

Wood you believe it?

Children and young
people's perceptions of
climate change and the
role of trees, woods and
forests

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Acronyms

CO ₂	Carbon dioxide
C of E	Church of England
CYP	Children and young people
DEFRA	Department for the Environment, Food and Rural Affairs
ETWF	England's trees, woods and forest
IPCC	Intergovernmental panel on climate change
LO	Learning outcome
TWF	Trees, woods and forests
Ofsted	Office for Standards in Education, Children's Services and Skills
SNIFFER	Scotland and Northern Ireland Forum for Environmental Research
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UK	United Kingdom
UKCIP	UK Climate Impacts Programme
WWF	World Wildlife Fund

Executive Summary

Background

There is a general consensus that the world's climate is changing and that the actions of humankind are a primary cause of this change (IPCC 2007). High levels of greenhouse gases in the atmosphere, which trap a greater proportion of the sun's radiant energy, are argued to have resulted in global temperature rise. The changing climate will have far reaching impacts, not only to the weather, but also to the natural environment and to humankind.

Adapting to and communicating the issues surrounding climate change is a key aspect of **the Forestry Commission's most recent strategy** (Department for Environment Food and Rural Affairs 2007). These goals are reflected in the new **learning strategy 'Leaving the Classroom'** which aims to **heighten awareness of trees, woods and forests** (TWF) and the role they have in improving attitudes to the wider natural environment (Forestry Commission England 2009). However, **little is known about children and young people's** (CYP) current knowledge of climate change and, in particular, the specific role of TWF.

Objectives

The primary objective of this research was to investigate **CYP's** perceptions of climate change and the role of TWF. Further objectives were to explore whether growing up in a rural or urban location had any effect on those perceptions and, finally, to investigate the relative influence **of the parents' and teachers' perceptions** on those of the CYP.

Methods

A mixed method design was employed during this research. Firstly, the **CYP's** perceptions of climate change and the role of TWF were investigated using focus groups. Secondly, teachers and governors were interviewed about the teaching approach of the school and the importance of environmental issues within their schools. **Thirdly, parents'** knowledge and perceptions of climate change and the role of TWF were assessed using a short questionnaire.

The pupils (n=89 aged 7-15), parents (n=67) and teachers and governors (n=7) from five schools (2 urban and 3 rural) in the south east of England participated in the research. The research was conducted in the spring of 2009.

Findings

Children and young people's perceptions

All of the CYP were aware of both climate change and global warming. Whilst there was confusion regarding the mechanisms causing climate change, many of the CYP could explain key parts of the processes. The majority of the CYP thought that climate change is a result of both natural processes and the actions of humankind. The CYP were able to describe a number of the impacts of climate change; particularly common perceptions were that the world will experience changes in weather, ice caps will melt and sea levels will rise.

Most of the CYP were aware that TWF are involved in climate change; deforestation was occasionally mentioned as a cause, though few were aware of **forestry's contribution to** global greenhouse gas emissions. They had negative perceptions of using wood for fuel, fearing the smoke would further contribute to emissions. Although the CYP thought that re-forestation was a very good thing, almost all thought that preserving existing TWF **was better as 'big' trees removed more carbon dioxide (CO₂)** from the environment than young trees.

When asked, the CYP expressed concern about climate change, though this was tempered, firstly, by the fact that few thought it would affect them (typically the CYP thought climate change would have a greater impact in places other than the United Kingdom (UK), such as Africa or the Pacific Islands), or their generation (the majority of the CYP thought that the impacts of climate change would not be felt for some time), secondly, by their opinion that we have not reached the **'tipping point' and that 'science'** would find a solution, and, thirdly, by their belief that other issues, such as the economic crisis or poverty, were more worrying.

No variation in perceptions was observed that can be confidently attributed to the type of geography in which the CYP live. What appeared to be of greater importance was the ethos of the school and enthusiasm for environmental matters amongst staff and pupils. **Likewise the media appeared to have influenced the CYP's perceptions and knowledge** of climate change and associated issues. The CYP considered that they knew more about climate change than their parents; parents were an unreliable source of information about climate change. The majority of the CYP stated they would look to the internet, a teacher or an expert to find out about climate change.

Parents' perceptions of climate change

The majority of the parents agreed that the world's climate change is changing and that these changes can be attributed to the actions of humankind. Similarly to the CYP, the current economic crisis was considered to be the greatest threat currently facing the UK.

As with the CYP there was confusion regarding the role of TWF in relation to climate change; in particular the majority thought that cutting down trees makes climate change worse even if they are replanted. However the parents had more positive perceptions than the CYP, of using wood as an alternative fuel.

Teachers' and governors' perceptions of climate change in schools

The teachers and governors reported that relatively little direct teaching time is devoted to climate change or similar environmental issues, though, as one school demonstrated, the issues can be incorporated effectively into extra-curricular activities. Materials for climate change lessons were obtained from education authorities, special interest groups and organisations (e.g. WWF), or from the internet. Although the teachers all thought they had a responsibility and a desire to educate the CYP about climate change most felt they were unable to devote more time to the subject; this was due to the restrictions of the curriculum and the number of competing issues.

Conclusions and recommendations

Although there was a high level of awareness, amongst the CYP, of climate change and of the causes and impacts, the findings of this research indicate that there is still a need to educate CYP about climate change and, perhaps, to focus on certain misconceptions (e.g. the role of the ozone layer). There is a particular need to focus on the role of TWF in helping mitigate and adapt to climate change.

It is suggested that further research is needed to examine in greater detail the various factors, for instance socio-economic status, age, educational experiences or level of experience of the natural world, **which may have an impact on CYP's perceptions of climate change**. There is also a need to examine in greater detail the most appropriate ways of reaching CYP, for instance an internet based approach may not be suitable.

Introduction

While a number of surveys have assessed the public's perceptions and knowledge of climate change few have focused on the attitudes of CYP. Fewer still have investigated perceptions of climate change in relation to TWF. The aim, therefore, of this research is to better understand **CYP's** perceptions of climate change in relation to TWF in the UK.

The specific objectives of this research were to:

- **identify and review literature (both academic and 'grey') relating to CYP's** perceptions and knowledge of climate change;
- identify and review teaching and web resources relating to climate change and the role of TWF; and
- conduct primary research into, firstly, **CYP's (both 'urban' and 'rural') perceptions and knowledge of climate change in relation to TWF in the UK**, secondly, investigate how climate change and other related environmental issues are taught in the sample schools, and thirdly, to assess parents knowledge and perceptions of climate change.

Policy context

The Forestry Commission recognises that climate change is one of the greatest threats facing the UK, to the TWF it manages, as well as to society as a whole (Forestry Commission England 2008). **In the current 'Strategy for England's Trees, Woods and Forests' adapting to, mitigating and communicating the issues surrounding climate change is explicitly identified as one of Forestry Commission England's five key aims**, though climate change is also relevant, arguably, to each of the other four key aims (Department for Environment Food and Rural Affairs 2007). It is stated in '**A Strategy for England's Trees, Woods and Forests – Delivery Plan 2008 -2012'** that TWF should be used to *"help communicate and improve understanding of climate change issues and bring about behavioural change"* (Forestry Commission England 2008 pp17). To this end promoting greater understanding of climate change in relation to TWF is a key aspect of **the Forestry Commission's education strategies**. The new Forestry Commission England education and learning strategy '**Leaving the Classroom'** (2009) specifically links its priorities to wider governmental targets, in particular those set out in the '**Climate Change UK'** programme (HM Government 2006). The government aims to *"change public attitudes toward climate change"* and to *"introduce further measures and initiatives to encourage and enable individuals to understand their role and responsibility to tackle climate change"* (HM Government 2006 pp6). These aims are reflected in three of the five learning outcomes of **Forestry Commission England's new learning strategy** mentioned above:

- Learning Outcome (LO)1 – increase in knowledge and understanding about trees and woods;
- LO 4 – change in attitudes or values towards trees and the environment helping people to impact less on the planet; and
- LO 5 – evidence of activity or modification of behaviour, which will help society, local communities and the environment locally and globally (Forestry Commission England 2009). (Byrne undated)

The Forestry Commission are demonstrating their intention to promote the importance of TWF in the effort to mitigate and slow the effects of climate change through projects **such as the recent 'Get Growing' initiative**, which they operate in conjunction with the News of The World newspaper and Royal Mail. This project is described as "***what might be the UK's highest profile forestry communications campaign ever mounted***"; tree seeds are to be sent to each of the 30,000 primary and secondary schools in the UK (Clark 2009). Schools will also be supplied with a video detailing the role of TWF in relation to climate change. Further examples **includes the 'A Convenient Truth' pack** which contains information on climate change and the role of TWF, a CD of a presentation of the issue and a pack of tree seeds described as '**DIY De-Carboniser**' (Forestry Commission 2007) and the **new 'Trees and Climate Change' pack** (Forestry Commission England undated).

In order to be able to measure 'change' and to tailor educational strategies, the beliefs and perceptions of the population of interest should be evaluated, therefore objective CC5.1 of the ETWF Delivery Plan 2008-2012 - Communicating Climate Change Activity - is **to "assess the current understanding of the role of trees and woodlands in climate change, including that of children, young people and the education sector"** (Forestry Commission England 2008 pp19). This research contributes towards fulfilling this objective.

Background: climate change

In the following sections, which provide a background to the research, three topics are explored: firstly, current expert knowledge of the causes and impacts of climate change is reviewed; **this is followed by an examination of what is known of people's perceptions of climate change and the role of TWF.** The final section briefly reviews current sources of information about climate change available to CYP.

Definitions and usage of **the term 'climate change'**

The Intergovernmental Panel on Climate Change (IPCC), defines the term **'climate change'** as *"the change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer"* (2007 pp30). The usage of **the term 'climate change'** by other organisations such as the United Nations Framework Convention on Climate Change (UNFCCC) explicitly associates changes in the climate with human activity (in addition to natural fluctuations); for instance one recent document begins *"human activities are releasing greenhouse gases into the atmosphere... rising levels of greenhouse gases are changing the climate"* (UNEP and UNFCCC 2002 pp1).

The term 'global warming' (which refers to a specific aspect of climate change) is also used in the literature review, typically when it is pertinent to reference the specific term used by other researchers. However, **as the term 'climate change' is preferred by scientists, and recent research indicates that the use of either term has little impact on people's perceptions** (Eurobarometer 2008), **the term 'climate change' will be used where possible.**

Climate change

It is widely accepted that **the world's climate is changing, the IPCC recently stated 'warming of the climate system is unequivocal'** (2007 pp30). Climate change is recognised by the governments of the UK; the introduction to a recent UK government strategy document begins *"there is strong and indisputable evidence that climate change is happening and that man-made emissions are its cause"* (HM Government 2006 pp3). The current expert knowledge regarding climate change, which has prompted such statements from the government, is reviewed in the following sections.

Changing global climate

The IPCC reports that global climate change is manifest in numerous ways (2007 pp30-33); for instance the 11 years between 1995 and 2006 ranked within the 12 warmest years since measurement began in 1850. Average temperatures in the Northern Hemisphere are very likely to have been higher in the period since 1950 than during any other 50 year period in the last 500 years and probably in the previous 1300 years. The **world's oceans are warming and the sea levels are rising; between 1961 and 2003 the global average sea level rose by 1.8 mm a year and between 1993 and 2003 by 3.1 mm a year.** Forty-three percent of the rise in the sea levels can be attributed to melting glaciers, ice caps and polar ice sheets; the melting of which is attributed to global warming. Precipitation rates over the landmasses have also been affected by the warming of the climate; in Northern Europe, the eastern parts of North and South America and northern and central Asia have experienced increased rates, while precipitation has declined in the Sahel, the Mediterranean and southern Africa.

Certainty of scientific opinion

The IPCC report that the weight of scientific evidence supports the assertion that the climate is changing and the trend is one of warming; of the 29,000 observational data series used to form their conclusions over 89% confirm the direction of change is consistent with a warming climate (2007).

Long term global impacts

The long term effects of climate change are likely to be serious and severe. Although predicting the exact impacts is an uncertain science, the authors of the Stern report (2006 ppvi) list a number of the potential consequences of global warming:

- the melting of glaciers both increases the risk of flood for many millions of people and reduces the water supplies of one-sixth of the worlds population;
- hundreds of millions of people in Africa face starvation as crop yields fall as a result of the increase in temperature;
- conversely, in higher latitudes temperature drops will result in a greater number of cold-related deaths; and
- between 15 and 40% of the world species face extinction as a consequence of just 2 degrees of warming.

The changes which are attributed to climate change are predicted to accelerate as the world continues to warm. As the global temperatures increase, further large scale and

abrupt changes may occur; for example shifts in certain regional weather patterns (e.g. El Niño) could be triggered (Stern 2006). It has been argued that the current evidence indicates **"increasing risks of serious, irreversible impacts from climate change"** if serious efforts are not made to tackle the issues (Stern 2006 ppiii).

Impacts of climate change for the UK

The UK Climate Impacts Programme (UKCIP) made a number of predictions, based on four emissions scenarios, as to the likely impacts of climate change for the UK environment (Hulme, et al. 2002):

- **it is likely that the UK's climate will become warmer; over the next 60 years annual temperatures may rise by 2-3.5°C.** The increase in temperature will be the greatest in the south-east;
- winters will be wetter and summers will be dryer. Again in the south-east the changes will be the greatest, the UKCIP suggest that by 2080 summer precipitation may decline by as much as 50% in this region;
- sea levels will continue to rise around the UK and could rise by as much as 86cm by 2080; and
- the gulf-stream may weaken, though this is unlikely to lead to a cooling of the UK climate in the next 100 years.

A recent report from the Scotland and Northern Ireland Forum for Environmental Research (SNIFFER) highlighted that, within Britain, there will be an inequality in the likely social impacts of climate change (Chalmers, et al. 2009). The authors concluded that certain groups of people, including those living in places which are at risk (e.g. from flooding), people who already are deprived in income, health or in quality of their housing, and people who lack the capacity to adapt, will be at most risk of suffering due to the negative impacts of the changing climate.

Causes of climate change

While the causes of climate change are still politically contentious (for example the Northern Ireland environment **minister's recent decision to ban an advert promoting energy saving** on the grounds that the human involvement in climate change is **"not proven"** (McDonald 2009)), the weight of scientific opinion attributes the trend of currently **rising global temperature to human activity.** The IPCC state with 'very high confidence' that **"the global net effect of human activities since 1750 have been one of warming"** (2007 pp37).

The warming of the climate is caused, in a large part, by continuing release, and accumulation of high levels of greenhouse gases (including CO₂, methane and nitrous oxides) in the atmosphere. The increased concentrations of these greenhouse gases in the atmosphere **traps a greater proportion of the sun's radiant** energy and this causes the global temperature rise. The increased levels of CO₂ are a result of the use of fossil fuels for energy and through the cutting down and burning of forests. Methane and nitrous oxide emissions are a result of agriculture and certain changes in land use (e.g. 'reclaimed land'). Global industry releases a range chemicals and gases into the environment including halocarbons (e.g. Chlorofluorocarbons (CFCs)) and the ozone in the lower atmosphere is predominantly a result of transport related emissions (UNEP and UNFCCC 2002).

The rate of emission of these gasses has increased since the industrial revolution and has accelerated in recent years; between 1970 and 2004 emissions increased by 70% (IPCC 2007). Scientific opinion, such as that expressed in the IPCC report, confidently attributes the raised levels of the gasses, such as CO₂, to human activity because the atmospheric concentrations deviate considerably and significantly from the natural range observed over the last 650,000 years.

Trees, woods and forests and climate change

TWF are inherently associated with climate change, both in the causes and in the strategies to mitigate and adapt to the impacts. TWF are crucial for the regulation of the **global climate; as the 'A convenient truth' pack** from the Forestry Commission states:

Through photosynthesis they remove CO₂ from the atmosphere, binding it and storing it as carbon. The carbon is held in the forest biomass – in the trunks, branches, foliage and roots, and in the soil as organic carbon. The process is constant. (Forestry Commission 2007)

Role of trees, woods and forests in the causes of climate change

The IPCC stated that forestry is responsible for 17.4% of global greenhouse gas emissions (2007). The recent Eliasch Review (2008) highlighted the point that on a global scale forestry is responsible for the third greatest source of greenhouse gas emissions, greater than the whole transport sector (13.1%) and a similar proportion to **global industry (19.4%) (the Forestry Commissions states that 'forestry' is responsible for the *second* greatest proportion of CO₂ emissions (Forestry Commission 2007)).** **Deforestation is a key aspect of the forestry sector's contribution towards the causes of climate change; deforestation and wider degradation of forest eco-systems emits CO₂**

into the atmosphere (Betts, et al. 2008). The destruction of forests is a key cause of climate change as forests are estimated to hold 80% of above ground and 40% of the below ground terrestrial CO₂ (The Woodland Trust undated). Annually, deforestation results in levels of CO₂ emissions similar to the total emissions of the USA or China (Eliasch 2008). **According to the MET office's** Hadley Centre deforestation is responsible for between 22% and 43% of the historical CO₂ rise (Betts, et al. 2008).

Impacts of climate change on Britain's trees, woods and forests

As the authors of a recent report from the Hadley Centre stated, climate change is likely to have a number of significant impacts, some positive, though the majority negative, for TWF, both globally and more locally in the UK. However those impacts are highly uncertain (Betts, et al. 2008), and will vary hugely between regions.

The impacts of one of the primary causes of climate change, rising levels of CO₂, are likely to have a beneficial effect for TWF in some regions (in particular Scotland and northern England). Higher concentrations of CO₂ are expected to result in enhanced growth rates should other environmental conditions remain constant (Broadmeadow and Ray 2005).

The increased temperature is likely to result in earlier tree budburst; Broadmeadow and Ray (2005) noted that these changes are already apparent with the observed flushing date for oak having been two weeks earlier in 2005 than in the 1950s. While the early budburst extends the growing season it leaves trees at greater risk of frost damage early in the season. In the southeast of England the predicted lower summer rainfall is likely to have a detrimental effect on trees through drought stress, whilst in winter the greater rainfall will cause damage through water logging which further exacerbates the impacts of summer drought. Trees which are stressed due to the changing weather patterns as described above will be more susceptible to pests and disease, and, to further compound the problems, those pests and diseases are likely themselves to benefit from the changes in climate, primarily through reduced winter mortality.

Role of trees, woods and forests in climate change mitigation and adaption

It was recently stated that "***without tackling forest loss, it is highly unlikely that we could achieve stabilisation of greenhouse gas concentrations in the atmosphere at a level that avoids the worst effects of climate change***" (Eliasch 2008). This statement makes it clear that TWF are a key aspect of climate change mitigation and adaptation.

The primary role of TWF in the prevention and mitigation of climate change is through **the tree's ability to "absorb CO₂ from the atmosphere, through photosynthesis, converting some of it into wood"** (Broadmeadow and Ray 2005 pp13). Mature woodlands, despite not taking more CO₂ from the atmosphere than they release, represent a significant store of carbon (Broadmeadow and Ray 2005). Further ways in which trees and woodlands can help mitigate climate change are through the use of wood as an renewable low-carbon fuel source and as an alternative to carbon-intensive materials, such as those used in the building industry (Broadmeadow and Ray 2005; Forestry Commission 2007).

The planting of woodlands is a popular (as demonstrated by the number of organisations **offering to plant trees to 'offset' CO₂ emissions**), but contentious, approach to climate change mitigation (The Woodland Trust undated). The Woodland Trust pointed out if the UK was to use woodlands to become carbon neutral, some 50 million hectares would need to be planted, twice the land area of the UK (Broadmeadow and Ray 2005; The Woodland Trust undated). In a global context even if deforestation was significantly reduced and the majority of all available land was planted with trees **"this would only delay the doubling of CO₂ concentrations by 20-30 years, assuming that fossil fuel consumption continues to rise as expected"** (The Woodland Trust undated). Although, as Broadmeadow and Ray (2005 pp13) acknowledged, the uptake of CO₂ by woodland is small in relation to total emissions, woodlands do **"have a significant role in emissions reductions in the short term, and 'buy time' to allow new, low carbon technologies to be developed"**.

Woodlands may also have a role to play in adaptation to the impacts of climate change; for example woodlands in floodplains can help reduce the risk of flooding, or woodlands can prevent soil erosion, which is more likely if rainfall increases during winters and summers become dryer. In the urban context trees will help reduce the negative impacts of climate change, primarily through temperature reduction and the removal of pollutants from the atmosphere in cities (Broadmeadow and Ray 2005).

Literature review: perceptions of climate change

This second section of the background chapter focuses on what is known of the public's, and in particular CYP's, perceptions and knowledge of climate change and the role of TWF.

Literature review methods

The following review of literature regarding perceptions of climate change and the role of TWF uses materials found through a desk based search of academic published literature **and of the 'grey literature'** ¹. A number of databases were used to search for academic literature; these included 'Biosis Previews', the 'Social Sciences Index', the 'British Educational Index' and 'IBSS Online', the internet search engine 'Google Scholar' was also used. Reference lists were also searched for new and relevant literature. An internet search engine (Google) was used to search for literature, both grey and academic, and for websites relating to climate change educational resources, both informal and formal. Finally contacts were used to acquire relevant literature not accessible through the internet.

A number of terms were used to identify the most relevant literature; the various terms can be described as belonging to one of five groups:

1. Terms associated with climate change, which included global warming, greenhouse effect, environ* and carbon dioxide.
2. Terms associated with TWF.
3. Terms associated with the population groups of interest, including child*, young people, teacher* and parent*.
4. Terms which were associated with learning, and included knowledge and educat*
5. Finally terms which were associated with perceptions, which included, attitude* and opinion*.

Sources

A number of studies, typically conducted by market researchers and private research groups (Downing 2008; Downing and Ballantyne 2007; Maibach, et al. 2008), or by the government (Department for Environment Food and Rural Affairs 2001-2008; Department for Environment Food and Rural Affairs 2007; Department for Environment Food and Rural Affairs 2008), have investigated and, in most cases, sought to quantify public perceptions of climate change. The majority tend to focus on adult attitudes (though young people aged 16 to 21 are sometimes included); however, a minority have sought the views of children.

A small number of studies were found which had specifically investigated CYP's perceptions of relevant environmental issues, though only two focused solely on climate change or global warming; one of which was an American market research report (Maibach, et al. 2008) and the second, primary research from the UK (Department for

¹ 'grey literature' generally refers to unpublished reports and evaluations which have not, typically, been peer-reviewed.

Environment Food and Rural Affairs 2008). The Department for the Environment, Food and Rural Affairs (DEFRA) commissioned a survey of children's perceptions of climate change (2008), the two waves² of the survey complement a corresponding adult survey which has run for some years (Department for Environment Food and Rural Affairs 2001-2008). A random sample of 749 young people (aged 11-17) was surveyed during the first wave, 711 in the second.

Other reports which had some focus on CYP's perceptions of climate change, amongst other topics, included a piece of research commissioned by the Woodland Trust (Millward Brown Ulster 2008), research conducted by the National Children's Bureau (Byrne undated; Read undated) and a review of CYP's opinions of certain environmental topics for the Department for Children, Schools and Families (Read 2007).

As mentioned earlier a far greater number of studies and surveys were found on adult knowledge, attitudes and perceptions relating to climate change. These included the Eurobarometer survey of European's attitudes to climate change (2008), a study commissioned by the English Government's Department of Transport which explored attitudes to climate change and travel options (King, et al. 2009) and surveys from market researcher Ipsos MORI (Downing 2008; Downing and Ballantyne 2007).

The studies and surveys of public perceptions of climate change are predominantly medium scale and have used quantitative research methods. Generally there is little information available as to the specific methods used to collect the data, though the actual questions are often accessible. This lack of information as to the sampling rationale, the research methods used, and the subsequent decisions taken as to how to analyse the data, means that the results of many of these studies must be treated with some caution.

Awareness of climate change

The DEFRA survey of young people's attitudes to climate change (2008) found that the majority of the young people surveyed were aware of the terms 'climate change' and 'global warming' (Table 1). In the most recent survey 97% of the young people had heard of the term 'climate change', and 93% of 'global warming'. The awareness of these two terms was significantly higher during the second wave (2008) than during the first wave of the study (2006). Awareness of related terms such as 'greenhouse affect', 'carbon dioxide' and 'climate change gases' was considerably lower than of climate change and global warming; however there was an increase in the percentage of

² In longitudinal or repeated measures research each set of data collection is referred to as a 'wave'

respondents indicating that they were aware of the terms during the second wave in comparison to the first wave of the survey.

Table 1 Awareness of climate change and contributing factors (DEFRA 2008)

Term	Wave 1 (2006) % aware of terms	Wave 2 (2008) % aware of terms
Climate change	90	97
Global warming	90	93
Greenhouse effect	68	70
Carbon dioxide emissions	51	66
Climate change gases	44	54

These results suggest that the majority of CYP are aware of climate change and global warming and, possibly, since 2006 awareness has increased. Furthermore, when compared to the results of an American survey (which found that 60% of the 8-14 years olds had heard of global warming), the level of awareness amongst British CYP seems high.

The corresponding adult survey from DEFRA (2001-2008) showed that in 2008 similar percentages of adults were aware of **the terms 'climate change' and 'global warming'** (98% for both terms). Likewise fewer adults were aware of the related terms listed above; though the percentages were far higher amongst adults than children (96% were aware of **'greenhouse effect'**, 96% of **'carbon dioxide'** and 92% of **'climate change gases'**). Again, as with the young people, there was a general trend of greater awareness of climate change and the associated concepts since the first wave of the adult survey in 2001.

The survey of young people's attitudes found that the vast majority (98% in 2006 and 97% in 2008) considered that the global climate *is* changing (Department for Environment Food and Rural Affairs 2008). Likewise the most recent wave of the adult survey found that 95% of the respondents **agreed that the world's climate is changing** (Department for Environment Food and Rural Affairs 2001-2008). A survey of adult beliefs commissioned by the Department of Transport found that acceptance that **'climate change is happening was virtually universal'** (King, et al. 2009 pp14); with only 4 of the 139 research participants disagreeing (virtually the same percentage as found by DEFRA). Although the variation is small, the findings suggest that acceptance of climate change is slightly greater amongst CYP than amongst adults.

Knowledge and perceptions of the causes of climate change

Whilst the majority of the young people participating in the DEFRA (2008) survey attributed climate change to the actions of humankind, significant percentages considered climate change to be a natural process (details in Table 2).

Table 2 Attribution of the causes of climate change (DEFRA 2008)

	Wave 1 (2006) % of total	Wave 2(2008) % of total
Totally natural	13	9
Mainly natural	11	11
Mainly human	53	60
Totally human	21	18

These findings are somewhat different to those of the DEFRA survey of adult attitudes (2001-2008): the most recent of which found that while 28% of adults thought that **climate change was either 'mainly' or 'entirely natural'**; 67% considered climate change to be **'mainly' or 'entirely attributable' to human behaviour**.

A BBC World Service poll of 22,000 people in 21 countries (2007) also found that the majority of its respondents in Britain attributed climate change to human actions: with 78% of British adults considering human activity as a major cause of climate change. The Department of Transport survey found that, according to the initial questionnaire (a two-stage methodology was used: first a questionnaire was administered, participants were then invited to take part in group discussions) around three quarters of the participants thought that climate change was the result of human behaviour (King, et al. 2009). However the authors noted that during the group discussions less scepticism as to the responsibility of humans was revealed. This disparity, they argue, may be due to a certain reluctance among participants to voice this scepticism, and therefore, to go **against the majority or 'fashionable' view. An IPSOS survey also found that significant percentages of its respondents were sceptical about the causes of climate change (Downing and Ballantyne 2007). Although 46% of the adult participants considered climate change to be 'mainly a result of human activity', 9% considered climate change to be a 'mainly natural process' and a further 41% thought it was a result of both 'human activity and natural processes'.**

King et al. (2009 pp16) identified a number of reasons for the scepticism amongst those adults who considered climate change to be a natural phenomenon, these included **"a belief that scientists do not agree on the causes of climate change and whether it is a result of human activity"** and **"a belief that the seriousness of the issue is being**

overstated – comparisons were made with how the hole in the ozone layer had repaired itself...". No research was found which explored possible reasons for climate change scepticism amongst children.

'Transport emissions' were named by the highest percentage (42%) of the CYP questioned during the second wave of the DEFRA survey (2008) as one of the main causes of climate change. This option was followed by the more general **'air pollution'**, which 28% of the children thought caused climate change. This is a considerable difference, suggesting that some children conceive of the causes of climate change in a relatively nuanced manner – that they are able to identify particular contributory causes of climate change. However the children's knowledge of the *exact* causes, i.e. which gases are implicated, seems to be somewhat weaker as just 19% of the children identified **'carbon dioxide emissions'** as a primary cause. Knowledge amongst British CYP appears to be high in comparison to their American counterparts; an American survey found that 82% of its respondents aged 8-14 years) claimed to know **'little'** or **'nothing'** about the specific causes of climate change (Smalls 2008).

Amongst adults, general **'pollution'** was identified by the highest percentage (30%) of the participants of the DEFRA survey as a primary cause of climate change (2001-2008). **'Road transport emissions'** were identified by the second highest percentage, with 23% considering they had contributed to the causes of climate change. Similarly to the CYP, just 17% of the adults attributed climate change to **'carbon dioxide emissions'**. The Eurobarometer survey (2008) revealed that Britons were more likely than most Europeans to think that CO₂ emissions have only a **'marginal impact'** on climate change (44% of British participants), only a greater percentage of the Dutch participants (47%) held this view. This is in comparison to 10% of the Belgians or 24% of the French.

While the lowest percentages of the young people and the adults questioned during the DEFRA survey considered that **'industrial processes'** were causing climate change, those taking part in the Department of Transport's study ranked emissions from industry as the most important cause of climate change (King, et al. 2009). This finding highlights the variability between the various surveys of public opinion on matters such as climate change, serving as an important reminder of the caution with which one must treat the findings reported.

Knowledge and perceptions of the impacts of climate change

Very little research (either academic or from the **'grey'** literature) was found that had attempted to assess CYP's knowledge of the impacts of climate change. What does exist is entirely comprised of children's agreement or disagreement with fixed response

categories during a survey, none of which allowed for any exploration of the children's perceptions.

During the survey commissioned by DEFRA (2008) the participants were asked to consider the veracity of four statements associated with the impacts of climate change. Ninety-two percent of the CYP (during the second wave of the study) thought that it was true that the ice caps would melt as a result of climate change and 85% considered that **climate change would result in 'changes to local weather'**. **Seventy-seven percent** thought that the hole in the ozone layer was associated with climate change. Finally **62% of the children considered that climate change would result in an 'increased risk of skin cancer'**. **These findings indicate that there is awareness of the general impacts of climate change;** however, as the authors of the report pointed out, some children appear to be confused about relationships between different environmental issues such as climate change and the hole in the ozone layer.

The results of the adult survey (Department for Environment Food and Rural Affairs 2001-2008) were broadly similar to those of the survey of CYP. Ninety percent of the adults thought that climate change would result in the melting of the ice caps and 84% in changes to local weather. Confusion as to a relationship between climate change and the hole in the ozone layer was also apparent amongst the adults; with 81% thinking that the hole is a result of climate change and 73% of the adult participants thought that climate change would result in increased risk of skin cancer. Similar confusion was also identified by the authors of the Department for Transport survey, though they offer an explanation for this; *"the most common misconception... was that the hole in the ozone layer is a cause of, a result of, or related to climate change. Some participants believed that the hole in the ozone layer lets the sun's rays through and makes it hotter causing problems such as increased skin cancer"* (King, et al. 2009 pp14).

Unsurprisingly people often associate the impacts of climate change with weather. The DEFRA survey of CYP's attitudes examined this relationship (2008). The most recent survey found that 81% of the participants thought that climate change would have at least 'a little effect' on the weather in their region, and 24% thought it would have a 'large effect'. A further question explored the actual changes to the weather that the children expected. The most common perception was that there would be 'hotter weather' with 39% holding this opinion. Likewise 32% of the adults participating in the corresponding survey (Department for Environment Food and Rural Affairs 2001-2008) also considered that there would be hotter weather. While 31% of the adults thought that climate change would result in wetter weather and more flooding, just 19% of the children held this view.

DEFRA (2008) also questioned the CYP about the specific impacts climate change may have on them as individuals; to their health, to their day to day life and on their

holidays. Generally the children did not appear to think that climate change would have much impact on their lives. Sixty percent of the children thought that climate change **would have 'no' or 'a little effect' on their health**. Sixty-five percent of the children did not think that climate change would affect their everyday life and 54% of the children considered that climate **change would have 'little' or 'no effect' on their holidays**. The children tended to think that climate change would have an impact on their lives in the relatively near future: for instance 66% of the participants thought that the UK would be affected by climate change in the next 20 years, and 67% that they personally would be affected in that time frame.

Concern about climate change

It has been previously reported that children are seriously concerned about the state of the world and its climate (BBC News 23/06/2006). Research reported by the BBC (the primary report was unavailable) suggested that climate change was considered, by young people, to be one of the greatest threats that we face, greater than the threat of crime, violence or terrorism. However, the second wave of the DEFRA (2008) survey found that while the majority of **young people surveyed were 'worried' about climate change**, 43% of the young people stated that they were **'not worried'** (Table 3). This clearly indicates that considerable percentages of those children surveyed appeared to have low levels of concern regarding climate change; though the trend does appear to be of increasing concern for climate change. These figures are similar to a survey of **American children's attitudes, which found that 54% of children aged 8-14 thought that global warming was 'an issue that the world should be concerned about'** (Smalls 2008). A further American survey found higher rates of concern regarding global warming amongst the CYP (aged 9-18) it questioned (Maibach, et al. 2008). For instance 79% of the participants considered global warming to be a **'very serious problem'**.

Table 3 Level of concern about the effects of climate change (DEFRA 2008)

Level of concern	Wave 1 (2006) % of total	Wave 2 (2008) % of total
Not at all worried	15	10
Not very worried	35	33
Fairly worried	40	46
Very worried	10	11

Far higher percentages of the adults questioned during the DEFRA (2001-2008) surveys were concerned about climate change; in the most recent wave of the survey 80% of the respondents were concerned, similar percentages to the findings of each previous wave.

The highest levels of concern were found among women; with 85% expressing concern in comparison to 74% of the men surveyed. Likewise the IPSOS survey of adult attitudes **found that 82% of the respondents expressed that they were either 'fairly' or 'very concerned' about climate change** (Downing and Ballantyne 2007).

The Special Eurobarometer (2008) survey questioned adult respondents regarding their concern towards climate change. The authors found that, across Europe, absolute majorities of the participants considered climate change/global warming to be a serious problem and in the UK **81% of the participants considered climate change to be a 'very' or 'fairly serious problem'**. While these findings are relatively consistent with those of the DEFRA (2001-2008) and Ipsos (Downing 2008; Downing and Ballantyne 2007) surveys, **the British adult's level of concern was low in relation to the results from the other European countries**. Levels of concern were lower in just 6 other European countries (of a total of 31 countries), including Poland and Italy. When looking at the figures in more detail we see that the Britons were the least likely to respond that they thought climate change was a 'serious problem', **just 59% expressed this view, in comparison to 96% of Cypriots or 84% of French adults**. The greatest percentage of respondents stating that **they thought climate change was 'not a serious problem' were to be found in the UK**; while just 2% of Greeks, Maltese and Slovaks and 3% of the French and Romanians thought climate change was not a serious problem, 14% of Britons held this view. Furthermore 39% of the Britons thought that the seriousness of climate change had been exaggerated, a relatively high percentage against other European nations.

The British adult's level of concern regarding climate change in relation to other threats was also low against other European countries. Fifty-seven percent of Britons thought **that climate change was the 'most serious problem currently facing the world as a whole'**. **Ninety-two percent of Cypriots and 90% of Greeks** thought climate change was the most serious threat. Just 5 other European countries (of a total 31 countries) had lower percentages of participants who considered climate change to be the most serious threat. The IPSOS survey (Downing and Ballantyne 2007), during which a similar question was asked, found, conversely, that climate change/global warming was considered, by the **highest percentage of British adults, to be the 'most serious threat to the wellbeing of the world'**. **Forty-five percent chose 'climate change' in comparison to the 32% who chose 'terrorism'**.

The attitudes of children regarding the relative importance of climate change in a global context was investigated during just one of the surveys; the research reported by Smalls (2008) found that when asked to indicate which were the five biggest problems that the world faced today, the 'environment' (33%) **lost out to the threat of 'war' (47%)**. However the environment was more of a problem than 'crime/violence' or than 'economy/jobs' (this research was carried out in March 2008 – before the depth of the

current economic crisis became fully apparent to the public, furthermore it is a survey of **American children's attitudes**).

While there is a general trend for concern regarding climate change at a global level, there appears to be less concern at a more local level; other local issues worried the participants of the various surveys to a greater degree. The adult respondents of the Ipsos survey (Downing and Ballantyne 2007) considered environmental issues to be of lower importance than other problems facing Britain, including immigration, education or crime. Similarly, at a more local level (i.e. to their town or village), the fewest participants were concerned about climate change (25%). Issues such as litter, graffiti and dog mess and the quality of parks seemed to concern the participants to a greater degree. Only one of the American surveys attempted to evaluate whether children held such views; Maibach et al. (2008) found that 44% of the participants thought that global **warming is 'not as important as other issues' facing their country, 56% disagreed with this position.**

Although the surveys of adult opinion are variable, comparison of the results suggest that concern about climate change is considerably higher amongst adults than children in the UK. However, one must bear in mind that although the adults indicated that, across the various surveys, they were generally concerned about climate change in a global context, this does seem to be in a more abstract and general sense. When questioned about their perceptions of the seriousness of climate change in comparison to other more local threats, the British adults appear to be more concerned by other issues. It is possible that the British children were also evaluating their concerns for climate change in a similar, local frame and were, therefore, relatively low. Unfortunately the British **survey of children's attitudes did not attempt to investigate the children's beliefs to this degree.**

These findings should be treated with a certain degree of caution. The disparity in the findings across the adult surveys (and which presumably would have been found across surveys of **CYP's perceptions if more had been carried out**) highlights two points: firstly, the caution with which one should compare the results of individual surveys and, secondly, the often huge variation in opinion, both across time and geographical location and in response to the method of questioning and the types of questions asked.

Knowledge and perceptions of action to combat and adapt to climate change

There was surprisingly little interest from **the surveyors of children's attitudes regarding actions to combat and adapt to climate change**, there was greater interest in exploring **who** the children thought should be tackling climate change. This is, perhaps, somewhat

understandable, since children have little agency when it comes to taking eco-friendly decisions. Just one question was asked during the DEFRA surveys and this was regarding actions they as individuals had taken to tackle climate change (2008). Fifty-eight percent of the children claimed that they had not done anything to tackle climate change. Of the **42% who had taken some actions, 74% 'recycled or made less waste', 44% 'walk or cycle' and 42% 'use less energy'**. Only 4% claimed that they had asked others to change their behaviour. While these figures appear to show children are willing to take environmentally friendly actions it is hard to know how realistic they are. For example, **one has to question whether the 44% who said they 'walk or cycle' actually took a conscious decision to travel in this manner for environmental reasons.**

It appears quite clear that the majority of the children who participated in the DEFRA (2008) survey considered that the government is an organisation which 'can help a lot' in the effort to 'slow down climate change'. Responsibility was also placed on the shoulders of 'big companies' (73%) and 'environmental groups' (64%). Few of the children thought that they or other individuals in society could have much impact; just 12% thought they could help slow down climate change. The adults were more pessimistic than the children; just 8% thought that they, as individuals, could have a 'large influence' on limiting climate change. The adults were also less likely to think that the government (55%) or industry/business (54%) 'have a large influence' in limiting climate change.

Knowledge and perceptions of the role of trees, woods and forests in causing, combating or adapting to climate change

It is surprising that, considering the relationships between TWF (TWF) and climate change, so little of the research into public perceptions of climate change have focused on this aspect.

Just two surveys were found that had attempted to assess CYP's perceptions of TWF in relation to climate change. The Northern Ireland Woodland Trust (Millward Brown Ulster 2008), during their survey of children's attitudes to trees and woods, asked four questions of relevance to this research. The children (aged 9-11 years) were asked whether they thought that trees were 'important', 74% agreed that trees are 'very important', and a further 18% that trees are 'fairly important', just 2% appear to have thought that trees were 'unimportant'. Of the 92% who thought that trees had some importance, 51% indicated that this was because they 'take in CO₂ and provide oxygen for us to breathe and to help the environment'. Nineteen percent of the children considered that trees were important because 'they help the planet'. Finally the children were also asked to indicate how much they knew about trees and the environment; 80%

of the sample stated that they know 'a little', 13% claimed they knew 'a lot' and 7% that they 'don't know anything'.

The DEFRA survey (2008) included deforestation in its list of possible causes of climate change; 15% of the CYP thought that deforestation had contributed. This was less than the percentage that considered aerosols had contributed to climate change (23%) and the same as that had implicated the burning of fossil fuels for energy (15%). Of the 15% who thought that deforestation was a major cause of climate change 35% thought that they, personally, had somehow contributed to deforestation. Deforestation was not included as an option in the adult survey (Department for Environment Food and Rural Affairs 2001-2008).

The adult participants in the Department of Transport's survey were asked to rank the relative importance of a number of contributors to climate change; the item that received the lowest ranking was farming. The authors of the report comment that the participants had somewhat idealised, bucolic perceptions of farming, *"farming was... not associated with pollution. Moreover there is a perception that trees and plants absorb CO₂ thus growing them is a good response to climate change"* (King, et al. 2009 pp16).

A survey from the Scottish Government found that 47% of its adult participants identified 'destruction of forests' as a major contributor to climate change (Scottish Executive Environment Group 2005). While this seems a relatively high percentage, 62% considered that the hole in the ozone layer was also a major contributor. A Welsh survey also found that the (adult) public associated trees and woods with climate change (Bibbings 2004). Almost three out of five of the people surveyed thought that cutting down trees was a contributor to climate change; the author noted that the percentages of the participants positively identifying the link between cutting down trees and climate change were higher in the social classes AB³ than in the social classes DE.

The Forestry Commission's survey of (adult) public attitudes to forestry includes a number of questions which are related to climate change (Grant and Smillie 2007a). The most recent survey (2007) found that 80% of the respondents agreed that 'trees are good because they remove carbon dioxide from the atmosphere and store it in wood'. However, when asked if cutting down woods and forests is 'always a bad thing' even if they are replanted, the majority agreed. This highlights a general confusion regarding the relative importance of young or mature trees for carbon sequestration and storage.

³ NRS (National Readership Survey) social grade system (a method of social demographic classification) used by governments and market researchers to distinguish between social groups by type and level of employment: AB refers to 'upper middle class' and 'middle class', DE refers to 'working class' and 'underclass'.

http://www.nrs.co.uk/about_nrs/data_available/definitions_of_social_grade

Less than half those questioned (45%) agreed that using 'wood for fuel is better for climate change than using fuels such as coal or gas', while a similar percentage (48%) also agreed that 'using wood for fuel makes climate change worse because it releases carbon dioxide'. It is difficult to interpret the responses to these two latter questions, particularly those of the second; as the question does not give the respondent the opportunity to be clear about whether the woodland was replanted after being cleared for use as fuel. If the woodland was replaced the process, according to the authors of the report, would be carbon neutral, however if not replaced then it would be contributing to climate change. One cannot just assume that the participants were aware of the difference in the two scenarios. Finally the participants were questioned about the value of planting trees to offset CO₂ emissions; some 55% agreed that the UK could offset 'all its greenhouse gas emissions by planting more trees', 20% disagreed. These responses indicate the common misconception regarding the sheer space needed to plant enough trees to offset the UK's release of greenhouse gases.

Children and young people's sources of information about climate change

CYP, generally, have access to, or are exposed to a number of sources of information about climate change; these are briefly reviewed in the following section.

Educational sources

There are a number of ways in which children may be exposed to the issues surrounding climate change within the school system; these include through formal teaching in academic subjects such as geography and science or through the 'Cross Curricular Dimensions', in particular the theme of sustainable development which should be incorporated throughout the children's learning. CYP may also encounter climate change during extra-curricular activities.

Specific aspects of, and issues surrounding, climate change may be formally taught to CYP in English schools at both key stages 1-2 and 3-4 (depending on options taken). Typically this more formal learning occurs in science and geography lessons; one instance is the key stage three (years 7, 8 and 9 in secondary school) Unit 9G: Environmental chemistry, section 8: is global warming happening?⁴. In this example the young people will learn whether there has been a climate change in the past, the effects

⁴ See the Department for Children, Schools and Families' website for details of schemes of work within the national curriculum (www.standards.dfes.gov.uk/schemes)

of these changes and, if the earth is currently warming, what the possible causes and impacts of this change may be. Teachers also use the focus on the topic of climate change as a means to develop their pupil's skills such as using primary sources of information to answer scientific questions.

The current national curriculum (for key stages 1-2 and 3-4) used in schools in England includes a number of 'Cross Curricular Dimensions'. These are described as a means of *"unifying areas of learning that span the curriculum and help young people make sense of the world"* (Qualifications and Curriculum Authority undated pp1). They are not academic subjects such as science or maths, rather they *"are crucial aspects of learning that should permeate the curriculum and the life of the school"* (Qualifications and Curriculum Authority undated pp1). The dimensions are not a statutory aspect of the National Curriculum (<http://curriculum.qca.org.uk/>), rather they 'add' to the curriculum, to give learning a depth and relevance. In a wider context the dimensions are also intended to contribute towards the government's 'Children's Plan'. There are seven cross curriculum dimensions, of which 'global dimension and sustainable development' is one. The cross curriculum dimension of global development and sustainable development is intended to help young people *"understand the needs of present and future generations and to consider the best ways to tackle interrelated global challenges such as climate change"* (Qualifications and Curriculum Authority undated pp22).

For both the formal statutory curriculum and the more flexible cross curriculum dimensions teachers will make use of a variety of teaching materials to aid their lessons. These materials come from a number of sources; some are supplied by the relevant educational authorities, others by examining boards or by higher education establishments. An example of this category of material is 'The Climate Change Pack – Guidance for teaching staff' which is designed to accompany the film 'An Inconvenient Truth' and includes ideas for work (in science, geography and citizenship) which are derived from or associated with scenes in the film. Other materials for teachers are available from a range of 'non-academic' sources which have an interest in the particular subject or topic; in the case of climate change materials are freely available from groups such as 'Princes Rainforest Project for Schools', and from charities such as Friends of the Earth and WWF. Materials are also available from media organisations such as Teachers TV or from Channel 4. A number of reviews of teaching resources relating to climate change have been carried out (Garcia 2008; SEEd Accessed April 2009). The organisation 'Children in a Changing Climate' concluded that there is a wide range of sources and materials available to teachers, which are generally easily available through the internet and that certain types of material, for instance child testimonies which personalise the reality of climate change, are more successful than others (Garcia 2008).

Children may also be exposed to climate change messages within the educational system through extra-curricular activities such as participation in the Eco-Schools

programme⁵. Children may also be members of groups or clubs that have, in some way, a focus on climate change or other environmental issues such as the 'Scouts'⁶.

Media sources

The internet presents CYP with an easily accessible source of information about climate change; unsurprisingly there are quite a number of sites which aim to educate children to some degree about climate change. Some sites are designed to inform children **specifically about climate change, an instance of which is the website from the 'Young People's Trust for the Environment'**⁷. There are also a number of websites from NGOs and charities, including 'The National Trust'⁸ which has an interest in educating CYP about climate change. Media groups, which are not primarily environmentally focused, **such as the children's television network 'Nickelodeon'**⁹ also have websites focused on climate change. The websites specially designed for children tend to incorporate information, activities and games.

The more traditional forms of media can also be considered as a source of information on climate change for CYP; **for instance television programmes such as the BBC's 'Newsround' or 'Blue Peter', regularly include climate change focused items.**

⁵ www.eco-schools.org.uk; around half the schools in England have achieved eco-school status

⁶ www.scouts.org.uk/climatechange

⁷ www.ypte.org.uk

⁸ www.youmeandtheclimate.org

⁹ www.nick.com/minisites/biggreen

Methodology

Aims and research questions

The primary aim of this research was to investigate CYP's **perceptions of climate change** and the role of TWF in the UK. From this primary aim four specific research questions developed:

1. What are CYPs perceptions of climate change?
2. What are CYPs perceptions of the role of TWF?
3. Do these perceptions vary according to age or to the location in which the children have grown up (i.e. rural/urban)?
4. **What impact do parents and teachers have on those children's perceptions of climate change?**

Research design

As the aims of this research were to understand the perceptions and opinions of those who participated, this study adopted a predominantly qualitative approach. Qualitative research designs are often argued to be the most appropriate approaches to gaining an insight into **an individual's perceptions and understandings** (Sale, et al. 2002). However, as with much research, practical constraints also impacted on the final research design. In this case the short time frame in which the research was to be conducted meant that an entirely qualitative approach was unrealistic; therefore a quantitative element was incorporated into the research design. While purists of either qualitative or quantitative approaches may believe that they are fundamentally distinct and therefore incompatible, others believe that mixing methods from either paradigm is a valid and important research approach (Onwuegbuzie and Leech 2005). Mixed method research is now commonplace and acceptable (Bryman 2006). The inclusion of a quantitative element allowed for a quicker and less intrusive method of data collection.

The methods

Three distinct research methods were used during the data collection: focus groups, interviews and a questionnaire.

Focus groups

Focus groups were used to assess the CYP's **perceptions and knowledge of climate change** and the role of TWF.

Focus groups are a common qualitative research tool. One of the strongest reasons for using a focus group approach is that it is particularly effective at accessing existing perceptions and social norms. This strength is particularly important when, as Lewis (1992) noted, one reflects on the significance of the social context on opinions and beliefs. At a more practical level the presence of several interviewees can result in the challenging of responses and ideas by others in the group, the outcome of which may be a greater breadth and depth to the data gathered. The group format could potentially provide more reserved members with the confidence to express their opinions. Furthermore the group format can aide recall and allow for greater elaboration. However, one must remember that focus groups need to be managed effectively to ensure that one or more of the participants do not dominate the discussions and that individuals who may be reluctant to voice opposing opinions are given opportunities to contribute.

A focus group schedule was prepared for this research which can be found in appendix 1. The schedule prepared for the CYP's **focus groups was designed to allow** discussion of three key themes: **firstly, the children's knowledge and perceptions of climate change** and global warming, both globally and locally, **secondly, the role of TWF in climate change**. The origin of those perceptions and the role of parents, teachers and the media in influencing the children was the final theme.

Interviews

Data was gathered from the teachers and governors using one-to-one semi-structured interviews, the aim of which was to understand their approach to teaching climate change and the importance of environmental issues to the school.

The emphasis of this method is on balancing the need for certain specific information while allowing the interviewee the time and opportunity to give their opinion as they see it (Patton 1987). An interview schedule was used for this research and was structured according to the three key topics of interest: the first focused on what climate change teaching took place within their school, the second on the importance of **environmental issues to the school and the children's engagement with those issues**. The final topic was **centred on the teacher's perceptions of the location (i.e. rural/urban) of the school and whether that influenced either their teaching or the children's perceptions**. The interview schedule can be found in appendix five.

Questionnaire

A self-complete questionnaire was used to assess the knowledge and perceptions of the parents.

The questionnaire used both closed and open-ended questions. The majority of the questions were adapted from ones used in previously published surveys (BBC News 23/06/2006; Department for Environment Food and Rural Affairs 2001-2008; Eurobarometer 2008; Grant and Smilie 2007a). This was an advantageous approach for two reasons; firstly, the questions had previously been validated for use, and, secondly, it allowed for comparison between the responses of the participants of this study with those of the study from which the questions were taken.

A total of seven questions were included in the questionnaire. Five of the questions were intended **to assess the parent's knowledge, understanding and concern for climate change**. One question asked whether they, as a family, recently visited a forest or woodland for recreational purposes. The aim of the final question, taken from the **Forestry Commission's survey of public attitudes** (Grant and Smilie 2007a), was to assess their perceptions of TWF role in climate change.

Basic demographic data (age group, occupation and educational achievement) was also collected using the questionnaire. A copy of the questionnaire can be found in appendix four.

The sample

The Forestry Commission requested that the children, parents and teachers from four schools take part in this research. Accessing children through schools is a recognised method of sampling children; after all, the majority of children in the UK pass through the school system. As there was interest in whether the perceptions of climate change and the role of TWF varied according to, firstly, age and, secondly, by the location in which the CYP had grown up; children from both primary (key stage two) and secondary schools (key stage three) and from urban and rural schools were sought. Therefore one urban and one rural secondary and one urban and one rural primary were sought. The research focused solely on the south of England. It was decided that the schools should not have previously participated in any FC education sessions.

A non-probability convenience sample was used for this study; convenience samples are, as described by Bryman (2001 pp97), one that is **"*simply available to the researcher by***

virtue of its accessibility". The recruitment of schools for this research was primarily driven by those factors listed above but also by the time frame of this research. Therefore, to maximise the chances of finding the four schools, two recruitment approaches were used: first, employees of the FC were asked if they had any close contacts with state primary or secondary schools in the south of England. Those individuals were asked to contact those schools regarding possible participation in the research; a short information sheet regarding the aims and procedures was produced to give to the schools. Second, lists of schools were identified through county council websites, and, after geographically locating the schools in terms of their urban or rural position, a number of schools were contacted directly.

Of the schools which offered to take part in the survey a total of five were selected because they were geographically suitable (i.e. good examples of a rural school) or because they were able to accommodate the data collection taking place at short notice. A second rural primary was also included in the study as this particular school had few apparent environmentally focused activities, and in a sample of potentially highly environmentally motivated schools, this provided a valuable subject for comparison.

Details of the sample

Table 4 displays details of the five schools (including the numbers of CYP, teachers/governors and parents) which participated in this research. Greater detail can be found in appendix six.

Table 4 Details of the research participants

School	Location	Age and gender of children or young people	Teacher/s and Governor/s	Number of parental questionnaires returned
Rural Secondary	Hampshire	Group1 – Years 9 and 10 (13-15 years old) Group 2 – Years 7, 8 and 9 (11-14 years old) 14 girls 10 boys	1 teacher (science) 1 governor	24 parental questionnaires returned
Urban Secondary	Hampshire	Both groups - Year 7 (11-12 years old)	1 teacher (geography)	0 parental questionnaires returned

		13 boys 7 girls		
Rural Primary (1)	Surrey	Both groups - year 5 (9-10 years old) 9 boys 11 girls	2 teachers (including geography)	20 parental questionnaires returned
Rural Primary (2)	Hampshire	Both groups - Year 5 and 6 (9- 11 years old) 6 boys 8 girls	1 teacher (years 5+6 group teacher)	14 parental questionnaires returned
Urban Primary	Surrey	Group 1 - Year 3 (6-7 years old) Group 2 - Year 6 (10-11 years) 6 boys 5 girls	1 teacher (vice head - lead on global issues)	9 parental questionnaires returned
Totals	5 schools	89 children	6 teachers and 1 governor	67 parental questionnaires

Ethical considerations

An aspect of good practice in social research is gaining informed consent from all those who participate. Therefore information sheets were produced which detailed the research; the aims, procedures and what would happen to the results.

Written consent to participate was acquired from both the children and, when possible, from their parents (permission was given by the head teacher in one secondary school). The children were informed, and reminded when appropriate, that they were under no obligation to participate and they could, if they wished, withdraw at any point.

The children, parents and teachers were not guaranteed anonymity; however no individual is identified in this document.

Piloting the research methods

The time available in which to conduct this project meant that full piloting of the research methods was not feasible. However the methods were piloted in a basic manner. The parental questionnaire was piloted on adult individuals known to the researcher, this highlighted small issues with the wording of a question and a point about the formatting of the questionnaire. The focus groups methods were reviewed after the first interviews, this highlighted that the order of questions should be amended and one question and six extra prompts were added.

Data Collection

The data collection was undertaken by the author over three weeks in March 2009. After gaining consent from the participants, each of the focus groups with the CYP were recorded using a digital voice recorder and the interviews with the teachers were recorded where possible (one interview was not recorded due to the noise level in the room), when not recorded detailed notes were taken and written up post interview. The ten focus group recordings were transcribed verbatim. The questionnaire responses were placed onto an excel spreadsheet.

Analysis

Focus groups and interviews

This **study used the 'framework approach'** which Pope et al. (2000), describe as having been developed in Britain and specifically designed for applied or policy relevant research; furthermore they argue that it is especially appropriate for mixed method studies. It is essentially a deductive approach; the framework of the analysis is usually derived from research aims and questions. Pope et al. noted that, although it is primarily deductive, the approach is flexible enough to allow for inductive analysis.

Questionnaires

The distribution of responses, given by the parents, was examined using frequency tables.

Limitations

A threat of using convenience samples is that of bias. In this particular case it is likely that some of the schools which consented to participate **have a more 'environmentally friendly' or environmentally aware outlook than many of the schools who declined.** Those teachers who put value on the environment and raising awareness of issues such as climate change were clearly more likely to find the time and make the effort to take part. Therefore this sample may be somewhat biased; this is, however, acknowledged and the analysis of the data and the conclusions drawn are done so with this in mind.

Findings

The following sections detail the findings of this research: the first section focuses on the CYP's **perceptions**; the second, details the findings of the interviews with teachers and **governors**. The final section explores the **parent's perceptions**.

Children and young people's perceptions of climate change and the role of trees, woods and forests

Awareness of climate change

The term 'climate change' was recognised by all of the CYP who participated in the focus groups. Likewise all of the CYP were aware of the term 'global warming'. There was a consensus across the groups that climate change (and/or global warming) is happening.

Despite the fact that all of the CYP were aware of the term 'climate change', many appeared to find it difficult to articulate what it meant. In particular the youngest participants were unable to define the term. Amongst the older CYP the definitions varied, though many still found explaining their understanding difficult. Participants in just four of the focus groups were able to give a relatively accurate definition:

I So what's climate change?

P Its like when, err, the general climate on the earth, um changes in a particular way, it gets colder or warmer, um throughout history.

(rural secondary)

Similarly, few of the CYP were able to accurately define the concept of 'global warming':

P It's hotness.

(rural primary)

P ...global warming, is that if it just heats up the poles?

(urban secondary)

In four of the focus groups more accurate interpretations of global warming were given, for example one participant stated:

I So what's global warming, is that...?

P That's a result [of climate change], cos like in January or December it was like hotter than it was usually being, like flowers all budding before they were supposed to and animals coming out of hibernation, so...

(rural secondary)

There was, amongst the CYP, disagreement as to whether the terms 'climate change' and 'global warming' were distinct or whether they described the same phenomenon. For around half of the CYP climate change and global warming, though related, were not inter-changeable, however participants in only two of the groups were able to describe the differences to any extent:

P Well they are linked together really because global warming is causing climate change which is terrible.

P I was going to say that they are different because there is global warming which is literally the globe heating up and that is causing climate change.

(rural secondary)

The majority of the CYP became confused when trying to articulate the differences:

I Are climate change and global warming the same thing or are they different?

P Sort of, but a bit different.

P Something different.

...

P Yeah, I am not really sure.

P No, neither am I.

(rural primary)

For the rest of the CYP, climate change and global warming were not distinct; one participant stated "*They are just different words*", another "*Climate change is just another word for global warming*" (both urban secondary).

Despite the confusion highlighted above, all of the CYP had a basic and correct understanding of climate change. Environmental change, and in particular the idea that the earth is warming, was key to most of their definitions. When trying to describe climate change the CYP mentioned causes, such as greenhouse gas emissions or pollution, "*I think, err, global climate change is where our cars, our cars, yeah, makes these fumes, that cause CO₂, carbon, that pollute the world*" (urban secondary). The impacts of climate change, such as the melting of the ice caps, were also incorporated into definitions:

P It's when the earths temperature is changing and warming up.

...

P And all the icebergs are melting away.

(rural primary)

The CYP's perceptions of the causes and impacts of climate change are explored in the following sections.

Causes of climate change

The vast majority of the CYP were unable to correctly describe why the climate is changing. Although most of the CYP had elements of the explanation (for example the idea of damage to the atmosphere and greenhouse gases) these would often be knitted together with other environmental issues (for example general pollution and littering) to create a coherent explanation.

All the CYP were aware that climate change is caused, in part, by greenhouse gases; carbon dioxide/ CO₂ were mentioned in almost all the ten focus groups, methane was also mentioned in four of the groups. Gases such as sulphur and fluorocarbons were mentioned in two focus groups. While the majority of the CYP identified transport and power stations (coal and nuclear) as primary sources of greenhouse gases, other sources such as volcanoes, lightning, the sky or the sun, were occasionally mentioned. Most of the groups who had mentioned that gas implicated cows as a source of methane, though one participant mentioned that melting ice in Russia was related to methane emissions, *"And isn't there somewhere in Russia where the ice is melting but then that's releasing methane that's trapped under the ice so that's not helping cos methane is ten times worse than CO₂ or something?"* (rural secondary).

Climate change was also attributed to pollution by participants in eight of the focus groups; **this was either general 'pollution' or more specific pollution from fossil fuel emissions, litter or oil spills:**

I So what's causing climate change?

P Pollution.

P Litter being left around.

(rural primary)

P It's the pollution.

I What kind of pollution?

P Like oil rigs, there's too, yes too much oil and stuff going in the sea and then there's like spreading and then it's going into the air as well...

(rural primary)

A further common perception was that the broad concept of 'energy' and particularly the wasting of energy was causing climate change:

I What's causing climate change?

P People, energy.

...

P Energy bills rising up and err people wasting a lot of electricity.

(urban secondary)

I Do you know how using all that extra electricity makes the weather change?

P Doesn't it go up into the air?

(rural primary)

TWF were mentioned by just three of the groups as a cause of climate change (before the topic was explicitly discussed); one participant stated that climate change was mostly attributable to man because, "**Yeah you get them cutting down trees and wasting energy...**" (urban secondary). In both of the focus groups held at the rural secondary school trees were mentioned as causes of climate change; one young person stated that the rate at which trees were being cut down was a cause of climate change, in the other group one participant stated, "**And also deforestation is getting rid of the trees which are obviously meant to cope with it [CO₂ emissions] and then its adding to the greenhouse effect**".

Describing the climate change process

Many of the children were relatively unspecific in their explanations of the climate change process, "**And then there's like, it's like a greenhouse and it gets warmer inside...**" (rural primary). In another focus group the CYP were similarly vague, "**I think that pollution and gases make the earth warmer and killing all the plants and trees and...**" (urban secondary). As these two quotes illustrate, many of the children had some knowledge but were missing key aspects of the explanation. Even when the children appeared to have knowledge of the basic elements of the explanation they had not necessarily put them together into a coherent whole, as this quote demonstrates;

I Do you know what is causing climate change?

P Emissions.

P CO₂ gases.

...

P It's got something to do with the sun as well.

I Do you know what happens?

P It's getting hotter so.

P It moves through to the atmosphere and then it's trapped in the atmosphere.

(urban secondary)

Amongst the CYP who constructed more complex interpretations of the process of climate change three general themes were identified;

- Climate change is related to the ozone layer
- Climate change is caused by greenhouse gases in the atmosphere
- Climate change is related to our proximity to the sun

It should be noted that these explanations were not distinct and often overlapped.

Climate change and the ozone layer

The ozone layer was mentioned in seven of the focus groups, and as specifically related (either as an impact or cause) to climate change in five of the focus groups. Typically the CYP conceived of the ozone layer as a protective coating around the earth which, due to damage by greenhouse gases, was letting in **the sun's rays**;

I What causes climate change?

P Ozone layer.

P Yeah the ozone layer is broke.

I What's happening to the ozone layer?

P We're killing it.

P Its having holes in it.

I Its got holes in it?

P Yeah and the suns going through so its not really protecting us as much as its supposed to.

(urban primary)

A similar opinion was expressed by a child at a rural primary, "***Because of all the carbon emissions and stuff making holes in the ozone layer the suns rays are more powerful because the ozone layer is weaker so there's more heat on the planet***".

However, not all the CYP thought that the ozone layer was related to climate change, one teenager (from the rural secondary) stated, *"It's nothing to do with the ozone layer"*.

Climate change is caused by greenhouse gases in the atmosphere

Participants in most of the focus groups were aware that climate change was related to greenhouse gas emissions in the atmosphere and that this was causing the globe to warm, however, they did not appear to fully understand the processes, *"The greenhouse gases in the air and that's affecting the climate, and that's why, that's why it's all, that's one of the reasons for global warming"* (urban secondary). In two of the focus groups the CYP discussed the idea that the greenhouse gases were 'breaking' the atmosphere:

P When the smoke goes up into the air there's sort of like a bubble round the outside so the sun doesn't burn us. So when the smoke is going up it's breaking a bit of the bubble thing.

P The magnetic field or atmosphere.

P Destroying our atmosphere.

...

P Yes, all our air will leak out.

(rural primary)

There were a small number of participants (in four of the focus groups), generally those who were older, who were able to articulate in relatively accurate terms the relationship between greenhouse gases and climate change:

I Do you know what happens?

P Its getting hotter so.

P It moves through the atmosphere [greenhouse gases] and then gets trapped in the atmosphere... um the suns rays go, um because there's the thingies, it [the suns rays] gets trapped inside the atmosphere.

(urban secondary)

P Oh its like when erm, the greenhouse gases collect in the atmosphere and they blanket the earth and err, keep the suns, err...

P Solar emissions.

P ...heat in the earth like a greenhouse and but err, heats up.

P Bounces the rays back instead of letting them go out.

(rural secondary)

The process was also described relatively accurately by a younger participant (though he was a notable exception amongst those from the primary schools), *"Well like say this is the sun and this is the earth, light comes down to the earth and because of the gases coming up the gases stop the heat from coming out so its stuck in the atmosphere so it gets really hot"* (rural primary).

Climate change is related to our proximity to the sun

In three of the focus groups the earth's proximity to the sun was mentioned as a cause of climate change, *"I think it is because the earth is moving closer to the sun so its almost like melting the earth"* (urban secondary). This opinion, however, tended to be questioned or refuted by a fellow participant:

P Is it, is it when, is the sun, is moving closer to the sun or something?

I And that's making us warmer?

P Yeah.

P We're not moving closer to the sun.

(rural primary)

Climate change – a natural or manmade process?

The predominant opinion in all of the focus groups was that climate change is a result of both human and natural processes, though the proportion of cause attributed to either humans or to natural processes varied between the groups. The following quote is representative of many of the discussions around whom or what was responsible for climate change:

I So do you think it is a natural thing or do you, like, think that man has caused it? Or do you think it's a combination of the two?

P A bit of both.

P Probably a combination.

...

P Yeah cos like we made the gases and stuff but its how like, the atmosphere reacts to like all our gases.

(urban secondary)

Around half of the groups came to the conclusion that human actions have exacerbated the natural processes of a changing climate, *"I think it's a bit of both because I think that it's a natural thing but its been sort of pushed forward cos of the man made stuff"* (rural primary). A similar opinion was expressed by young people at the rural secondary:

- P Erm the ice ages and stuff, coming out of ice ages so that might have something to do with the fact that it is rising [global temperatures], we might be helping as well but it may have something to do...*
- P We are not helping it, it, it will be partly natural because that's what the earth's done, earths already done in the last million years or whatever.*

Three of the participants stated that they thought that climate change is due solely to natural processes:

- I ...why do you think it is mostly natural?*
- P Cos you can't really control the sun, you know how it is getting hotter.*
- I So it's something that is out of our control?*
- P Yeah.*

(urban secondary)

Amongst those who attributed climate change to natural processes the idea that the globe's climate and temperature fluctuated throughout the earth's history appeared to explain the current changes, *"It's because like there was an ice age before and nobody was there and it got warmer, I think it will just carry on in a cycle like that"* (urban secondary).

Again only a small number of the participants (four explicitly articulated this opinion) attributed climate change solely or mostly to humankind:

- I So how much do you think man is involved in this? Like if we say a percentage?*
- P A hundred percent cos they are ruining everything.*

(urban secondary)

There was, however, agreement between the groups as to who was responsible for much of the green house gas emissions; *"Because America haven't been like cutting back, well no, not just America, but most countries have been trying but they haven't... it wastes more electricity than probably the rest of the world"* (urban secondary). China was another country singled out for criticism, *"They don't care about global warming"* (rural primary). Individuals in three of the focus groups argued that the more populous developed countries shoulder much of the responsibility for climate change, *"Err, I think it may be, climate change is down to the more richer more developed countries, well,*

England, the US and China, well they do more emissions than poorer countries” (rural secondary).

Are trees, woods and forests associated with the causes of climate change?

The CYP were asked specific and direct questions aimed at understanding their perception of the role of TWF in relation to the causes of climate change.

The contribution of forestry to climate change

During the focus groups the CYP were asked to indicate which of the six sectors (houses and buildings, transport, agriculture, forestry, industry and energy production - as identified in the Eliasch review (Eliasch 2008)) were primarily responsible for annual greenhouse gases emissions. It was quite clear that the CYP did not consider forestry to be one of the primary contributors; of the 87 participants just eight thought that forestry contributed significant amounts of greenhouse gases. It became clear that the CYP had little knowledge of the contribution by forestry to greenhouse gas emissions and, therefore, to the causes of climate change.

Despite this result, when asked, the CYP did generally consider that TWF are associated with climate change.

How trees, woods and forests contribute to the causes of climate change

The majority of the CYP, while considering that TWF **have** contributed to climate change, were less certain as to **how** they have contributed. One participant suggested that forest fires may be responsible, *“There could be forest fires; that makes a lot of smoke”* (rural primary). Participants in two groups suggested that machinery used in the forestry industry, *“We’re cutting down trees with chainsaws and they use petrol and let off fumes”* (rural primary). The most common perception was that deforestation has upset the ability of TWF to manage the relative levels of oxygen and CO₂.

Trees, woods and forests and the carbon cycle

All of the children were aware that trees have a role in the carbon cycle, though, as with the processes behind climate change, there were differing levels of understanding. Naturally the youngest had the most basic knowledge;

I Do you know if cutting down trees makes climate change worse?

...

P Because we need oxygen from the leaves and also...

...

P From the leaves. The leaves use oxygen.

P Yeah they come out of the point of the leaves.

(urban primary)

Greater levels of understanding were demonstrated by older participants, *"Don't trees let out oxygen and suck in CO₂?"* (rural primary).

The CYP appeared to have the perception that, throughout history, trees, along with other green plants, have maintained a balance of CO₂ to O₂ levels, *"If we didn't have any of the factories and things or anything that's causing climate change everything would be perfect because it's all sort of balanced out with the trees but then by chopping down the tree it's all unbalanced and the levels getting too high for the trees to cope"* (rural secondary).

Deforestation and climate change

As the previous quote indicates the CYP thought that deforestation had upset the delicate balance of greenhouse gases in the atmosphere. There was a perception that there are now not enough trees to deal with current levels of CO₂ emissions:

I So do you think that makes climate change worse, when they cut down the trees?

P Yeah.

P This whole earth used to be...

P There used to be trees everywhere.

(urban secondary)

Therefore the CYP did not so much think of TWF as directly contributing to climate change, rather their current scarcity due to deforestation meant that they were unable to fulfil their role of managing CO₂. This perception was articulated by a participant from a rural primary:

I OK, so, deforestation, think of that, has that made climate change worse?

P Yes because the trees actually bring in the greenhouse gases and I think turn them into oxygen and if we don't have the trees you run

out of oxygen and if we run out of trees we run out of getting rid of climate change thing. And if you get too much of the climate stuff we'll all overheat or something and die.

There was a second commonly held perception that deforestation would result in lowered levels of oxygen, to the point that without trees we would have no oxygen, **"We'll run out of oxygen"** (rural primary). It is not clear whether the CYP directly associated deforestation and the decreasing supplies of oxygen with the causes of climate change; though the following quote indicates that they may have done so:

P Yeah cos like, when you are cutting down trees and getting rid of all the air, and cos trees give, um air and oxygen and like, um, and if we are producing loads of gases and like we use oxygen to like over take it, so we need more trees.

(urban secondary).

Participants in four of the focus groups indicated that they were aware that trees 'hold on' to the CO₂ absorbed during their growing period and that, if the tree is cut down, this CO₂ may be released and would therefore contribute to the causes of climate change. For example, a participant from one of the two rural primary schools stated, **"The trees are going to be cut down and CO₂ going to be let out..."**. A similar explanation was given by a participant from the rural secondary, **"When they are cut down, the carbon dioxide they have collected over the years is released into the atmosphere"**.

Participants in just two of the ten groups, both of which were from the rural secondary, were aware that woodlands and forests act as a carbon sink, **"The rainforest was this huge bowl to store the carbon dioxide and that sort of got cut, well sort of, is getting cut down, bits of it have been cut down and that's been, sort of, a really big factor"**.

Typically the CYP gave the impression that they perceived of deforestation as happening in places such as South America or Africa:

I Have you heard of deforestation?

P Yeah.

...

P It's lumberjacks.

P In the Amazon and Brazil and places they are cutting down all the trees.

(rural primary)

When asked, the CYP all agreed that deforestation has happened in the UK:

I Has it happened in the UK or is it just something that happens in far-away countries?

P ...it has happened in the UK, that's what I think.

P Yes it has happened in the UK.

(urban primary)

Some of the CYP were even able to give examples of their direct experience of (what they perceived to be) deforestation in the UK, "*I went to a farm a couple of weeks ago and there was people chopping down the forest and that, because I saw loads of trees on the floor...*" (urban primary). However there was a general perception that deforestation in the UK has not contributed to climate change to the degree that it has in places such as South America, "*I think it has but not as much as the rainforest*" (rural secondary). There appeared to be two explanations behind this perception: firstly, that the levels of deforestation have not been so great in the UK. Secondly, there was a perception that the removal of the specific types of forests in places such as South America, namely rainforests, had had a greater impact:

I So you think it might be worse in other places?

P Yes it's better here but it's still an issue.

P Because Britain doesn't have that much forest, no, no rainforest.

(rural primary)

Regardless of where it was happening the CYP thought that deforestation was a 'bad' thing, "*People who do deforestation are evil*" (rural primary). Participants in one focus group appeared to think that deforestation is an illegal process, especially in places such as South America:

I What's deforestation then?

P Yeah, there is the illegal people which just keep on, on cutting down the trees.

P In South America.

(urban secondary)

Not all the participants thought that deforestation was reducing the levels of trees to a dangerous degree; participants in three of the focus groups argued that there were still plenty of trees:

P Because when I go to school even though, when I go through the city, there are still lots of trees.

P Yeah.

P London is a city, you find lots of trees, you find lots of trees everywhere.

(rural primary)

The impacts of climate change

The participants perceived that climate change would have a number of impacts; the most common of which, unsurprisingly, was that the globe has been or will be warming, ***"It's where everything is sort of changing and all the cold places are all getting warmer and all the warm places are getting warmer as well"*** (rural primary). Although this opinion was expressed in each of the focus groups, there was disagreement about the longer term impacts of climate change, in particular participants in three of the focus groups discussed the possibility of climate change causing an ice-age, ***"Its getting hotter and hotter, like every summer is going to be hotter now and like, yeah so the ice is melting and we are going into an ice-age"*** (urban secondary). Only one participant explained how climate change may cause an ice age:

P Because of climate change if the Gulf Stream actually closes up because the wind is usually south easterly wind or westerly wind, if it comes in, if that closes up we are expected to go into an ice-age.

I Do you think that might close up and cause an ice age?

P Yes it definitely has got something to do with climate change because it would be hard for it to happen naturally and I think it definitely has something to do with climate change, all the things we are giving off into the atmosphere.

(rural secondary)

Beyond the idea of global warming (or indeed cooling) the CYP thought that climate change would have impacts on or for:

- the weather
- the ice caps
- sea levels
- flora and fauna
- humans

Impact of climate change on the weather

That climate change is, or will have an impact on weather was discussed in the majority of the focus groups; typically the participants thought that climate change would result in hotter weather during the summers:

I What do you think climate change is going to do to the weather in Britain? So what is going to happen in the summer time?

P It's going to get really hot.

P Really hot.

...

I What about, is it going to rain more or less in the summer...?

P It's going to rain quite a lot in the summer cos when it gets hotter, err you have more thunder storms and stuff.

P No I think that erm, the rain is going to be less because the, seeing as it's going to get hotter, its going to evaporate the water before it hits the ground probably.

(urban secondary)

As this quote demonstrates there was less agreement as to the impacts of climate change on precipitation.

There was also disagreement as to whether winters would be warmer or colder, "***And in winter it's getting colder, cos all the cold ice and...***" (urban secondary) (the perception that winters would be colder may be related to the exceptional snow which had occurred shortly before the focus groups were held). Others thought that winters would be warmer.

Participants in three of the focus groups argued that climate change would result in unpredictable weather, for both the UK and the rest of the world.

Impact of climate change on the icecaps

The perception that climate change will have negative impacts on the icecaps was common to all of the focus groups. Typically the CYP thought that climate change is or will cause the ice caps to melt:

I So do you know what climate change is doing to the world...?

P It's melting the Antarctic and the Artic.

P The ice is melting.

(rural primary)

Participants in two of the focus groups thought that the warmer temperatures were causing newly formed polar ice to be thinner, which further compounded the problems associated with the melting, "***And when the ice forms again it's not as thick***" (rural primary). The thin and melting ice had further implications, particularly to the inhabitants of the poles.

The threat to the ice caps was a very popular perception, and was often one of the first impacts of climate change to be mentioned. It was also used as an explanation of what climate change is, suggesting that many of the CYP conceive of climate change in terms of its impacts, specifically to the ice caps, rather than as a process.

Impact of climate change on sea levels

Associated with the melting ice caps was the idea of rising sea levels, CYP in seven of the focus groups argued that there is a direct link between the melting ice and rising levels:

P ... I have read this magazine and it said that, err like, I saw this picture of London and it was like half under water.

P Oh yeah.

I So, what, are sea levels going to rise?

P It's cos all the ice is melting.

(urban secondary)

In two of the focus groups participants argued that the increased temperatures could further contribute to the rising sea levels, *"It affects sea levels in two ways cos when the water is hotter it will swell as well as the ice caps melting and stuff"* (rural secondary). Another stated that *"Warming it up [the globe] and melting glaciers so the water level will rise"* (urban primary).

For many of the CYP rising sea levels was one of the key ways in which Britain would experience climate change, one participant from a rural primary argued that Britain is *"...going to shrink and the coast is all going to go into the sea"*. However the CYP were aware that rising sea levels would also affect other countries; one participant described a television programme he had watched which had described the impacts of a rise in sea levels on an island (possibly in the Pacific), *"...the sea had moved in loads on the beach, like a few metres and there was this, this tiny little hill just after the water and then they said that's the highest point on the island and if the water goes above this tiny little hill and then it's, then the whole island will be under water"* (rural secondary).

Impact of climate change on flora and fauna

Climate change would, according to the CYP, have a number of impacts on flora and fauna. One of the most common perceptions, which is related to both of the impacts discussed in the previous two sections, was that climate change would have serious

implications for the inhabitants of the ice-caps and in particular polar bears. CYP in the majority of the focus groups (nine of the ten groups) mentioned polar bears, typically expressing concern about the destruction of their habitat, ***"Every year the polar bears are making a bigger journey because some of them have got to swim a really long distance and then if it gets slightly warm, they have got to go further and then, if they do make the journey and then there's a lack of food because the sea isn't frozen and then they can't catch seals more quickly..."*** (rural secondary).

In a more general sense there was disagreement between the groups as to whether animals would be able to adapt to climate change. Some argued that they would not:

I ***What's this [climate change] doing to wildlife?***

...

P ***They won't be able to adapt to it.***

P ***I think the animals are going to get really confused cos maybe in the winter, some days are going to be really hotter so it feels like spring... they won't be able to adapt fast enough for the weather.***

(urban secondary)

The inability of animals to adapt could have serious consequences, ***"...I think more animals are going to become extinct"*** (rural secondary). Other participants argued that animals would be able to adapt, for instance one argued, ***"...might migrate over here 'cos this country is getting colder than hot"*** (urban secondary). Another participant stated that climate change was causing animals to evolve and this ability to adapt meant that they will survive.

In two of the focus groups participants argued that the impacts of climate change on biodiversity could be very serious, ***"About the food chain, so if the bees die [as a result of climate change] they don't get all the pollen out of the plants which doesn't make any trees grow which doesn't, which makes our oxygen levels go eeuurr [indicates downwards] and then we all die"*** (urban secondary).

Impacts of climate change for humans

Beyond the threat of sea-level rises the CYP typically thought that climate change would to a greater degree affect people in other countries, specifically those which were poor, developing or in Africa. When asked whether climate change will affect humankind a participant from the rural secondary stated, ***"Yeah, the like poor people, it's the rich people who are causing all the global warming, all the problems, and it's the poor people who will starve or drown or suffer"***. Typically the CYP argued that the threat of

desertification or, conversely, flooding would adversely affect ability to grow food crops, and heighten the risk of drought in places such as Africa.

Participants in four of the focus groups thought that climate change may cause ill-health; this opinion was expressed by the youngest participants in the study:

I Do you know what climate change is doing to Britain?

P Making people sick.

(urban primary)

A participant from the urban secondary also thought that global warming could have negative impacts on human health and wellbeing, *"And you know when there was that hottest summer, like everyone was ill so maybe we are going to have to like build up the hospital supplies and stuff"*.

Others thought that humans would be able to adapt and that our ability to develop technological solutions would mean we will be able to avoid the most serious impacts of climate change (these ideas are explored further in a subsequent section).

When would these impacts be felt?

The CYP tended to perceive of climate change as something that will happen in the future. Participants in around half of the focus groups indicated that they thought that the impacts of climate change would not be felt during their lifetimes. This opinion was expressed by CYP across the age range, for instance one of the youngest participants stated, *"Well, if stuff like that does happen [melting ice caps] it will probably be like in 10,000 years time, so it's going to be..."* (urban primary), while one of the oldest participants (from the urban secondary school) argued, *"I think about it [climate change] but then I just think well it probably won't happen in my lifetime"*. The idea that climate change would affect the next generation was also common, *"...probably like the next, like the next generation of people; it will affect most"* (rural primary). Even amongst those who thought that climate change would affect their lives, this was likely to be towards the end of their lives, *"It might at the ends of our lives but it won't affect us now, not now"* (rural secondary).

Impacts of climate change on trees, woods and forests

The CYP appeared to have very little idea as to how climate change would impact on TWF, either locally in the UK, or globally. There was no discussion of what might happen to trees if global temperatures rise or if rates of rainfall change. The CYP in six of the

focus groups were more concerned with the threat to the inhabitants of the wood and forest environment, though typically these threats were due to deforestation rather than climate change, ***"And there is another thing, it is not entirely to do with climate change but there is this palm oil production and that's greatly affecting wildlife in places like Borneo, because deforestation, it doesn't just cause that... in poorer countries they chop down the whole rainforest to grow palm oil and a lot of animals especially orang-utans are homeless"*** (rural secondary). Equally there was no discussion of how TWF may be able to help adaptation to the potential impacts of climate change; indeed there was almost no discussion of adapting to climate change at all.

Preventing and mitigating climate change

Reaching the tipping point

While the majority of the CYP (this opinion was expressed in all of the focus groups) **thought that we had not yet reached the 'tipping point', beyond which we would not be able to prevent the more serious impacts of climate change**, participants in six of the focus groups argued that it was already too late:

P I think we have reached it.

P I think we have hit it.

P I think we have hit the tipping point.

P I think there is stuff we can do to reduce it but I think that no matter what we do it's going to happen.

(rural secondary)

Amongst those who perceived that we had reached a point of no return there was a distinct note of pessimism. As the previous quote illustrates, those CYP who argued this position thought that although we might be able to alleviate some of the impacts climate change was now unstoppable:

P We couldn't sort it out, it'll keep on getting worse.

...

P It's physically impossible just to stop it all together now.

(rural primary).

Those who thought that we had not yet reached the tipping point argued that we were, however, close to it and therefore action was imperative, ***"I think we have a chance, have a chance. We've got a bit longer but we don't have that long"*** (rural primary). This sentiment was echoed by a participant from the rural secondary, ***"If we don't take action***

soon then we are going to reach the top of the hill and then we are just going to keep going”.

Taking action to help prevent climate change

There was a clearly identifiable split regarding the CYP’s perceptions of the value of taking personal action to either prevent or mitigate climate change. Participants in four of the focus groups argued that individual action was worthless, their contribution would be so small and insignificant it would in effect be drowned out by, their perceived, lack of action in general, *“If one, if only one person does it, it won’t make a difference”* (urban primary).

This position was often countered by fellow participants who thought that individual action was worthwhile, for instance the following was in reply to the above quote:

P Yeah but it does kind of make a difference, it’s just one person, one person does make a difference but if you had more it will be, it will make much...

P Yeah, if had ten people, you’ll make a bigger difference.

...

P Like fifty million people would make a lot more difference!

(urban primary)

A similar opinion was expressed by a participant from the rural secondary, *“Some people think that the little things won’t help, but if everyone does lots of little things like everyone, it would make a difference but some people just don’t think that it will help but even if they tried..”*. Whilst those who held the perception that personal action was worthwhile tended to have positive perceptions about the potential outcome of collective action, *“Well if everybody did something I think we could save the world”* (rural primary), they were not particularly optimistic about the likelihood that the urgency of the situation would be recognised and acted upon:

P I think that we have to act quickly and all act now, because if we keep saying ‘oh we have got to act soon, oh yeah we have got to act soon, ok lets do it...’, not they are not unless, they are going to keep pushing it back and to, eventually it’s happened...

P Too late.

P ...boom there was your chance and you blew it.

(rural secondary)

The young people from the rural secondary appeared to have a relatively subtle understanding of the reasons why people failed to take action to help combat climate change. For instance while discussing the various changes we will have to make to our lives to combat climate change participants from the rural secondary argued:

- P I think we can try to do something cos we are like, if everyone worked together, then we could hopefully minimalise the amount*
- P Yeah but not everyone is going to listen.*
- P They are not going to want to give up their luxuries.*
- ...
- P Why can't we all just use like donkeys or horses or whatever?*
- P Cos we don't want to give up our lives.*

These young people were also aware that climate change was not an issue for some people, that not everybody was as interested or as worried as they may have been, *"...only about half the people are actually doing something, because some of them don't care because they think it's nothing to do with them..."* (rural secondary).

As with their opinions regarding personal action to combat climate change there was also a split between the groups as to whether their status as children affected their ability to take meaningful action. CYP in three of the focus groups were convinced that their status as children meant that they had a voice and that people would listen to their opinions:

- P What we could do is you know there's news at 6, 7, 8, 9 and 10, stuff like that, we could put on an advert like sorry to interrupt your fascinating news but...*
- P No, but with kids because they'll listen to kids.*
- P Do it with kids cos they listen to kids...*

(rural primary)

Others had less confidence in their abilities:

- I Do you think that you can help [prevent climate change]?*
- P No, we can't; we are too little.*
- I You can't do anything?*
- P No, we are just kids.*

(urban secondary)

Awareness of strategies to tackle climate change

The CYP's discussion of strategies to combat climate change centred on two main topics: firstly, reducing the use of power and raw materials, and, secondly, technological approaches.

While discussing the ways in which we can prevent climate change the CYP frequently mentioned the need to reduce our use of both power (e.g. electricity, gas, and fuel for engines) and raw materials (e.g. wood for paper). This message was frequently translated into personal actions:

I Do you think there is stuff we can do to stop climate change?

P Stop using stuff.

P Don't use too much energy.

P Cycle more.

P We can turn the TV off.

P And read a book.

(rural primary)

This strategy would, according to the participants, be a positive step towards preventing climate change:

I ...do you think, like, turning off light switches and saving paper is going to help?

P(all) Yeah!

(urban secondary)

The need to find alternatives to current, unsustainable, sources of power was also highlighted; one participant had identified a potential source of 'free energy', "*There are better deals all round, especially for like the farmers and the energy producers...when the cows just go doing their stuff all over the place... you can make bio-fuels out of it, its getting rid of all the farmers [cow's] poo and its producing energy without burning fossil fuels*" (rural secondary).

Recycling was also mentioned in each of the focus groups, typically this focused on recycling paper, a point which was highly relevant to them. While discussing efforts to recycle paper in their school, a participant from the rural secondary stated, "*If they charged more for refuse... it would encourage more people [to recycle]*". However, for a small number of the participants action should be taken 'upstream', "*But isn't it better to like reduce the amount of paper you use first?*" (rural secondary).

Though again, for the CYP in five of the focus groups, reducing energy use and recycling has to be a collective action to make a difference, "*I think it does make a lot of difference because if lots of people turn off everything, their lights, and not leave things*

on standby then that's a lot of people who are turning off their electricity" (rural primary).

In two of the focus groups, the CYP were also aware of the need to educate people in order to change attitudes and encourage more pro-environmental behaviours; when asked what we could do to prevent climate change one participant included, **"Tell more people about it so they stop doing it as well"** (rural primary). However one participant was sceptical of the current educational approach, **"They're telling us but it's not enough we need to know more because we'll just say 'oh who cares' basically and we need to think why, we need to actually do something about it"** (rural primary).

The second most commonly mentioned way in which we may be able to prevent climate change is through the application of technology and science (this theme was identified in eight of the ten focus groups), **"The future might be a bit more high tech than it is now" (urban secondary)**. Most of the CYP's knowledge and discussion related to cars which used a fuel other than petrol or diesel; potentials included electric cars, cars that run on a battery cell, hover cars, hydrogen powered cars, hybrid cars and a car that ran on seawater. However the CYP were not convinced that these cars would necessarily be that much better; some thought they were too expensive and not as good as current options:

P They are really expensive, that's the only problem.

P Because they are really hard to make.

P And they go really slow.

(rural primary)

Others questioned whether they really would reduce power use, **"But erm to get the hydrogen in the first place and into like the hydrogen cells, they have to use energy to do that so they are just using as much energy anyway"** (rural secondary).

Science will find a solution

Participants in the majority of the groups (seven of the ten) appeared to place great faith in the ability of scientists to find solutions. This opinion was often, though not always, related to less concern about climate change (discussed in the following section) and the idea **that we have not yet reached the 'tipping point'** as this quote demonstrates:

P ...I'm not all that worried cos in the time that we've got, say just like...

P 80 years?

...

P ...say like, yeah, 60 years or something, I think the scientists will think of something.

(rural primary)

Trees, woods and forests and climate change prevention and mitigation

Typically the CYP thought that TWF did have a role in helping prevent or mitigate climate change, though, as this quote indicates, there was no overall consensus of opinion:

I ...do you think that trees can be used to help stop climate change?

P No.

P Yeah.

P Well partly.

(rural primary)

Unsurprisingly the primary way in which TWF could contribute towards preventing climate change, according to the CYP, is by removing CO₂ from the atmosphere.

Trees, woods and forests and the carbon cycle

As discussed in previous sections the CYP knew that trees take in CO₂ and give out oxygen, it appears, therefore, that they made the logical inference that trees could contribute to climate change prevention and mitigation by removing CO₂ from the atmosphere:

I Can trees help fight climate change?

P Yes because the carbon dioxide that we put out goes into the trees and they give us oxygen, which is a plus, and so then they take in the carbon dioxide, not all of it, because there's not enough trees, there's too much of, carbon dioxide, but it takes in a lot so there's less carbon dioxide floating around'.

(rural primary)

However, as this quote demonstrates the CYP were also aware that there are not enough trees to absorb all the CO₂. The participants were asked how much of the UK would need to be covered in trees to absorb our yearly CO₂ emissions, typically they answered that around 50% coverage would be required. This indicates that the CYP had little conception of either the quantity of CO₂ emissions or had vastly overestimated trees ability to absorb the gas.

Preserving existing mature woodlands is, according to the CYP, an important strategy to prevent climate change, ***"If we keep more of them, then well, they're going to breathe in more carbon dioxide and breathe out more oxygen for us"*** (rural primary). Planting new TWF was, however, not necessarily a potential way of preventing climate change. This highlights a misconception, which was common to almost all of the participants, that mature, big trees absorb more CO₂ than still growing, smaller trees. Only one individual stated that he thought growing trees would take in more because they needed greater amounts of the gas to grow.

The value of growing trees versus mature trees

Almost all of the participants held the perception that there was a relationship between the size of the tree and the quantity of carbon dioxide it was able to absorb. One participant stated, ***"Well it [a young growing tree] won't do much cos they are brand new trees, so they won't take in as much, so it's better to have huge old trees than tiny little twigs that only take in, sort of their weight in carbon dioxide"*** (rural secondary). Others directly related the size of the tree to its potential ability to absorb CO₂:

P Yes because they have got a bigger area of leaves to take in more sun.

I So bigger trees are more valuable [for climate change prevention]?

...

P Smaller trees have less space to store all the oxygen whilst big trees have tonnes of space.

(rural secondary)

Despite this misconception the CYP were all in favour of planting more trees; young trees would, after all, grow into mature trees. They thought that new TWF should be planted to help mitigate climate change, but they also felt that when TWF were cut down for fuel, to make paper or for other reasons those trees should be replaced. Typically the CYP argued, quite strongly in some cases, that each tree removed should be replaced by two or three trees:

I So does anyone know if trees are important for climate...

P If you, like, cut, um, like a tree down, you should plant like two more.

...

P If we take one, give two back.

(urban secondary)

One participant thought that there is a legal duty to replace any tree cut down with another tree, *"In most countries, they have agreed this treaty thing, that, they say for every tree that they cut down they plant a new one"* (urban secondary). Others thought that certain species of trees were protected, *"...I think that if they planted oak trees, because they are protected now, and if they are bigger than a certain size or whatever you are not allowed to chop them down or whatever, so people wouldn't be able to chop those down, so they would have to let those grow..."* (rural secondary).

Using wood for fuel

The CYP had mixed opinions on the value of using wood for fuel. CYP in each of the groups that were asked the question (seven of the ten groups) thought that using wood for fuel would contribute to climate change:

I *Instead of coal or... what about using wood for fuel, do you think that can help climate change?*

P *No.*

I *Or would that make it worse?*

P *No that makes it worse.*

P *That makes pollution I think.*

(urban primary)

Woodfuel was perceived of as dirty; this opinion appears to stem from the idea that the burning of the wood would contribute to greenhouse gas emissions, *"You can't do that, well you can do it, but it's bad for the environment because you'll burn it and that will let out gases"* (rural primary) (it is possible that this child was arguing that by burning the wood the stored greenhouse gases would be released, though reading this quote in the context of the whole interview suggests that the child was actually referring to a broader idea of gases being produced during the process of burning). The youngest participants agreed that using wood for fuel would contribute to the causes of climate change, though for these children the smoke produced was the issue:

I *Some people use wood to burn for fuel, is this a good thing or a bad thing, do you think for climate change?*

P *Bad thing.*

P *Bad thing.*

...

P *There would be loads of smoke.*

...

P *I think because it makes smoke.*

I *Because the smoke causes climate change?*

P Yeah...
(urban primary)

One participant argued that using wood for fuel was a bad idea because it would mean trees would have to be cut down which would further contribute to the problem of deforestation.

However, despite these negative perceptions of using wood as a fuel, CYP in three of the focus groups did recognise that it is a renewable source of energy, *"It's ok if they use wood for energy because you can always put them back into the environment, but fossil fuels you can't really get back if you have run out of it, so if every tree they cut down they plant a few more that would be good..."* (rural secondary). A number of the participants sounded a note of caution, that even though woodfuel (and other bio-fuels) are renewable they are not perfect, *"I think it's renewable but you have to take into consideration what you have to get that. To get the sort of bio-fuel you need to first grow the crop, cut it down, cutting it down takes either man power of either sort of machinery... meanwhile you are transporting it around all these place using non-environmentally methods..."* (rural secondary). For one participant these factors negated the potential benefits, *"But it wouldn't make any difference because you are cutting down the trees with chainsaws which are letting out fumes"* (rural primary).

Concern for climate change

As mentioned in the previous section there were some CYP who appeared to be relatively unconcerned about climate change (in five of the focus groups individuals expressed relatively low levels of concern); likewise there were a small number who could be described as quite concerned (the highest levels of concern were expressed by individuals in three of the focus groups). However the majority (across all of the focus groups), while expressing some concern about climate change, gave the impression that it did not worry them too much especially when compared to other threats.

The groups which expressed the least concern about climate change were both those from the urban secondary school:

I ...how worried are you about climate change? Does it worry you?

P(all) No.

...

P I think about it and then I just think it probably won't happen in my life time.

P I don't care.

P It doesn't worry me.

It should be noted, however, that both extreme level of disinterest in and deep concern about climate change were only voiced by a minority of those who participated in the focus groups. A participant from a rural primary was considerably more concerned than her fellows, *"Everything's changing [as a result of climate change] and it's really scary cos we might die"*. Typically, those who expressed concern did so in relation to the threat climate change posed to animals or to future generations of humans. The uncertainty of the situation was worrying for one of the older participants, *"It's concerning cos it's like our future really and we don't really know because of like all the things, what will happen, like what, like what will happen"* (rural secondary). Again the other participants in this girl's group were less concerned:

- P I do worry about it.*
I You do worry about it?
P Yeah, but not that much cos it won't really affect our lifetimes that much.
...
P There is not much you can do about it.

This almost fatalistic perception of the threats related to climate change was common to a number of the groups. When asked whether they were concerned about climate change a group from a rural primary answered:

- P Yes I worry about it but I am not very worried about it.*
P I'm not too, I'm not bothered about it...
P It's not the worst it could be right now.
P It could be worse.

A participant from the rural secondary stated that he was not that worried about climate change because, *"...there's not that much you can do about it anyway"*.

Low levels of concern and complacency

The complacency, which is evident from the previous two quotes, was apparent in the majority of the focus groups. Generally this complacency appeared to stem from the perception that climate change would only **affect those in the 'distance', either** temporally, geographically or socially. The complacency may also be due to many of the **CYP's certainty that science would find a solution**. CYP in three of the focus groups argued that even if climate change became a reality and some of the more serious impacts were realised, humans have the capacity to cope. These CYP cited the example

of humans living in extreme or demanding circumstance and having survived previous ice-ages as proof that we would live through the changes to the global climate:

P Thing is though, all the Victorians and like the Tudors and people, the poor didn't survive very well but they... were fine, they didn't have the technology we have today so why do we need it?

...

P And like the Bushmen...

I In Africa.

P ...yeah in Africa and the desert.

I Don't have technology?

P No but they survive... they get roots and eat them, and they can get water out of them and they're very clever.

(rural primary)

The perception that action *is* being taken to help prevent and mitigate the impacts of climate change may form part of the explanation for the lower levels of concern amongst the many of the participants. One suggested that, *"I think you do have to worry about it but you have also got to think lots of people are doing it and, since like ten years, people have been more concerned about it and are doing more, so you shouldn't worry as much... the government have let people have free cavity wall insulation and lots of homes are actually doing that now..."* (rural secondary).

Finally there is evidence to suggest that the CYP, faced with a world full of risks, had devised strategies to justify their lower levels of concern:

P Life is full of risks.

P It is full of risks.

P You got to enjoy life...

(urban secondary)

Others took the approach of trying to ignore the issue and living in the here and now, *"...I wouldn't be too worried about it now so just imagine its not there but just don't go on the TV too much or anything like that, so just get on with your life...recycle and go outside and enjoy what you've got as well as trying to stop what's going on"* (rural primary).

This apparent complacency was an example of what caused some of the other participants concern; **their perception that many people simply don't care about the threat of climate change was as worrying as the climate change itself**, *"Yes because it [climate change] will get a lot worse as we go along because only about half the people are actually doing something, because some of them don't care, they think it's nothing*

to do with them" (rural secondary). Similar opinions were expressed in three of the focus groups.

Climate change in relation to other threats

The CYP were asked to discuss their perception of the threat of climate change in relation to a number of other global and local threats, including the economic crisis, threats to health (using bird flu as an example – this research was carried out before the swine flu pandemic) or threats to security (using terrorism as an example). Perhaps as a reflection of the time at which this research was carried out (March 2009) the majority of the CYP perceived the economic crisis to be of most concern, this opinion was expressed in nine of the ten focus groups. Even amongst those who appeared to be most concerned about climate change, the economic crisis was, by some, perceived to be of greater threat:

P Climate change is probably my second, I think, to the economic crisis cos its just really bad at the moment.

...

P ...well climate change would be but because of the economic crisis it is kind of lessening it [the threat posed by climate change] which pushes it down to number two.

(rural secondary)

However there were a small number of participants, from two of the focus groups, who considered climate change to represent the greatest threat, for example some of the children from the urban primary argued this position, "***Because climate change would make a difference to the whole world...***". The sense that climate change would have global impacts and would, therefore, have a range of 'knock on' effects meant that climate change was of greatest threat to these teenagers from the rural secondary:

P I think that global, climate change and global warming are affecting all the other things, because of sort of using up the fossil fuels... and that's getting expensive and that's affecting the economy and also sort of terrorism; wars are being fought over oil. So if we got rid of all those factors and solved global warming it would solve a few of the others.

...

P I think climate change is actually at the top... because... like temperatures will change like in some countries like erm, depend on some temperatures to grow crops, so if they was to change... the

crops will die and they will have no food... that would also affect the economic crisis.

The children and young people's perceptions of their parents' knowledge, beliefs and behaviours

In around half of the focus groups participants recalled climate change or global warming having been discussed or mentioned in the home environment, "...*he [her father] knows about it, my parents do know about it, they do sometimes talk about it like when we are eating dinner or something they like bring it up*" (urban secondary). The remaining half either could not recall any incidents or stated that climate change and global warming were never discussed.

From the children's reports it seems that climate change was typically mentioned in relation to energy saving, "*My dad, I used to go on the computer a lot, and I always used to leave the internet, which is in a box in another room, so he decided to stick a big sticker on the wall next to our computer and it says 'turn it off, save energy, save the planet'*" (rural secondary). Participants in six of the focus groups were, however, **sceptical as to their parent's motivations**, suspecting that they were more interested in saving money than saving the planet:

I What about your parents? Do they talk about climate change?

P No.

P They talk about energy bills.

...

P With my parents it's mostly just about saving the money.

(urban secondary)

Others were less cynical:

P My parents talk about it quite a lot and we have got energy saving light bulbs in every single room in our house which is good and they have been talking to some of their friends about it, too.

I Are they doing it because they want to save the environment or because it is cheaper?

P Oh no they are doing it because of the environment – I think so.

(rural secondary)

The participants of seven of the focus groups were asked whether they thought they knew more about climate change than their parents. The majority of those asked did

consider that they knew more and, across the groups, there was a clear reason for this, *"When they was going to school I don't think that climate change was like a big issue like it is now, so they weren't taught, like how you're coming in, and sometimes your teacher tells you about it, I don't think that they was taught that ever..."* (urban secondary). The CYP were aware that popular knowledge of the threats of climate change is a relatively recent phenomenon, *"When they was young it wasn't as much a big problem..."* (rural primary), *"My mum didn't even know what climate change was when she was at school"* (urban primary).

Learning about climate change at school

Despite the point made earlier, that the CYP considered they knew more about climate change than their parents because they had *"learnt about it at school"*, when asked directly about their experiences of learning about climate change they typically said they had done little or none at school. There was a split between the groups as to whether the CYP could recall any learning about climate change in their lessons. The CYP from the two rural primary schools and from the urban secondary stated that they could not remember learning about climate change during any of their lessons. Those from the rural secondary and the urban primary recalled learning about climate change during lessons. The young people from the rural secondary, after stressing that *"it's hardly any"*, explained that it was during their science and geography lessons they learnt about climate change:

- P Geography has some and science, like we had, in year nine.*
- P Oh yeah in geography.*
- P Like we had, some people came up with like sixteen page booklets on global warming and how global warming is caused.*

Similarly it was during their geography lessons that the children from the urban primary recalled having learnt about climate change.

There was a real desire, amongst the participants of all of the focus groups, to spend more time learning about climate change:

- P I just want to do, do stuff like... I want to learn more about the environment... I want to do about it, as I want to know more about it but then we don't, we just do other stuff that's, well, we basically already know... I want to do something that actually what's happening at the moment...*
- P ...we do maths everyday and literacy everyday but sometimes there's more important stuff to do, say climate change or something...*

(rural primary)

Even amongst the young people who had stated they did learn about climate change in their lessons there was a desire to devote a greater amount of time to the subject, ***"I think we should have a lesson once a week or once a month about how we can help and we could do stuff to try and help..."*** (rural secondary).

Climate change in the media and on the internet

The media, television in particular, appeared to be one of the CYPs primary sources of information about climate change. The children had watched items relating to climate change on the news; one participant, while discussing whether he was concerned about climate change stated, ***"Only when it comes up on the news and that, and then I really think about it and gets scared, but then..."*** (urban secondary). Both the news aimed at adults and those aimed at children (for example 'Newsround') were mentioned during the discussions.

Television adverts, containing climate change messages were also mentioned in each of the groups. Often the CYP could not remember the product or the organisation behind the advert but they could vividly describe the message or images, ***"There used to be an advert where they had the earth with this thermometer sticking out of his mouth and it's saying stuff like 'reduce CO₂ and we could make the earth well again' and then he's taken it out and patted the earth on the head and its smiley"*** (rural primary). One product which had made a big impression on almost all of the children was Triple Velvet toilet roll (the product was mentioned in seven of the ten focus groups). It appears that the combination of a catchy theme tune and appealing subject matter had helped lodge the message, that for each tree cut down, three are replanted, in the minds of the CYP.

CYP in six of the ten focus groups stated that they had heard about climate change during documentaries and lifestyle programmes; they were particularly aware of environmental messages during nature documentaries:

I Do you ever see anything on TV...?

P I watched a new programme called 'Yellowstone'... it was something about climate change and how it can affect animal's lives.

P I watched 'Planet Earth'...

I Did they mention climate change on that?

P It says stuff about animals and climate change, about how like the polar bears can die.

(rural primary)

The children had also watched documentaries which were aimed directly at them, "*On Nickelodeon [a children's channel on satellite television] there's something showing us about how to save the planet and how other people are, like, your saving the paper and plastic bags that you use, use them over again or use a bag*" (urban secondary).

The CYP did not think that they had seen many climate change messages on the internet. They were aware that information was available if they looked for it, but that there was little on the sites they tended to visit:

- P I have seen some stuff on websites but not that many...*
P Adverts.
 ...
I So if you went to look for it you would find it but not if...?
P Yeah if you type climate change into google you will find stuff but .
P Yeah or Wikipedia.
P But no one really does that.

(rural secondary)

Parents' perceptions of climate change and the role of trees, woods, and forests

Results of the parents questionnaires

The parents responses to the questionnaires are displayed in the following tables and the findings discussed in the subsequent section.

Table 5 Parents' perceptions of whether the world's climate change is changing

Is the world's climate changing?	Count of responses
Disagree strongly	0
Disagree slightly	1
Agree slightly	18
Agree strongly	48

Table 6 Parents' perceptions of whether climate change is attributable to the actions of human kind or natural processes

Is climate change a result of human behaviour or natural changes?	Count of responses
--	---------------------------

Entirely human	4
Mainly human	50
Mainly natural	10
Entirely natural	0

Table 7 Parents' perceptions of the causes of climate change

Causes of climate change	Count of responses	
	Yes	No/unsure
Pollution	53	14
Road transport emissions	45	22
Carbon dioxide emissions	53	14
Natural changes in the environment	33	34
Manufacturing/industry	48	19
deforestation	57	10

Table 8 Parents' perceptions of the most serious threat to the UK

Problems facing the UK	Count of responses
Poverty	4
Climate change	11
Terrorism	7
The economic crisis	45
The spread of infectious disease	0

Table 9 parents' perceptions of the ways in which TWF may have an impact on climate change

Ways in which TWF can impact on climate change	Strongly agree	Agree	Don't know	Disagree	Strongly disagree
Trees are good because they remove carbon from the atmosphere	33	20	11	2	1
Cutting down TWF makes climate change worse even if they are replanted	11	36	7	12	0
Using wood for fuel is better for climate change than other fuels such as coal or gas	10	22	23	12	0
The UK could offset all its	4	14	29	18	2

greenhouse emissions by
planting more trees



Relationship between the perceptions of the parents and those of the children and young people

There were a number of similarities and differences between the CYP's **perceptions of** climate change and those of their parents.

As with their children, the over whelming majority (98%) of the parents considered that the worlds climate is changing (Table 5).

Whilst it is acknowledged that it is impossible to compare the answers in any truly meaningful way (due to inherent differences between the questions and in the ways the questions were asked), there appears to be some divergence between the opinions of the children and their parents over the causes of climate change. A common view held by the children was that climate change is a natural process which has been exacerbated by the actions of humankind. The majority of the parents (80%), however, considered climate change to be caused entirely or mainly by humans; just 15% indicated that they **though climate change is caused 'mainly by natural changes'** (Table 6). It should be noted that this variation may be due to the inflexibility of the questionnaire format; if the parents had had the time and space to give fuller answers, they may have qualified their responses just as the CYP had during the focus groups.

When asked to indicate which of five global threats (poverty, climate change, terrorism, economic crisis, spread of infectious disease) was of most concern, the majority of the parents 67%, chose the economic crisis (Table 8). Sixteen percent thought climate change was of most concern. These proportions are similar to those amongst the CYP; where the majority also thought that the economic crisis was currently the most concerning threat.

Seventy-nine percent of the parents indicated that they were aware that trees remove CO₂ from the air (Table 9). This, it could be argued, is a somewhat lower percentage than amongst the CYP, where it appeared that the majority (leaving aside the youngest participants) had some knowledge of the relationship between trees and CO₂. There was greater agreement between the parents and their children regarding perceptions of the impacts of cutting down trees; 70% of the parents indicated that they agreed that cutting down trees makes climate change worse even if they are replanted (Table 9). **This echoes the children's perceptions that we should protect existing forests** to combat climate change. Finally there were fewer negative perceptions of the use of wood for fuel

amongst the parents; whilst the majority of the CYP had had negative perceptions of woodfuel, considering it to be dirty and polluting, just 52% of the parents thought that using wood for fuel made climate change worse (Table 9).

Teachers and governors: climate change in schools

This final section of the findings focuses on the results of the interviews with teachers and governors of the five schools.

The six teachers interviewed for this research indicated that while climate change is taught in their schools, relatively little time is devoted to the subject. According to the three primary teachers, topics, such as climate change, are incorporated into other cross-curricular projects. One teacher described how a recent project on rainforests had touched on relevant issues such as deforestation, habitat destruction as well as the relationship between forests and global warming. In the secondary system climate change, according to the teachers, can be taught as a module in science or geography. One teacher described his approach to teaching issues associated with climate change in geography, *"We start with the potential local effects, what would be the local effects from climate change?... so they will think 'oh the flowers have come out earlier', 'leaves drop later, or whatever it happens to be. And then we look at it from a sort of regional areas. So sort of north-western Europe, so they will start talking about the coast and potential sea-level rises and then we look at it global and how some countries might be in real problems cos they are low-lying..."*. According to one of the secondary teachers, young people may also learn about climate change in their personal, social, cultural and health lessons.

Materials for teaching these subjects were acquired from a variety of sources; these included schemes of work which came directly from their education authority, lessons plans from interest groups (for example the WWF or Friends of the Earth), or the teachers may compiled the resources themselves, primarily from the internet and the media.

The teachers were split as to their perception of their influence over the CYPs beliefs regarding climate change. While one teacher considered that parents exerted a greater **influence over their children's perceptions and beliefs in relation** to issues such as climate change, others argued that they did have a role, *"Err, well, yeah pretty influential; it depends on the pupil and the teacher but I'd say we get the message across more often than not"*. A second teacher argued that they could be very influential, *"You do get the odd student that says 'my dad says this is junk [climate change]'. I've had that once and so I'll say 'ok fine, make up your own opinion, this is how it is, what it*

is' and I'll leave them to it and I won't challenge them again but by the end of the session that child acquiesced and conceded that probably there was something there".

The teachers all emphasised that, although they were interested in, and considered they have a responsibility to spend a greater amount of time teaching issues such as climate change, realistically they were unable to. The obligation to adhere to the national curriculum constrained much of what the teachers did, reducing their ability to be flexible and introduce topics such as climate change into lessons. The teachers also indicated that there are many important issues, of which climate change is just one, which compete for time and space in the school environment. While the environment was prioritised in the rural secondary and a great amount of time and effort was devoted to it, it was not in the other schools. For those schools, issues such as maintaining attendance and academic achievement had taken a higher priority.

Summary, conclusions and recommendations

The research

The aims of this research were to explore CYP's perceptions of climate change and the role of TWF. A secondary objective was to investigate what impact geographical location, educational experiences and the influence of parents and the media had on those perceptions.

Eighty-nine children, 67 parents and six teachers and one governor, from five schools in the south-east of England took part in this research. A range of methods were used to understand the participants' perceptions, knowledge and practices in relation to climate change and TWF.

Perceptions of climate change

Although awareness of climate change was high there was confusion amongst the CYP regarding the precise processes which are causing climate change. While most of the CYP had the various pieces of the explanation, including greenhouse gases, damage to the atmosphere and the idea that the globe is warming, they appeared to have difficulty in putting them together in a coherent and accurate explanation. These findings are similar to those of previous **research into CYP's perceptions of climate change; for instance the vast majority of the participants (aged 11-17) of the DEFRA survey (2008) were aware of the terms 'climate change' and 'global warming' (97% and 93% respectively)**. However, there appeared to be greater awareness of the related terms (for instance greenhouse gases and CO₂) in the present study than found by DEFRA. While this finding may be due to greater prominence of climate change in the media (for instance the outcomes of an important climate change conference¹⁰ was reported widely in the media during the time the data was collected), it may reflect the suspicion that that sample for this present study is somewhat biased in favour of more environmentally aware schools and pupils, which resulted in the greater knowledge of these terms. This assumption is supported by the apparent greater awareness of the more specific causes of climate change amongst the participants of this present study. The authors of the DEFRA survey reported that only 19% of the participants thought that high levels of CO₂ emissions were responsible for climate change, a greater proportion of this sample were

¹⁰ The International Scientific Congress on Climate Change <http://climatecongress.ku.dk/>

aware of the role of CO². However, a common finding between the studies was that many CYP appear to attribute climate change to the more general and un-specific **concept of 'pollution'**. Furthermore many of the CYP in the present study incorporated unrelated issues, such as the hole in the ozone layer and oil spills, into their understanding of climate change. Confusing the causes of climate change with other environmental issues appears to be common; similar findings were reported by the authors of the DEFRA survey (77% of the DEFRA participants associated the hole in the ozone layer with climate change). Unfortunately no previous research was found which had attempted to evaluate **CYP's perceptions of the processes of climate change; it is** therefore difficult to evaluate the findings of this study in a wider context. Overall, the general findings presented here are consistent with evidence from previous research and in particular that discussed by Kahn (1999). Kahn argues that children, while aware of and able to distinguish between different environmental issues, have some difficulty comprehending the causes and processes.

While a small number of the CYP attributed the causes of climate change solely to humankind, many argued that it is a natural process which is exacerbated by human actions. These findings differ somewhat from those of previous research. Whilst there are obvious issues regarding the comparison of the different types of data (i.e. that derived from focus groups to that from closed question surveys), the DEFRA (2008) survey found that the majority of its participants held the perception that climate change is attributable, either totally or mainly, to the actions of humankind. It is possible that the variation in these results is related to the differences between the study types; with focus groups giving the participants greater opportunity to explain their position, or, more negatively, it may be that individuals with strong opinions (and a desire or ability to articulate those opinions) drown out the more moderate or reticent (regardless of their opinion) individuals.

The CYP held a number of common perceptions of the likely impacts of climate change, for instance melting ice caps and rising sea levels were mentioned in almost all the groups. Again this is similar to the results of DEFRA (2008) study, which found that 92% of the participants thought the ice-caps would melt as a result of climate change. It **seems that the CYP's perceptions of the impacts of climate change are strongly related** to common images relating to climate change; in particular the polar bear. The **polar bear has been described by numerous individuals and organisations as the 'poster-child'** of climate change (McKenna 2007a); it is possible that the frequency at which CYP are exposed to images of polar bears swimming in the sea devoid of ice-bergs (the CYP stated that they had seen polar bears in relation to climate change in documentaries, in adverts and in magazines) has had an impact on their perceptions of the results of climate change. It is also possible that the simplicity of the process (that due to climate change the globe is warming, this is causing the ice to melt, and, therefore, the polar bear's home is disappearing), **allowed a greater number of the CYP to remember and**

recall the specific impact of climate change. The argument, that media images influence knowledge, may equally be related to the **CYP's** perception that climate change could result in an ice age. Although scientists do not think that the possible slowing of the north Atlantic current will cause Europe to cool to the extent of causing an ice age (McKenna 2007b), **the idea has been worked into recent films, including 'The Day After Tomorrow'. The apparent plausibility of the film, and strength of the images (i.e. cities such as London encased in ice and snow) appears to have had an impact on the CYP's perceptions of the results of climate change.**

The CYP, while aware of deforestation both globally and more locally in the UK, had little idea of the total contribution of forestry to the causes of climate change. This may reflect a common lack of knowledge regarding the impacts of global forestry to the environment; as the DEFRA (2008) survey also found low rates of awareness (just 15% of the participants of the DEFRA survey indicated that they thought forestry was a contributor to climate change). However the CYP participating in this present study did conceive of deforestation as an environmental issue; most held the perception that it is detrimental, to biodiversity, to the human inhabitants of the forest and to the wider environment. Similarly to the results found by the Woodland Trust (Millward Brown Ulster 2008) the CYP appeared to value TWF; there was concern that trees, both globally and more locally in their own environments, were being cut down. There was greater awareness of the potential ways in which TWF could be used to help prevent climate change, in particular as a means of reducing the levels of CO₂ in the atmosphere amongst the CYP who participated in this present study in comparison to those surveyed by the Woodland Trust. However, as with the parents and the respondents of the **Forestry Commission's public attitudes surveys** (Grant and Smilie 2007a; Grant and Smilie 2007b; Grant and Smilie 2007c), there was widespread misunderstanding about the value of young trees and of the use of wood as a low carbon fuel. The CYP had come to the apparently logical conclusion that mature trees were more valuable as a means of removing CO₂ from the atmosphere because they were bigger with a greater quantity of leaves to absorb the gas. Likewise the CYP objected to using wood as a fuel because of the smoke produced.

Concern and action

Most of the participants thought that we have not yet reached the point of no return and that there is still time to prevent the worst impacts of climate change, but that action should be taken immediately. There was, however, less agreement as to whether personal action was worthwhile; for some it was meaningless, for others each individual action accumulated and could make a difference. Although some of the participants did not think that they, as children, could take meaningful action, there was little sense of helplessness. Furthermore there was a clear desire to learn more about climate change

and for that learning to be 'active'. The CYP, including those who were somewhat fatalistic about the consequence of climate change, suggested many ways in which people could take action towards preventing further deterioration of the situation. However many of the CYP appeared to be reluctant to take action while they thought that others were also not taking action. The lack of motivation to take personal action to prevent climate change **were compounded by the CYP's optimism** that science and technology will find a way to solve or, at least, manage climate change.

Levels of concern regarding the impacts of climate change were mixed. Although the majority expressed some concern this was tempered by the **CYP's** perception that the current economic crisis was more worrying. Some stated that they were not concerned about climate change at all. This is, perhaps, not surprising when one considers the rather fatalistic and complacent attitude of a number of the participants or the common perception that they would not be affected by climate change: that the impacts would be physically and temporally distant. There were, however, a small number of individuals who were considerably more concerned about climate change than their fellow participants. Whilst these results differ from those of research reported by the BBC (23/06/2006), which found that the majority of CYP are very concerned about climate change, the findings from this present study echo those of the DEFRA survey which also found mixed levels of concern.

Influences

It has been stated that there is very little research which has focused on the ways in which CYP develop their environmental attitudes and perceptions (Evans, et al. 2007). However, existing (international) research has indicated **that CYP's** environmental attitudes and perceptions may be influenced by a number of factors including family, media and school-based environmental educational programmes (Eagles and Demare 1999; Evans, et al. 2007; Kahn 1999). These factors were investigated during this present study; only two were found which could, with any confidence, be said to have influenced the **CYP's** perceptions: firstly, the media (as discussed above) and, secondly, the ethos and enthusiasm for environmental issues of the school. One must bear in mind that the author is **not** suggesting that these are the only factors to have influenced the **CYP's perceptions** – rather these are the only factors for which there was evidence of impact.

The suggestion that the ethos of the school may have had an impact on the knowledge of and concern towards climate change is supported by the findings of previous research (again international) which concluded that social context and membership of an environmental programme are strongly associated with environmental concern (Berenguer, et al. 2005; Olli, et al. 2001). Furthermore it has been suggested that

teachers and educational experiences can have particular influence over children's (specifically younger children's) environmental attitudes (Phenice and Griffore 2003). Participants from the rural secondary school were conspicuously more knowledgeable and concerned about climate change than CYP from the four other schools. As was detailed in an earlier section (and in appendix six) the rural secondary had a strong emphasis on environmental, sustainable development and human rights issues; the school had achieved the Eco-Schools Green Flag twice, had a very active eco-council and the teachers involved appeared to have worked hard to include the whole school in the programme of activities. This appears to have had at least some influence on the young people. Conversely the groups with the least concern, and in some cases, least knowledge about climate change came from a school which appeared to have less interest in or time to devote to environmental issues.

This is a very tentative suggestion based on a very small sample, and while it did appear that the culture of the school **influenced the CYP's perceptions of climate change**, one must be cautious, primarily because the most knowledgeable and motivated groups were also the oldest of the sample. It is possible that their greater maturity had an impact on their perceptions as well as on their knowledge.

Research by Hinds and Sparks (2008), carried out in the south east of England, found that young people who had grown up in a rural context had more positive environmental attitudes than those with an urban childhood. However, this present study did not find any relationships between geographical contexts and perceptions of climate change and the role of TWF.

There was no evidence from this research that growing up and attending a school in a rural or urban location had a relationship with awareness or knowledge of climate change. The CYP from both the urban and rural schools were all aware of climate change. Likewise all of the CYP, regardless of location, had some knowledge of the causes, process and impacts of climate change. Rather than variation between the groups there was a general uniformity of awareness and knowledge regarding climate change. Knowledge did, naturally, vary according to age and educational level of the participants; the oldest (years 9 and 10: 13-15 years old) were more knowledgeable than the youngest (year 3: 6-7 years old) and were able to describe to a far higher degree of accuracy the causes, processes and impacts of climate change.

Again there was no convincing evidence to suggest that location affected levels of **concern** regarding climate change. Although the two groups which exhibited the greatest concern were from a rural location and those which exhibited the least concern were from an urban location, this does not constitute evidence that concern varied according to location. The majority opinion, held by CYP from both urban and rural locations, was that while climate change is worrying, other threats, and predominantly the current

economic crisis, were more concerning. Greater variation, in both knowledge and concern, was observed *within* the groups; often participants within an individual group would voiced quite different opinions and perceptions to others from the same group.

There are a number of potential explanations for the finding. Firstly, and most obviously, the finding may be correct in its own right, that knowledge and concern for climate change have little to do with the location in which the CYP grew up and attended school. Secondly, this is a small study with a correspondingly small sample group; it is likely that the breadth and range of opinions of all CYP are not represented. A larger study would be necessary to examine with greater accuracy any relationship between location and perception. A third reason for these findings, and which is relevant to many of the other findings discussed in this research report, may be that the sample was biased. As was highlighted in an earlier section, this study made use of a convenience sample; it is very likely that the schools which agreed to take part were those with a greater interest in environmental matters and with a greater concern for issues such as climate change. **This may have had the effect of 'levelling out' the influence of other factors, such as the relative location, on the CYP's perceptions of climate change. The final reason for the finding that there was no variation in knowledge or perception of climate change between the 'urban' and the 'rural' CYP may be that the concepts of 'rural' and 'urban' are unhelpful and possibly misleading. It has been suggested that the "*two way urban-rural split is an extremely crude way of classifying places in a country*" (Champion undated). This has two implications, firstly, that identifying a certain location as either rural or urban is difficult, as Scott et al. (2007) suggested, the boundaries between the two types of location have become "*blurred and fuzzy*". Secondly Scott et al. argue that it may be misleading to assume that people living in what would be commonly described as a 'rural' location have differing views or perceptions of environmental issues to those living in 'urban' locations.**

Recommendations for further research

A particularly interesting avenue of research would be to investigate the influence of different educational experiences on knowledge and perceptions of climate change and the role of TWF, and in particular to investigate the potential impact of relevant outdoor educational experiences. The results of this study suggest that the ethos of the school, in particular the time and effort devoted to environmental issues and actions may have resulted in greater knowledge and concern for climate change. A larger study, perhaps with a longitudinal design, would be necessary to test this hypothesis.

It has been argued that 'connectivity'¹¹ with nature and the natural environment are positively related to environmental values, concern and behaviours (Dutcher, et al. 2007; Hinds and Sparks 2008). It would be interesting to investigate what impact different levels of direct contact with the natural environment has on perceptions of climate change and the role of TWF.

Finally it would be interesting to explore whether socio-economic status and age affects perceptions of climate change and the role of TWF. While previous research (Olli, et al. 2001) has indicated that quantified measures of pro-environmental attitudes vary according to both age and socio-economic status, it appears that this type of analysis has not been applied to perceptions of climate change and the role of TWF.

Recommendations for policy and practice

This research suggests that there is still a need to educate the public, both the younger generations and the older, about the causes and impacts of climate change. Many of the misconceptions highlighted in this study are related to the role of TWF. A particularly relevant point for the Forestry Commission relates to the negative perceptions of the use of wood fuel; this finding suggests that the Forestry Commission should continue its efforts to promote the benefits of this energy source. This research suggests that highlighting a number of key misconceptions about climate change and the role of TWF would be valuable in the effort to educate the public. Perhaps the findings of this research could contribute to future editions of the FCE's '**Trees and Climate Change**'¹² pack (Forestry Commission England undated); for instance it seems that a page that explicitly highlights and discusses misconceptions (e.g. that the ozone layer is not related to climate change) would be valuable. However it must be pointed out that if the **Forestry Commission's aim is to encourage more environmentally** friendly behaviours, previous evidence suggests that greater knowledge is not necessarily positively related to pro-environmental behaviours (Walton, et al. 2004).

The CYP's **discussion** of their awareness of climate change in various contexts, for example, the school, the home or on the internet, may aid the Forestry Commission in deciding where to direct valuable resources for education and awareness promotion. For instance the children's **discussion of their experiences of the internet suggests that**

¹¹ Connectivity is described as 'a shared or common essence between self, nature and others' (Dutcher et al. 2007)

¹² The pack presents key Forestry Commission England messages on climate change and was developed by FCE staff at Westonbirt. It is available online at [http://www.forestry.gov.uk/pdf/eng-trees-and-climate-change.pdf/\\$FILE/eng-trees-and-climate-change.pdf](http://www.forestry.gov.uk/pdf/eng-trees-and-climate-change.pdf/$FILE/eng-trees-and-climate-change.pdf)

developing web-based educational instruments may have little impact. What may be of more value would be a strategy of targeting schools in a manner that the Eco-Schools group or the Woodland Trust have already done. In this vein the Forestry Commission could **promote the 'Trees and Climate Change'** pack to educators, and, more specifically to education authorities as they appear to have an important influence over what is taught within schools.

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Appendices

Appendix one: Information sheet and consent from children and young people

Aim of the research

The Forestry Commission (the government department which looks after the trees, woods and forests in the UK) want to know more about what young people like you think about climate change and about how it will affect the trees, woods and forests in the UK. I want to ask you, your classmates and young people from other schools in England what you think...

I have two main questions I want to ask you;

1. What do you think about climate change and do you think trees, woods and forests have caused it or do you think they can help solve it?
2. Where, and from whom, have you learnt about climate change?

What will happen?

I will come to your school and will interview (talk to) you with a group of about 10 of your school mates. We will talk for about 30 or 40 minutes.

Do I have to take part?

It is entirely up to you; if you do not want to take part that's OK! Even if you agree to take part now you can change your mind later.

Contact details

If you want to ask me any questions you can contact me at any time;

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Alice Holt Lodge
Farnham
Surrey GU10 4LH
Rebecca.Lovell@forestry.gsi.gov.uk
0141 526 196

Consent Form

Please sign this form to let me know if you would like to take part in the climate change research (don't forget that you can change your mind about taking part later!).

I would like to take part in the climate change research

I do not want to take part in the climate change research

Name

Date

School

Class

Appendix two: Children and young people - focus group schedule

Ask the children where exactly they live? Heard of the FC?

1) Knowledge and perceptions of climate change

- Have you ever heard the terms climate change or global warming?
- Do you know what the terms climate change or global warming mean?
(?) is there a difference between the terms?
- What is causing climate change?
(?) is it caused by man or is a natural thing? Which is more responsible?

ACTIVITY: ask the children to indicate which of a number of causes they think is responsible for climate change?

- What is climate change doing to the world / to the UK?
(?) to the weather, to the plants and animals, to humans
- How concerned are you about climate change? Do you care?
(?) to them personally, to other people around the world, to the environment - do they care about climate change?
(?) is it more worrying than other things like terrorism, the economic crisis or bird flu?
(?) should we try and stop climate change? – how can we do this? – do you feel powerless?

ACTIVITY: ask the children to imagine raising money for a charity, would any of them choose to donate it to a climate change focused charity? Are other charities more important?

2) Role of trees, woods and forests on climate change

- Have trees woods or forests contributed to the causes of climate change in any way?
(?) has cutting down trees in Europe had an impact?
(?) is deforestation in tropical parts of the world making climate change worse?
(?) does using wood for energy have an impact? Help or make worse?
- Can trees woods and forests help fight climate change?
(?) how are trees part of the carbon cycle (have they heard of the carbon cycle?)

- If we plant more trees will they remove some, all or none of the CO² from emissions?
- Can trees be used to make people care more about climate change?
(?) or would things like polar bears make people care more? Why?

2b) Use of trees, woods and forests

- What do you think of trees, woods and forests?
- Do you ever visit woods or forests – for recreation, picnics or for physical activity?
(?) specifically with school – for either an educational or recreational trip?
(?) is that an enjoyable thing to do, or are they boring places?

3) The origin of these perceptions – the role of parents, teachers, friends or the media

- Who do you hear talking about climate change?
(?) do they hear their teachers, parents, friends or people on TV or on the internet talking about climate change?
(?) which group seems to care more about climate change?
(?) who do they pay the most attention to?
 - **Tell me about what you have learnt in school about climate change...**
(?) what did you learn about – interesting – useful?
(?) did twf come into what they learnt in any way?
(?) are schools the right places to learn about climate change?
 - If you wanted to know something about climate change who would you ask or where would you go to find out?
(?) why that source?
 - Do you know more about climate change than your teachers/parents?
(?) can you think of any examples of this?
 - Do you think that going to a forest would be a good place to learn about climate change, or would another type of place (e.g. a museum) be better?
- If the FC made an internet site with quizzes and information would you ever think of going there?

Appendix three: Information and consent form for parents

Dear Parent or Carer

I am writing to ask for your permission for your child's participation in a focus group lasting around 30-40 minutes to be held at your child's school. The focus groups will form part of a research project for the Forestry Commission.

Aim of the research

There is currently great interest in climate change; of the causes, its effects and in ways **to combat it. There have been a number of surveys of the general public's knowledge** and perceptions of climate change, however only a small number have sought the opinions of children or young people and fewer still have specifically investigated perceptions of climate change in relation to the trees, woods and forests of the UK.

This research by the Forestry Commission is intended to plug that gap. The results of the research will be used to inform Forestry Commission education strategies and to help create and develop climate change resources and materials.

The focus groups will discuss two main topics;

1. **what are children's perceptions of climate change in relation to trees, woods and forests**
2. and how the children form these opinions

Consent for participation

You are under no obligation to permit your child to participate in this research and, you, or indeed the child, can withdraw from the research at any time.

Questionnaire

If you do give your consent for your child's participation in this research we would be very grateful if you could fill in the short questionnaire included with this letter; this is so we can evaluate the importance of parent's views on those of their children. Please return the questionnaire with your child's consent form to the school.

Contact details

If you have any questions about this research please contact me at any time.

Thank you
Rebecca Lovell

Consent Form

Please use this form to indicate whether you give permission for your child to take part in the perceptions of climate change research

I do give consent for my child to participate in the perceptions of climate change research

I do not wish for my child to participate in the perceptions of climate change research

Name of your child

Your name

Name of your child's school

Date

If you have agreed to your child's participation, please fill in the short questionnaire on the following pages...

Appendix four: Parental questionnaire

Your name

Your child's name

Name of school

Your age

under 20

21-30

31-40

41-50

51-60

61+

Occupation of
parent(s) or carer(s)

You

Your partner

Highest educational
achievement of
parent(s) or carer(s)

You

Your partner

GCSE

A-Level

Higher (e.g. degree)

(1) Do you agree or disagree that the world's climate is changing?

Disagree strongly

Disagree slightly

Agree slightly

Agree strongly

(2) To what extent do you think climate change is a result of human behaviour or natural changes? Do you think climate change is...

Entirely natural

Mainly natural

Mainly human

Entirely human

(3) Specifically, what do you think are the main causes of climate change? Please **tick all boxes that apply...**

Pollution

Road transport emissions

Carbon dioxide (CO²) emissions

Natural changes in the environment

Manufacturing/industry

Deforestation

(4) In your opinion which of the following do you consider to be the most serious problem currently facing the UK? Please rank 1 (of greatest threat) and 2 (next greatest threat).

Poverty

Climate change

Terrorism

The economic crisis

The spread of infectious disease

(5) Who, if anyone, have you heard talking about climate change recently?... please tick all boxes that apply

Government or politicians

Charities or pressure groups

Friends or family

Celebrities

Your local authority

Colleagues at work

Your children

The media

(6) Have you, as a family, visited woodlands or forests for walks, picnics or other recreational activities in the past few years?

Yes

No

(7) Would you agree or disagree with the following statements about the ways in which trees, woods and forests in the UK can impact on climate change?

<p>'Trees are good because they remove carbon dioxide from the atmosphere and store it in wood'</p>	Strongly agree
	Agree
	Don't know
	Disagree
	Strongly disagree
<p>'Cutting down trees, woods or forests makes climate change worse even if they are replanted'</p>	Strongly agree
	Agree
	Don't know
	Disagree
	Strongly disagree
<p>'Using wood for fuel is better for climate change than other fuels such as coal or gas'</p>	Strongly agree
	Agree
	Don't know
	Disagree
	Strongly disagree
<p>'The UK could offset all its greenhouse emissions by planting more trees'</p>	Strongly agree
	Agree
	Don't know
	Disagree
	Strongly disagree

Appendix five: Teachers and governors - interview schedule

(a) Do you have any specific educational (or other) focus on climate change or other environmental topics?

- If so in what subject?

(?) Where do you get the materials for teaching these topics?

(?) Are the materials satisfactory? (i.e. are they relevant, do they engage the children?)

(?) Would you ever look to organisations such as the FC to find these kinds of resources and materials?

(?) Are trees, woods and forests and their role in climate change, and the impact climate change will have on them, in any way part of your teaching on climate change and other environmental topics?

(?) do you feel confident in your own knowledge of climate change and related environmental topics?

(b) How important are environmental issues...

- To the school?
- To you as individuals?
- To the parents of the children?

(?) Do you think it is your responsibility to teach children about climate change and other environmental issues?

- Or is it that of parents
- Or other sectors, e.g. governments, related charities etc

(?) How influential are your school, the teachers and the education in raising environmental awareness?

- are other sources more influential? (e.g. family, friends or media?)

(c) What kind of pro-environmental actions do you as a school take?

- do you recycle etc?

(?) Do you/have you raised money for an environmental charity?

(?) Do you take the children on trips that are in any way focused on climate change or other environmental issues?

- If so how successful were those trips?

(?) Do any of the environmental actions you have taken have a lasting impact?

- On the school
- The children
- On the parents?

(d) How engaged with climate change and other environmental issues are the children in the school?

(?) Are the children interested in the topic?

(?) Do they request any information/teaching on the subject?

(?) Do they request to do other things like raise money for charities or appeals?

(e) Do you think that geographical location affects environmental awareness?

- Of the school?
- **Of the children's** homes?

Appendix six: Details of the schools

Rural secondary

The rural secondary is a mixed gender comprehensive with around 1500 pupils aged 11-18. The proportion of those pupils who are entitled to free school meals is below average (this can be used as a proxy indicator of the social and economic background of the pupils). The majority of the students are white British or of other white ethnicity. The proportion of children with special educational, behavioural, emotional or other difficulties is also **below average**. **The Ofsted inspection rated the school as 'an outstanding school [the highest standard a school can achieve]... standards are consistently well above average'.**

The school has twice achieved Green Flag 'Eco-School' status and was awarded a Gold Green Tree award (recognition for the number of trees the school has planted) and a Silver Tree award (recognition for their efforts in collecting Christmas cards and mobile phones for recycling) from the Woodland Trust. The school has also won a Roots and Shoots award which is given for work in three areas – animals, environment and community. The school has an active eco group and a school council, members of which took part in a climate change conference.

The school is situated in a town in Hampshire. Students attending the school are drawn from primaries in the surrounding areas. Although the school is in the town, and can, therefore, be described as urban or semi-urban, many of its students are from rural areas.

Urban secondary

The urban secondary is a mixed gender comprehensive school with around 1000 pupils aged 11-16. Ofsted described the school as having an above average proportion of student from minority ethnic backgrounds; the largest groups of which are Indian, African and children from other white backgrounds. The proportion of students with English as their second language is twice the national average, at around one in five of the students. The number of children receiving free school meals is above average. Finally the number of students with emotional, behavioural and educational difficulties is also above average. The most recent Ofsted inspection found that the school was **'satisfactory'**

The school takes part in a number of environmental initiatives; for example staff and pupils are involved in a project with N-Power focusing on environmental issues.

The school is situated in Southampton and the majority of the students attending the urban secondary are from local urban areas.

Rural primary (1)

The first rural primary is an average sized junior school with over 200 pupils aged 7-11 years. Few of the pupils are from minority ethnic groups and a below average proportion of the children have learning difficulties. Fewer than average children receive free school meals. The school was **found to be 'good' during the most recent Ofsted inspection.**

The school has silver 'Eco Schools' status and is working towards the higher, Green Flag status. The pupils take part in a number of environmentally focused activities; for instance the children are **encouraged to compete for the 'Golden Boot'**; awarded for travelling to school in the most ecologically friendly way possible. The school also runs a gardening club and the children have attended talks by organisations such as the World Wildlife Fund.

The school is in a small village in Surrey and is described as semi-rural.

Rural Primary (2)

The second rural primary is, according to Ofsted, a larger than average primary school, with more than 200 pupils, aged 4-11, attending. Most of the pupils are white British, though there are a small number of children with English as second language. The number of children receiving free school meals is lower than average. The most recent **Ofsted inspection found the school to be 'good'.**

The school appears to have little focus on environmental activities, for instance they only recently received their first recycling bins.

The primary school is in the small village in a rural area of Hampshire.

Urban primary

The urban primary is a school with around 200 pupils. According to the recent Ofsted report it has a very diverse intake of pupils, an above average proportion of which have

English as a second language; likewise the proportion of pupils with special educational needs is above average. The Ofsted inspection **found that the school was overall 'good'**.

The pupils at the urban primary are currently working their way towards 'Green Flag' Eco School status, they already hold gold status. The school has other environmental activities including a school garden and participates in the Surrey and South-East schools in bloom scheme. The members of the school council also have environmental duties.

The school is situated in the very centre of a town in Surrey. All the pupils are resident within the town; the school and the children can therefore be described as urban.