesting that the survey respondents would be prepared to take more action, if such support was forthcoming at the policy level.



5 CONCLUSIONS

This study aimed to explore the interface between an ageing population and global environmental change and to gain an understanding of older people's attitudes to environmental issues. From the evidence presented here, it is clear that there is a need to raise awareness of the effects a changing environment will have on an ageing population in both the developed and developing world at the local, regional, national and international level.

While the survey results presented in this report have their limitations, they do provide a preliminary insight into the environmental attitudes and knowledge of a sample of over 55s across three continents and in five countries. They are important in suggesting that 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 mobilise their wealth of knowledge and experience in addressing environmental problems.

REDUCING THE ENVIRONMENTAL FOOTPRINT OF AN AGEING POPULATION

Promoting greener attitudes and behaviours 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. This is particularly important at a time when many rapidly developing countries are seeing an increase in a high-consuming middle-class group who will eventually grow older. There is an equally important need to engage older people using appropriate approaches such as peer-to-peer approaches which could provide more credibility (Reed et al., 2008; Haq et al., 2010).

Targeted engagement of older people not only fosters greener behaviours but also responds to their perceived lack of opportunities for social involvement and interaction. Recent studies undertaken on direct interaction with the older age sector on climate change have demonstrated that, used in the appropriate way, it is a headline topic that stimulates lively discussion and debate on many issues related to environment and sustainability (Brown et al., 2010).

Appropriate infrastructure and incentives that encourages greener behaviours in later life will also be needed. Since there will be a high number of urban seniors, achieving age-friendly cities will be important. In

particular, older people require supportive and enabling living environments to compensate for physical and social changes associated with ageing (WHO, 2007). These include walkable outdoor space and accessible public buildings, accessible and affordable public transport, appropriately designed, affordable and energy efficient housing with access to local services, opportunities for social participation and social inclusion, civic participation and employment.

PROTECTING OLDER PEOPLE FROM ENVIRONMENTAL CHANGE

We need policies that reduce the environmental vulnerability of older people and that focus on each part of the dynamic process that creates vulnerability. These include policies that ensure people reach later life with sufficient 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. These factors will be different for older people in the developed and developing world. In developing countries, lack of basic infrastructure such as clean water and sanitation and health and social care combined with poverty and malnutrition make them vulnerable to environmental threats. HelpAge International (2012b) has discussed the need for climate and development strategies to be responsive to the realities of the ageing population and climate change. They suggest without age appropriate action, the effectiveness and success of climate adaption and national development and resilience strategies could be significantly compromised. HelpAge International outlines ten strategies to coping with an ageing population in a changing climate (see Box p.25).

In addition, Help the Aged identified ten basic requirements to make developed world communities better for older people (Help the Aged, 2008). These requirements included: adapting new and existing accommodation to suit people of all ages; transport options that meet the needs of all older people; keeping pavements in good repair; provision of public toilets; public seating; good street lighting and clean streets with a police presence; access to shops and services; places to socialise; information and advice; and ensuring older people's voices are heard on issues from social care to volunteering opportunities.

If we are going to better protect older people then appropriate policies and strategies that address both

Reducing the environmental footprint

In the developed world, home energy use and transport are the key areas where older people could take action to reduce their environmental footprint. Although not unique to older people the following actions can be taken to reduce the impact of individual lifestyles.

Energy	Food and products	Transport	Water	Waste
	Reduce meat and dairy consumption	Reduce air travel	Install a toilet water-saving device	Recycle household waste
Insulate homes and fit double glazing	Reduce fish consumption and purchase fish from sustainable stocks	Reduce car use Increase public transport use	Install low flow taps and showers	Dispose of toxic materials safely
Reduce temperature of the home environment	Purchase locally grown produce	Walk and cycle over short distances	Reduce use of water (e.g. car washing, lawn sprinklers, dish washers)	Compost organic waste
Purchase energy efficient appliances and do not leave appliances on, even in standby mode	Reduce levels of highly processed food Don't flush unused medicines down the toilet	Use smaller, fuel efficient cars and car share		
Reduce temperature of clothes washer cycles to 40°C	Purchase certified sustainable wood and paper products			

Source: Bedford et al. (2004)

development, ageing and environmental challenges in individual countries need to be adopted. Policies that provide social protection, encouraging healthy lifestyles, acquisition of coping skills, strong family and social ties, active interests and, of course, savings and assets, will be important. All will assist in ensuring that people's reserves are, and remain, strong in later life (Grundy, 2006).

MOBILISING 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 knowledge of socio-ecological system and coping mechanisms

can in some contexts be critical when developing local disaster risk reduction and adaptation plans (HelpAge International, 2012).

There is still a general lack of political awareness of the potential of older people in environmental volunteering. Further efforts should be made to mobilise the increasing number of older people. This will require additional funding, recruitment and retention strategies, especially for older people from excluded and marginalised communities and older people who are at risk of social exclusion. Appropriate advice and information and communication channels are need to engage and inform older people. In addition, barriers to volunteering for older people such as insurance restrictions, health and safety regulations, and lack of access for disabled people need to be removed (Davis-Smith and Gay, 2005; EFILWC, 2011).

Strategies for an ageing world in a changing climate

Strategy 1: Develop national and community disaster risk management programmes which proactively engage older people's knowledge and skills, and ensure their needs and vulnerabilities are considered in mitigation, preparedness and response work.

Strategy 2: Policy makers acknowledge the role older people play in farming and food security, and ensure that these are supported in adaptive agricultural and food security policies, as well as in access and utilisation of food and water.

This should include conservation agriculture practices, which are inclusive of labour saving techniques to make them more appropriate for older farmers and those with disabilities.

Strategy 3: Ensure mechanisms are in place so that older farmers' knowledge of resilient agricultural methods and environmental service and management are integrated and acknowledged in adaptive strategies and combined and shared with technological and modern knowledge advances, innovation, and technological advances.

Strategy 4: Support the empowerment of sustainable smallholder farming, including older farmers, to collectively develop more economic power, but also to work together through risk and knowledge sharing initiatives so that older farmers become more resilient and increase their adaptive capacity.

Strategy 5: Development of a social protection floor to support people across the life course

Strategy 6: Invest in health and social wellbeing systems for the growing numbers of older people, especially in areas where NCDs and other infectious diseases will be exacerbated by increasing temperatures and public health risks, especially non-communicable diseases in cities.

Strategy 7: Develop age-friendly and resilient cities and urban areas, which address both the infrastructural, economic and employment, social and wellbeing needs of growing older migratory populations.

Strategy 8: Ensure that the development of social protection systems and floors are resilient and adaptable, allowing older people to be supported whether they remain in environmentally risky areas or face climate-induced migration.

Further ensure that in crises or disasters, those social protection mechanisms can be augmented and used to deliver quick and effective cash aid to those most affected.

Strategy 9: Ensure social protection mechanisms facilitate access to fuel, energy, food and water, guaranteeing the most vulnerable, including older people, are protected from food and resource price shocks and stresses.

Strategy 10: Introduce a rights convention for older people, which includes the protection of their ownership and equitable access to land, water and other natural resources as well as wider social and economic entitlements.

Source: HelpAge International (2012b)

MOVING FORWARD

Global ageing and environmental change bring together two key policy challenges which need to be addressed to ensure a safe, secure, equitable and sustainable future. Growing old in the twenty-first century will bring with it the unique challenge of a changing global environment with variable climate and weather patterns which will impact on all aspects of life. In order to effectively manage the impacts associated with environmental change it will be necessary to confront and integrate social dimensions in adaptation planning. This requires a better understanding of the effects a changing environment will have on older people at the local, regional, national and international level and in different geographical and socio-economic contexts. Understanding how social factors contribute to older people's vulnerability and resilience can strengthen the capacity of governments and agencies to prevent and minimise the impact of global environmental change on this growing demographic group (Pillemer et al., 2011).

There is a need to focus on reducing the vulnerability of older people to environmental change by improving their coping capacity and resilience. Strategies are needed to examine the social processes which force older people into vulnerable conditions, and the structural inequalities that are the root cause of social-environmental vulnerability. It is important that efforts are focused on determining who will be most vulnerable to which events, what exacerbates vulnerability and what policies best strengthen people's capacity to adapt.

Our social and economic policies need to be shaped by a shared understanding of the ageing of our society and global environmental change. We can adapt to each

of these separately, but that risks seeking solutions in one area that might impact adversely on the other. For example, we might drive up the cost of fuel in order to restrain usage but impose in consequence, on our older population, an inability to keep adequately warm and price them out of the car-using public when that might be their only option to get out and about. Likewise, we might develop more technologies to sustain older people living independently at home today, but fail to appreciate the hazards of hotter summers, storms and high winds, and flash floods and power failures which could negate the value of those technologies.

Policies therefore need to be 'age proofed' so that they can support older people through their life course. If we are to prevent and minimise the negative impact of environmental change on older people, there is an urgent need to better understand the interaction between global ageing and the environment. We need to harness the contribution older people can make to addressing environmental threats, while reducing their vulnerability.

More evidence-based research is required to enable a better understanding of the unique geographical and socio-economic contexts of the older people-environmental change interaction. This is particularly the case in the developing world where older people are faced with multiple health, social, economic and environmental challenges without the necessary resources or technology to support them. 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 respond to 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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APPENDICES

APPENDIX I: QUESTIONNAIRE SURVEY

ARE YOU AGED 55 OR OLDER?

IF SO, WE WOULD LIKE TO FIND OUT WHAT YOU THINK ABOUT ENVIRONMENTAL ISSUES

In June 2012 the environment will once again be in the international spotlight as world leaders descend on Rio de Janeiro (Brazil) for the United Nations Conference for Environment and Development or “Earth Summit”.

We want to know what people aged 55 and over think about environmental issues at this current time.

Evidence shows that some older people in certain regions of the world can be disproportionately affected by environmental problems such as air pollution, climate change-related heat waves and other natural disasters.

It's important that seniors around the world make their voices heard so that policy makers can take action to better prepare for the needs of an ageing population.

In addition, recent research, surveys and consultations have exposed the missed opportunities associated with the lack of closer engagement of the over 55s in general discussion on environmental issues.

This short questionnaire is an attempt to address this “missing voice” and to widen involvement by seeking your views on the environmental issues of primary concern and your ideas for tackling them.

This survey is being conducted by an international consortium of older people organisations and universities. The consortium is led by the Stockholm Environment Institute at the University of York (UK) and the Simon Fraser University Gerontology Research Centre (Canada) and includes Help Age International, Age UK, Community Service Volunteers' Retired and Senior Volunteer Programme (RSVP) and the Council On The Ageing (COTA) – Victoria (Australia).

The on-line survey consists of 29 questions divided into four sections and should take about 10-15 minutes to complete.

All responses are anonymous and will only be used by the research team for this specific project. You can exit the survey at any time. Although to help our analysis, please ensure you complete Section 4 'About you'.

PLEASE RETURN YOUR COMPLETED QUESTIONNAIRE

BY

Q3 What do you think are the 3 most important environmental issues in the region where you live? *Please select 3*

- | | | |
|--|---|---|
| <input type="checkbox"/> Air pollution | <input type="checkbox"/> Noise pollution | <input type="checkbox"/> Water pollution |
| <input type="checkbox"/> Litter | <input type="checkbox"/> Loss of green space | <input type="checkbox"/> Loss of wildlife habitat |
| <input type="checkbox"/> Hole in the ozone layer | <input type="checkbox"/> Sustainable energy supply | <input type="checkbox"/> Loss of biodiversity |
| <input type="checkbox"/> A stable food supply | <input type="checkbox"/> A stable water supply | <input type="checkbox"/> Industrial development |
| <input type="checkbox"/> Climate change | <input type="checkbox"/> Use of non-renewable natural resources (e.g. coal and oil) | |

Other <i>Please specify</i>	
---------------------------------------	--

Q4 What do you think are the 3 most important environmental issues at the national/global level? *Please select 3*

- | | | |
|--|---|---|
| <input type="checkbox"/> Air pollution | <input type="checkbox"/> Noise pollution | <input type="checkbox"/> Water pollution |
| <input type="checkbox"/> Litter | <input type="checkbox"/> Loss of green space | <input type="checkbox"/> Loss of wildlife habitat |
| <input type="checkbox"/> Hole in the ozone layer | <input type="checkbox"/> Sustainable energy supply | <input type="checkbox"/> Loss of biodiversity |
| <input type="checkbox"/> A stable food supply | <input type="checkbox"/> A stable water supply | <input type="checkbox"/> Industrial development |
| <input type="checkbox"/> Climate change | <input type="checkbox"/> Use of non-renewable natural resources (e.g. coal and oil) | |

Other <i>Please specify</i>	
---------------------------------------	--

Q5 Are you personally affected by environmental problems?

- Yes No

If Yes, please specify

**Q6 How do you think environmental problems will have changed in 2050?
Will they have gotten ...**

- a lot better a little better remained about the same a little worse
 a lot worse

2 YOUR VIEWS ON CLIMATE CHANGE

Q7 Please complete the following sentence: climate change is ...

- Partly due to human behaviour Partly due to natural causes
 Mainly due to human behaviour Mainly due to natural causes
 Entirely due to human behaviour Entirely due to natural causes
 Don't know

Q8 Some people think that the following changes might occur as a consequence of climate change. For each option, please tell us how likely you think it is that this change will happen.

	Most likely	Possibly	Not likely	Don't know
Changing global climate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Changing local climate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Melting ice caps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A hole in the ozone layer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More frequent severe storms and floods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased risk of skin cancer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q9 How concerned are you that the following possible climate change effects will have an impact on your life?

	Not at all	A little	Quite a lot	Very much	Don't know
Changing global climate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Changing local climate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Melting ice caps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A hole in the ozone layer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More frequent severe storms and floods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased risk of skin cancer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q10 How concerned are you about the impacts of climate change on the following:

	Not at all	A little	Quite a lot	Very much	Don't know
Your holidays	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your safety and security	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The economy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The weather	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q11 How concerned are you about the overall impact of climate change in your country?

- Very concerned
 Not very concerned
 Fairly concerned
 Not at all concerned
 Don't know

Q12 How, if at all, do you think your country will be affected by climate change?

Q13 How soon, if at all do you think your country will be affected by climate change?

- | | |
|---|--|
| <input type="checkbox"/> It is already affected by climate change | <input type="checkbox"/> In the next 21-50 years |
| <input type="checkbox"/> In the next 5 years | <input type="checkbox"/> In more than 50 years |
| <input type="checkbox"/> In the next 6-20 years | <input type="checkbox"/> I don't think it will be affected by climate change |
| <input type="checkbox"/> Don't know | |

3 YOUR VIEWS ON TAKING ACTION

Q14 How likely is it that you personally will take action in the next six months to limit your impact on the environment (including any action that you already take)?

- | | |
|--|--|
| <input type="checkbox"/> Very likely | <input type="checkbox"/> Fairly unlikely |
| <input type="checkbox"/> Fairly likely | <input type="checkbox"/> Very unlikely |
| <input type="checkbox"/> Don't know | |

Q15 Have you heard of the ecological and/or carbon footprint?

- | | |
|------------------------------|-----------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Goto Q16 | Go to Q17 |

Q16 If YES, how do you feel about the following statement:

'knowing my ecological and/or carbon footprint would encourage me to make different choices to reduce my personal impact on the environment?'

- | | |
|---|--|
| <input type="checkbox"/> Strongly agree | <input type="checkbox"/> Partly disagree |
| <input type="checkbox"/> Partly agree | <input type="checkbox"/> Strongly disagree |
| <input type="checkbox"/> Don't know | |

Q17 How do you feel about the following statement:

'friends, family, colleagues or community expect me to do something to limit my impact on the environment' ?

- | | | | |
|--------------------------|----------------|--------------------------|-------------------|
| <input type="checkbox"/> | Strongly agree | <input type="checkbox"/> | Partly disagree |
| <input type="checkbox"/> | Partly agree | <input type="checkbox"/> | Strongly disagree |
| <input type="checkbox"/> | Don't know | | |

Q18 How might those aged 55 or over play a role in helping to overcome environmental problems?

- | | | | |
|--------------------------|---|--------------------------|---|
| <input type="checkbox"/> | Changes in personal behaviour | <input type="checkbox"/> | Lobbying government |
| <input type="checkbox"/> | Participating in local/community action | <input type="checkbox"/> | I do not think those aged 55 or over have a specific role to play |
| <input type="checkbox"/> | Other | | |
- Please specify*
-

Q19 Who do you think should be taking action to address environmental issues? *Please select all that apply*

- | | | | |
|--------------------------|--|--------------------------|-----------------------|
| <input type="checkbox"/> | Policy makers at the international level | <input type="checkbox"/> | Industry and business |
| <input type="checkbox"/> | National government | <input type="checkbox"/> | Local community |
| <input type="checkbox"/> | Federal/regional government | <input type="checkbox"/> | You, personally |
| <input type="checkbox"/> | Local government | <input type="checkbox"/> | Younger generation |
| <input type="checkbox"/> | Don't know | | |

Q20 Do any of the following factors prevent you from taking part in the efforts to tackle environmental problems?

	Yes	No	Not applicable
Lack of knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of appropriate information on which to based decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of support or incentives from local government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of support or incentives from federal/regional government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of support or incentives from central government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of support from family and friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Poor health or mobility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other <i>Please indicate these below in Q21</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q21 If you have indicated that there are factors that prevent you from taking part in the efforts to tackle environmental problems, please outline these here.

--

Q22 What assistance or support (if any) do you need to help you take part in the efforts to tackle environmental problems?

- Access to more reliable independent information or advice about the issues
 - Guidance on how you can respond to these issues
 - Provision of incentives to act (for example, financial incentives)
 - I do not need any assistance or support
- Other (Please specify)**

--

Q23 Who do you think should be responsible for providing the assistance and support you have identified?

- | | | | |
|--------------------------|-----------------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Central government | <input type="checkbox"/> | Business/industry |
| <input type="checkbox"/> | Federal/regional government | <input type="checkbox"/> | The voluntary sector |
| <input type="checkbox"/> | Local government | <input type="checkbox"/> | You, personally |
| <input type="checkbox"/> | Other | | |
- Please specify*

4 ABOUT YOU

IMPORTANT: In order to allow us to undertake an international comparison we need information on your age, gender and location. This information will not be passed on to anyone else.

Q24 Are you

- | | |
|-------------------------------|---------------------------------|
| <input type="checkbox"/> Male | <input type="checkbox"/> Female |
|-------------------------------|---------------------------------|

Q25 How old are you?

- | | |
|--------------------------------|--------------------------------|
| <input type="checkbox"/> 55-59 | <input type="checkbox"/> 70-74 |
| <input type="checkbox"/> 60-64 | <input type="checkbox"/> 75-79 |
| <input type="checkbox"/> 65-69 | <input type="checkbox"/> 80-84 |
| | <input type="checkbox"/> 85+ |

Q26 Are you

- | | |
|--|----------------------------------|
| <input type="checkbox"/> Working full time | <input type="checkbox"/> Retired |
| <input type="checkbox"/> Working part time | |
| <input type="checkbox"/> Other | |
- Please specify*

Q27 Which country do you live?
Please specify

Country	
---------	--

Q28 Which region do you live in (e.g. New South Wales, South Yorkshire, Ontario)?

Region	
--------	--

Q29 What is your highest level of education (e.g. degree, postgraduate degree, 8th grade, high school diploma, GCSE etc)

--

Q30 If you feel that this questionnaire does not adequately address the points or comments you want to make, then feel free to state these below.

--

THANK YOU!

Please help us to gain more views by encouraging your peers to complete the survey too.

Your results will be included in an international survey of older people's attitudes to the environment.

***PLEASE SAVE THE COMPLETED
QUESTIONNAIRE AND SEND BY EMAIL BEFORE***

APPENDIX II: RESPONSES TO GENERAL CONCERN AND PERCEPTION QUESTION BY COUNTRY

	Country	Strongly agree (n)	Agree(n)	Neither (n)	Disagree (n)	Strongly disagree (n)
In order to protect the environment this country needs economic growth¹	Australia	8.4% (20)	19.2% (46)	18.4%(44)	27.6% (66)	25.9% (62)
	Canada	8.2% (18)	13.6% (30)	20.5% (45)	29.5% (65)	26.4% (58)
	Sweden	27.0% (31)	24.3% (28)	23.5% (27)	17.4% (20)	7.0% (8)
	UK	14.2% (38)	25.4% (68)	22.0% (59)	25.7% (69)	12.3% (33)
	USA	15.3% (26)	27.1% (46)	25.9% (44)	21.8% (37)	8.2% (14)
	Total	13.1% (133)	21.5% (218)	21.6% (219)	25.4% (257)	17.3% (175)
We worry too much about the future of the environment and not enough about prices and jobs today²	Australia	5 % (12)	5.9 % (14)	5.4 % (13)	26.8 % (64)	56.9% (136)
	Canada	0.5% (1)	4.5% (10)	4.5% (10)	27.3% (60)	62.7% (138)
	Sweden	13.9% (16)	18.3% (21)	9.6% (11)	21.7% (25)	36.5% (42)
	UK	8.6% 23	13.0% 35	11.2% 30	33.5% 90	33.8% (91)
	USA	4.1% (7)	4.7% (8)	11.8% (20)	40.2% (68)	39.1% (66)
	Total	5.8% (59)	8.7% (88)	8.3% (84)	30.3% (307)	46.7% (473)
People worry too much about human progress harming the environment³	Australia	6.3%(15)	7.6 % (18)	7.1 % (17)	28.2 % (67)	50.4 % (120)
	Canada	4.5 % (10)	3.6 % (8)	5.9 % (13)	25.9 % (57)	58.6 % (129)
	Sweden	14 % (16)	15.8 % (18)	14.9 % (17)	21.1 % (24)	32.5 % (37)
	UK	6.7 % (18)	15.7 % (42)	10.9 % (29)	30 % (80)	35.6 % (95)
	USA	2.9 % (5)	12.4% (21)	8.8 % (15)	30 % (51)	45.9 % (78)
	Total	6.3% (64)	10.6% (107)	9% (91)	27.7% (279)	45.5% (459)
Modern science will solve our environmental problems with little change to our way of life⁴	Australia	0.8% (2)	5.4% (13)	10.0% (24)	27.2% (65)	54.8% (131)
	Canada	0.9%(2)	4.1% (9)	7.3% (16)	28.2% (62)	59.5%(131)
	Sweden	12.2%(14)	17.4% (20)	19.1% (22)	27.0% (31)	23.5%(27)
	UK	0.7% (2)	7.1%(19)	18.7% (50)	41.4% (111)	30.2%(81)
	USA	1.8%(3)	4.7% (8)	11.8% (20)	37.9% (64)	42.0%(71)
	Total	2.3% (23)	6.8% (69)	13.1% (132)	32.9% (333)	43.6%(441)
There are more important things to do in life than protect the environment⁵	Australia	1.3% (3)	4.6%(11)	8.9% (21)	26.2% (62)	58.2%(138)
	Canada	1.4%(3)	5.0%(11)	6.4%(14)	21.6% (47)	65.6%(143)
	Sweden	10.4% (12)	11.3%(13)	16.5%(19)	23.5%(27)	35.7%(41)
	UK	3.3%(9)	7.8% (21)	14.5%(39)	33.8%(91)	39.8%(107)
	USA	4.7%(8)	10.1% (17)	10.1%(17)	29.6%(50)	43.2%(73)
	Total	3.5% (35)	7.2% (73)	10.9% (110)	27.5% (277)	49.8% (502)
Many of the claims about environmental threats are exaggerated⁶	Australia	4.6% (11)	8.4% (20)	6.3% (15)	19.2% (46)	59.4%(142)
	Canada	1.4% (3)	5.5% (12)	5.5%(12)	20.9% (46)	65.9%(145)
	Sweden	22.6% (26)	15.7% (18)	9.6% (11)	16.5% (19)	32.2% (37)
	UK	7.5% (20)	15.3% (41)	13.4% (36)	24.6%(66)	34.3% (92)
	USA	5.9% (10)	8.3% (14)	1.8% (3)	22.5% (38)	58.0% (98)
	Total	6.9% (70)	10.4% (105)	7.6% (77)	21.3% (215)	50.8% (514)

1 Pearson Chi-Square 90.272, df 20, p< 0.01

2 Pearson Chi-Square 113.294, df 20, p<0.01

3 Pearson Chi-Square 72.099, df 20, p<0.01

4 Pearson Chi-Square 154.640, df = 20, p<0.01

5 Pearson Chi-Square 84.128, df = 20, p <0.01

6 Pearson Chi-Square 138.693, df 20, p< 0.01

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