

Population Dynamics and Climate Change

Scoping document for DFID, December 09

Principal authors:

Susannah Mayhew (LSHTM)

Karen Newman (PSN)

Judith Stephenson (UCL)



Young Sudanese refugees in the sand storm in Bamina, Chad. It is predicted that millions of people will migrate as a response to climate change. Credit: UNHCR/H.Caux.

This report was funded by the Department for International Development (DFID). The views expressed by the authors are not necessarily those of DFID.

Table of Contents

Table of Contents	1
Executive Summary	3
Key Messages	3
Key Facts	4
Key Recommendations	5
Introduction	7
Key Message 1: Rapid population growth has a negative impact on human development, provision of basic services, poverty eradication; an effect that is magnified and made more urgent in the context of climate change	9
Background and Rationale	9
Figure 1: UN 2008 World Population Projections	9
Evidence	10
Case studies	12
Key messages for DfID	12
Key Recommendations	13
Key Message 2: Although the principle cause of climate change is consumption in developed countries, those most vulnerable to the effects of climate change are those living in the developing world. Rapid population growth has a negative impact on the ability of communities and countries to adapt to climate change, particularly if they are poor. It has also been identified by many developing countries in their National Adaptation Programmes of Action as a key factor confounding their attempts to adapt to climate change	15
Background and Rationale	15
Evidence	16
Case Studies	17
Key Messages	20
Key Recommendations	20
Key Message 3: Climate change induced mass migration is likely to be significant, and must be recognized as a legitimate response to climate change	22
Background and Rationale	22
Evidence	23
Case Studies	25
Key Messages	25
Key Recommendations	25

Key Message 4:

Linking population dynamics, particularly population growth with climate change is sensitive; there is a need to forge consensus within the sexual and reproductive health and rights world and beyond on addressing this link in ways that emphasize the need for increased investment in family planning programmes that respect and protect rights, and ensuring that the link is made in ways that do not blame the South (where most population growth is taking place) for climate change which has clearly been caused by the significantly greater per capita consumption in the North..... 26

Background and Rationale.....	26
Case Study: Contraction and Convergence	28
Key messages	29
Key recommendations	30

Key Message 5:

Despite evident need for family planning services, there is a lack of global funding for & attention to family planning; funding for family planning has been declining over the past 15 years, despite the known contribution of sexual and reproductive health and rights to the achievement of the MDGs..... 31

Background and Rationale.....	31
Figure 2: Family Planning Programme Funding 1995-2006	31
Evidence.....	32
Key messages	33
Key recommendations	33

Key Message 6:

Population dynamics have not been systematically integrated into climate change science; to date only limited analysis has taken place, and no Intergovernmental Panel on Climate Change (IPCC) Assessment Review to date has addressed the issue of population growth and dynamics, or the policy issues that they present. Research is urgently needed on the extent to which addressing population dynamics, including population growth, migration, urbanization, ageing, household composition etc can contribute to effective climate change mitigation and adaptation programmes 33

Background and Rationale.....	34
Key message for DFID.....	34
Key Recommendations.....	35
Reflections of Key Informants	36

Appendix I: Mapping the interaction between Population and Climate Change Adaptation 37

Appendix II: Connections between MDGs, population growth, sexual & reproductive health in the context of climate change 45

Appendix III: Responses from key experts to questions about population and Climate Change..... 47

Executive Summary

The Population and Sustainability Network was commissioned by the UK Department for International Development (DFID) to produce this scoping paper on the links between population dynamics and climate change, in advance of the United Nations Framework Convention on Climate Change (UNFCCC) Conference in Copenhagen in 2009. The paper is a result of collaborative working between colleagues from the London School of Hygiene and Tropical Medicine (LSHTM), University College London (UCL) and The Population and Sustainability Network (PSN). As UNFPA has stated, “People cause climate change. People are affected by it. People need to adapt to it. And only people have the power to stop it¹.”

The paper is structured around six key messages, each of which appears in a section containing background information, key messages, evidence and recommendations.²

Key Messages

1. **Rapid population growth has a negative impact on human development**, provision of basic services, poverty eradication; **an effect that is magnified and made more urgent in the context of climate change.**
2. **Although the principle cause of climate change is consumption in developed countries, those most vulnerable to the effects of climate change are those living in the developing world.** Rapid population growth has a negative impact on the ability of communities and countries to adapt to climate change, particularly if they are poor. It has also been identified by many developing countries in their National Adaptation Programmes of Action as a key factor confounding their attempts to adapt to climate change.
3. Climate change induced **mass migration** is likely to be significant, and **must be recognized as a legitimate response to climate change.**
4. **Linking population dynamics, particularly population growth with climate change is sensitive; there is a need to** forge consensus within the sexual and reproductive health and rights world and beyond on addressing this link in ways that **emphasize the need for increased investment in family planning programmes that respect and protect rights**, and ensuring that the link is made in ways that do not blame the South (where most population growth is taking place) for climate change which has clearly been caused by the significantly greater per capita consumption in the North.
5. Despite evident need for family planning services, there is a **lack of global funding for & attention to family planning; funding for family planning has been declining over the past 15 years**, despite the known contribution of sexual and reproductive health and rights to the achievement of the MDGs.

¹ UNFPA State of the World's Population. New York: UNFPA, 2009

²A summary of this paper has since been published in the Journal of Public Health, see: Stephenson, Newman and Mayhew (2010) *Population dynamics and climate change: what are the links?*, Journal of Public Health, 32, 2, pp. 150-156. Available at: <http://jpubhealth.oxfordjournals.org/content/32/2/150.abstract>

6. Population dynamics have not been systematically integrated into climate change science. **Research is urgently needed** on the extent to which addressing population dynamics, including population growth, migration, urbanization, ageing, household composition etc can contribute to effective climate change mitigation and adaptation programmes

The connection between Population Growth and Climate change is: -

- **Complex:** Increased research over the past decade shows that increased investment in access to voluntary family planning programmes could make a positive impact on mitigation and adaptation strategies, there is also no doubt that the key driver of climate change is the relatively high level of carbon emission in the developed world, where (apart from the USA, where it is mostly migration-driven) population growth is not a major issue. Demographic variables such as household size, age and sex composition and population density intensify the complexity of the relationship between population growth and climate change.
- **Controversial:** While developing countries themselves are increasingly identifying population growth as a factor that compounds national efforts to adapt to climate change, it is not easy to position increased investment in family planning as an important strategy in the face of climate change. In a scenario within which the industrialized North is not radically reducing its carbon emissions, advocating reduced population growth in the South risks appearing to blame climate change on that population growth, instead of recognizing that it is precisely those countries which will suffer the most as a result of climate change. It is also vitally important to advocate family planning programmes that respect and protect human rights; historically those which have been undertaken with the objective of reducing fertility have not always reflected these values in the ways that services have been offered; coercive family planning programmes have no place in international development programmes of any kind.
- **Critical:** While regional differences in per capita carbon emissions must be recognized, alongside the legitimate economic aspirations of developing countries, and it is plainly wrong to seek to blame the South for causing climate change, which has been driven by the actions of the North, it is also important to recognize that the populations in the developing world are far more vulnerable to the effects of climate change.

Key Facts

- The world population is projected to reach **9.1 billion persons by 2050** (the 2006 Revision projected figure for 2050 was 7.8 billion), that is, 2.3 billion more than in 2009, an increase close to the combined populations of China and India today. **Most of this growth will be experienced by developing countries.**
- At the same time, the **population of the least developed countries is projected to more than double**, from 835 million inhabitants in 2009 to 1.7 billion in 2050.
- This **median projection assumes expanded access to the family planning** services the use of which is a key factor in reducing fertility. **Investment in such services has declined**

over the past two decades for a variety of factors, including the emergence of HIV/AIDS as a global international development priority.

- One **third of the world's population lives within 60 miles of a shoreline** and **thirteen of the world's twenty largest cities are located on a coast.**
- **Population growth is an important factor in both climate mitigation and adaptation strategies.** Due to inequities in per capita consumption - the number of tonnes of CO² emitted every year by the average Kenyan is 1.3, while the average Briton emits 10.8 tonnes every year (in the USA the figure is 24.3), it seems obvious that family planning's greatest potential contribution to climate change mitigation is in the developed world, and this is true. However, given the legitimate right of developing countries to develop economically, **carbon emissions in developing countries will rise**, and will rise more quickly in countries with relatively high population growth rates.
- Nevertheless, for the immediate future, population growth is a more significant factor for effective climate change adaptation strategies, since **rapid population growth will make adaptation to the effects of climate change more difficult, and more expensive.** While the developed world hesitates to link population growth with climate change, the relationship is clear to several developing countries, which have themselves identified population growth as a significant factor confounding their attempts to adapt to climate change.

Key Recommendations

- **Rights-based family planning programmes work.**
- High levels of **unmet need** exist in most countries where population growth is highest. Therefore there is a need to continue to **expand and scale-up family planning programmes.**
- DFID could **publicly and actively support family planning as part of a climate change response**, and use its convening power and international credibility to influence national and international policy discourse in this direction.
- DFID may wish to use its influence to ensure work with other governments to **increase recognition of migration as a rational and legitimate response to climate change**
- **Adequate resources will be needed for climate change refugees**, and those suffering from pressures on resources resulting from population growth and other factors; for adaptation, particularly in the area of energy, and for dealing with mass migration, both internally and internationally.
- It is important to **start planning for mass-migration caused by climate change**
- **Encourage growth in, and development aid to, 'climate-safe' cities.**

- DFID has a strong record of handling and leading on sensitive issues/influencing bilateral partners, World Bank, WHO, UN etc; it is well placed to **facilitate high-level dialogue to increase understanding among political leaders of the significance of the population/climate change link** and **underscore these links at relevant governmental and intergovernmental fora** on climate change, progress on the MDGs etc
- Call for **increased investment in family planning as part of a climate change response**. Specifically, it could, among other things, ensure that core climate change funding (from national and international sources) includes streams for family planning/reproductive health programmes and activities, particularly in respect of funding available for NAPAs.
- **Expand and scale-up family planning programmes** as a response to the continuing high levels of unmet need that exist in most countries where population growth is highest.
- **Sustain international funding for family planning programmes**; funding has decreased over the last 15 years.
- DFID has a leading role to play in **supporting research** that will provide the evidence-base for sustainable policy decisions on future development strategies

Introduction

The Population and Sustainability Network was commissioned by the UK Department for International Development (DFID) to produce this scoping paper on the links between population dynamics and climate change, in advance of the United Nations Framework Convention on Climate Change (UNFCCC) Conference in Copenhagen in 2009. The paper is a result of collaborative working between colleagues from the London School of Hygiene and Tropical Medicine (LSHTM), University College London (UCL) and The Population and Sustainability Network (PSN).

DFID commissioned the paper in 2009 to alert DFID staff and raise their understanding of the inter-relationship between population dynamics and climate change; to highlight the cost-effective contribution that investment in sexual and reproductive health and rights can make to economic growth, the achievement of the MDGs and to reducing vulnerability to the impacts of climate change, and to identify a menu of possible actions where DFID could add value to address the identified challenges.

Climate change is probably the greatest challenge to human life this century; the Lancet Commission on Climate Change, reporting in May 2009, identified climate change as “the biggest global health threat of the 21st century”. It will affect populations around the globe in different ways and all populations are intimately connected with it – rich consuming populations are part of the cause while populations in the poorest countries suffer the worst effects. Fast population growth, fuelled by high fertility, hinders the reduction of poverty and the achievement of other internationally agreed development goals. While fertility has declined throughout the developing world since the 1970s, most of the least developed countries still have total fertility levels above 5 children per woman. Yet, population is perhaps the most neglected dimension of climate change. This paper seeks to explore what we know about the links between climate change and population issues and the implications of this for development in general and for DFID’s development programmes and approach in particular.

In May 2009 The Lancet Commission – a year-long Commission held jointly between the Lancet and University College London (UCL) Institute for Global Health - described climate change as “the biggest global health threat of the 21st Century”³. The Commission’s report noted that climate change will have its greatest impact on those who are already the poorest in the world, have the least access to the world’s resources, and who have contributed least to its cause. The vast majority of scientists agree that global warming is real, it’s already happening and that it is the result of human activity and not a natural occurrence. During the 21st century, the earth’s average surface temperature rises are likely to exceed the realistic target threshold of 2°C above preindustrial average temperature. Even 2° C rise cannot be considered “safe” it would mean that low lying island nations will be flooded.

³ Costello et al. 2009. Managing the health effects of climate change. The Lancet 373 (9676): 1693-1733.

This paper explores the links between population dynamics and climate change, within the context of a commitment to global equity, sustainable development, and the values enshrined in the July 2009 UK Government White Paper on International Development, *Eliminating World Poverty: Building Our Common Future*. In his Foreword to this document, Prime Minister Gordon Brown identifies “securing global justice” as one of his “top priorities”, and the White Paper pledges the government to “continue to act with confidence and determination to protect the world’s poorest, and to deliver real global justice”.

2009 has seen the worst global economic downturn for 60 years; while the moral case for ending poverty remains unassailable, turning pledges into progress against this background will be a major challenge. Social justice demands that distributive justice form the centre plank of the global response to climate change, partly but not exclusively due to historical and on-going practices of exploitation which have resulted in widening disparities between rich and poor nations.

While consumption in the North has caused a vast proportion of the carbon emissions responsible for global warming, it is the populations in the South that are most vulnerable to the effects of climate change. Even today, much of China’s rising emissions is linked to consumption based in High Income Countries.

It is critically, politically and ethically important that the identification of links between population dynamics and climate change take place within a context that recognizes that, while increased investment in voluntary family planning programmes that respect and protect human rights has a contribution to make to climate change in respect of both mitigation and adaptation strategies, population growth in the South is not and must not be seen as a mechanism by which the South can be blamed for a phenomenon for which the North is overwhelmingly responsible. Relatively poor countries will have some justification in resisting the idea of population management policies unless they see visible commitment to equity from rich countries.

In July 2009, Indian Prime Minister Manmohan Singh stated “As responsible members of the international community, we recognize our obligation to preserve and protect our environment. But climate change cannot be addressed by perpetuating the poverty of the developing countries”. The challenge is to identify models of economic development that are sustainable in terms of climate change, and which make a direct contribution to poverty elimination by placing distributive justice at the heart of policy development and practice. This paper seeks to identify links between population dynamics and climate change not in the belief that reducing population growth will be a magic solution to the grave problems facing the planet as a result of climate change, but that a comprehensive strategy to address climate change must factor in population dynamics among a range of other critical elements if efforts to mitigate and adapt to its effects are to be successful.

The rest of this report is structured around six key messages; each message has background information, evidence and key recommendations.

Key Message 1

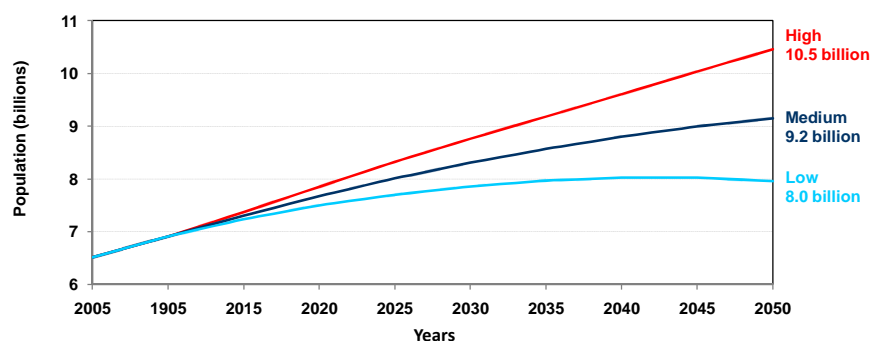
Rapid population growth has a negative impact on human development, provision of basic services, poverty eradication; an effect that is magnified and made more urgent in the context of climate change.

Background and Rationale

According to the UN World Population Prospects 2008 Revision⁴, on 1 July 2009, the world population reached 6.8 billion with 5.6 billion (or 82 per cent of the world's total) living in the less developed regions. According to the medium variant, the world population is projected to reach 9.1 billion persons by 2050 (the 2006 Revision projected figure for 2050 was 7.8 billion), that is, 2.3 billion more than in 2009, an increase close to the combined populations of China and India today. Most of this growth will be experienced by developing countries.

Figure 1: UN 2008 World Population Projections⁵

UN World Population Projections for 2005–2050



Source: United Nations World Population Prospects, the 2008 Revision Database.

<http://esa.un.org/unpp/>

Between 2009 and 2050, the population of the more developed regions will remain largely unchanged at 1.2 billion inhabitants, but the population of the less developed regions is

⁴http://www.un.org/esa/population/publications/wpp2008/wpp2008_highlights.pdf

⁵ Future population growth is highly dependent on the path that future fertility takes. In the medium variant, fertility declines from 2.56 children per woman in 2005-2010 to 2.02 children per woman in 2045-2050. If fertility were to remain about half a child above the levels projected in the medium variant, world population would reach 10.5 billion by 2050. A fertility path half a child below the medium would lead to a population of 8 billion by mid-century. Consequently, population growth until 2050 is inevitable even if the decline of fertility accelerates. UN Population Division, *ibid.*

projected to rise from 5.6 billion in 2009 to 7.9 billion in 2050. At the same time, the population of the least developed countries is projected more than to double, from 835 million inhabitants in 2009 to 1.7 billion in 2050. It should be noted that the median projection assumes expanded access to the family planning services the use of which are a key factor in reducing fertility⁶. Investment in such services has declined over the past two decades for a variety of factors.

The complexities of the challenges posed by climate change demand a comprehensive response that recognizes that demographic dynamics include a wide range of factors in addition to population growth; these include migration, ageing, urbanization, household structure, and other issues relevant to climate change mitigation and adaptation strategies. Additional complexities include the consumption patterns and survival strategies of populations; the former highlights the need to look at carbon emissions in per capita terms, while the latter highlights the fact that survival strategies which result in deforestation and unsustainable practices can also impact on Climate Change. In a world in which one third of the world's population lives within sixty miles of the sea, and, of the world's 20 largest cities, 13 are located on a coast, the importance of reviewing population factors in respect of climate change becomes clear, yet population issues remain perhaps the most neglected dimension of climate change.

Evidence

No country, barring a few oil-rich states, has risen from poverty while still maintaining high average fertility. In developing countries, where birth rates have successfully declined (particularly Asia and Latin America) between 25-40%, the resulting economic growth is directly attributable to fertility decline according to research on economics and poverty over the past decade⁷. The link between slowing population growth and enhanced economic development, has been fairly well documented^{8,9}; at the micro-level it is widely recognized, but debate is ongoing with respect to the relationship between population growth and economic development at the macro level; in some countries population growth and expanding markets associated with industrial development has contributed to economic growth.

⁶ World population in 2050 would be substantially higher if the decline in fertility projected in the medium variant fails to be realized. If fertility were to remain constant at current levels in all countries, world population would increase significantly by 2050, reaching 11 billion. In the high variant, where fertility is assumed to remain mostly half a child higher than in the medium variant, the world population in 2050 would reach 10.5 billion persons. In the low variant, where fertility is projected to be half a child lower than in the medium variant, world population would still grow, but only to reach 8 billion by 2050. According to the low variant, the population of the least developed countries would still nearly double, to reach 1.5 billion by 2050, but the population of the more developed regions would decline to 1.1 billion. UN Population Division

http://www.un.org/esa/population/publications/wpp2008/wpp2008_highlights.pdf

⁷ Bloom D., Williamson J.G. (1998) 'Demographic transitions and economic miracles in emerging Asia' World Bank Economic Review Vol.12:419-455

Eastwood R., Lipton M. (1999) 'The impact of changes in human fertility on poverty' Journal of Development Studies vol. 36:1-30

⁸ Birdsall N. et al., (eds) (2001) *Population Matters - Demographic Change, Economic Growth and Poverty in the Developing World*. Oxford.

⁹ Dyson, Tim; Cassen, R.; Visaria, L (eds.). (2004) *21st Century India: Population, Economy, Human Development and the Environment*. Oxford University Press.

Important work in India shows clearly that large future increases in population will make the creation of sufficient employment opportunities much more difficult to achieve and therefore the alleviation of mass poverty less likely⁹. The UN's MDG website suggests that Sub-Saharan Africa's rapid rates of population growth are impeding its ability even to keep static the numbers of people living in extreme poverty. The numbers of people in extreme poverty in Sub-Saharan Africa increased from 231 million in 1990 to 318 million in 2001. Although the proportion of people living in extreme poverty in Africa may have declined by a few percentage points in recent few years, high population growth rates mean that absolute numbers continue to rise¹⁰.

There is ample evidence and relatively widespread agreement about the inverse relationship between high fertility and the rate of per capita income: a strong positive, but not necessarily causal association between high fertility and poverty. From the macro-economic perspective, studies show that lowering fertility is a necessary spark for growth to begin, only however if the ancillary social and political conditions are favourable to make use of the demographic dividend that appears from a large, relatively healthy and well-educated work force with fewer dependents¹¹. Such studies show that where birth rates have successfully declined (particularly Asia and Latin America) between 25-40%, the resulting economic growth is directly attributable to fertility decline according to research on economics and poverty over the past decade¹². In some countries, however, population growth and expanding markets associated with industrial development has contributed to economic growth.

Poor access to contraception can also be considered to be a result of poverty. Contraceptive use is uneven within countries and varies by education, ethnicity, and place of residence as well as by wealth. Evidence shows that unmet need for contraception is greatest among poorer women worldwide. Even though poorer women use contraceptives at a lower rate than more wealthy women, there is evidence this differential can be reduced by well designed and accepted family planning services.

- An example of this is **Bangladesh**, where the contraceptive prevalence difference between the richest and the poorest quintiles is much lower than in other countries, such as Burkina Faso and Guatemala, where there are weaker family planning programmes.

Since 2000 the driving framework for development has been the 'Millennium Development Goals' (MDGs). In the original version of the MDGs no link with 'population' (fertility, access to reproductive health services) was present. After considerable pressure from a range of governmental and non-governmental organizations, these appeared under MDG5. Since then, however, many publications have made abundantly clear the links between population and reproductive health issues and the attainment of each of the MDGs. There is evidence

¹⁰ Lutz, W. et al (eds) *The End of Population Growth in the 21st Century. New Challenges for Human Capital Formation and Sustainable Development.*

¹¹ Bloom, D, Canning, D. & J. Sevilla. *Banking the "Demographic Dividend" How Population Dynamics Can Affect Economic Growth.* RAND.

¹² Bloom D., Williamson J.G. (1998) 'Demographic transitions and economic miracles in emerging Asia, *World Bank Economic Review* Vol.12: 419-455.

that rapid population growth creates significant problems for attaining the MDGs over and above existing challenges.

Case studies

Nigeria: Population and Poverty

Nigeria, with its rapidly growing population, has seen its proportion of poor people rise from 28% in 1980 to 66% in 1996. At the time, Nigeria also had significant revenue from oil, and poor governance, so there were clearly additional factors at play; addressing the weakness of governing institutions must be a continuing priority the importance and urgency of which climate change can only underscore.

Today Nigeria's population is around 133 million (the most populous country in Africa) of whom 90 million live on less than \$1 a day –with the population set to grow to 178 million in less than ten years, poverty reduction will be even more difficult¹³.

In Kenya the proportion of children vaccinated against childhood illnesses has declined because vaccine programmes cannot keep up with the numbers of new children needing vaccinations (see Box 1)

Key messages for DfID

- On 1 July 2009, the **world population reached 6.8 billion** with 5.6 billion (or 82 per cent of the world's total) living in the less developed regions.
- The world population is projected to reach **9.1 billion persons by 2050** (the 2006 Revision projected figure for 2050 was 7.8 billion), that is, 2.3 billion more than in 2009, an increase close to the combined populations of China and India today.
- **Most of this growth will be experienced by developing countries.** Between 2009 and 2050, the population of the more developed regions will remain largely unchanged at 1.2 billion inhabitants, but the population of the less developed regions is projected to rise from 5.6 billion in 2009 to 7.9 billion in 2050.
- At the same time, the **population of the least developed countries is projected to more than double**, from 835 million inhabitants in 2009 to 1.7 billion in 2050.
- It should be noted that this **median projection assumes expanded access to the family planning** services the use of which are a key factor in reducing fertility.
 - **Investment in such services has declined** over the past two decades for a variety of factors, including the emergence of HIV/AIDS as a global international development priority.
- **Rapid population growth is known to inhibit economic growth.**

¹³ African Foundation for Population and Development and Population Action International, evidence cited in: *Return of the Population Growth Factor: its impact upon the Millennium Development Goals*. Report of Hearings by the All Party Parliamentary Group on Population, Development and Reproductive Health, 2007

Key Recommendations

- **Rights-based family planning programmes work.**
- High levels of **unmet need** exist in most countries where population growth is highest. Therefore there is a need to continue to **expand and scale-up family planning programmes.**
- There is a need for **sustained international funding** for family planning programmes; funding has decreased over the last 15 years.
- **Girls'/women's education and empowerment** are important for increasing demand for, and use of, family planning as well as contributing to a skilled labour force.

Box 1: Impact of Population Growth in Kenya

The high rate of growth in Kenya has been the result of a combination of high fertility and, by developing country standards, relatively modest mortality. In the 1970s Kenyan women who lived to the age of 50 were having an average of 8 live-born children, of which some 6 or 7 would survive to adulthood. The population was therefore trebling every generation. But in the 1980s fertility started to decline dramatically and by the late 1990s was down to less than 5 births per woman. There was reason to hope that Kenya was well set on its fertility transition. Unfortunately a survey conducted in 2003 showed that the fall had ground to a halt and levelled out at 5 births per women, with small increases in the poorer and less educated sections of the population.

The importance of this stalling of the fertility decline on future population growth in Kenya is reflected in the revision of the United Nations' population projections. The medium variant projections made in 2002 assumed that the fertility decline would continue so as to reach 3 births per woman by 2015 and 2 births per woman by 2050, giving Kenya a total population of 44 millions by the middle of the century. But in 2004 these assumptions had to be revised. Although the fertility decline was envisaged as resuming, slowly, after 2005 so as to reach 4 births per woman by 2020 and 2.4 by 2045-50, the revised population total for 2050 was not 44 millions but 83 millions. These figures illustrate the principle of "*population momentum*": the mothers of the next generation are already born and they are twice as many as their mothers were, so that even if they only have half the number of children, the numbers of births will continue to increase. Any delay in the fertility decline will therefore have a huge effect on the size of future generations.

These United Nations projections make optimistic assumptions about the future course of mortality: they see life expectancy at birth increasing from some 50 years at present to nearly 70 years by 2050. In fact there is abundant evidence to show that mortality in Kenya, of both children and adults, has been *increasing* in the last fifteen years, largely, but not entirely, due to the AIDS epidemic. Some alternative projections have been made in the Centre for Population Studies at the London School of Hygiene and Tropical Medicine which assume that mortality will continue to rise so that life expectancy is reduced to 46.7 years by the 2050, while fertility falls to replacement level (2.64 births per woman). These projections give Kenya a population of 72 millions by the middle of the century. Thus unless a *rapid* fertility decline can be resumed in the immediate future, a further doubling of the population will, in the absence of some catastrophic epidemic, be virtually inevitable.

The impact of rapid population growth is illustrated in the education enrolment rates. Figures of school attendance compiled in the Kenya censuses show a remarkable increase in the primary school enrolment ratios in the 1970s and '80s. The proportions of children aged 10-14 who had never attended school fell from 50.4 percent in 1969 to 13.8 percent in 1979 and 8.3 percent in 1989. The goal of universal primary schooling appeared to be almost within reach, but the 1999 census again showed an upturn: the proportion of 10-14 year-olds with no schooling rose to 10.2 percent. Once again, however, this increase must be set against the increasing numbers of school-age children. In 1989 there were just under 3 million children shown as aged 10-14; by 1999 they had increased to over 4 million. Thus the numbers in the age group who had actually received some schooling increased by nearly 900,000 – more than three times the number needed to wipe out the 1989 residual had the base numbers remained constant.

Sources: Kenya Census 1999; Kenya DHS 2003; Blacker et al. 2005

Key Message 2

Although the principle cause of climate change is consumption in developed countries, those most vulnerable to the effects of climate change are those living in the developing world. Rapid population growth has a negative impact on the ability of communities and countries to adapt to climate change, particularly if they are poor. It has also been identified by many developing countries in their National Adaptation Programmes of Action as a key factor confounding their attempts to adapt to climate change.

Background and Rationale

In May 2009 The Lancet Commission – a year-long Commission held jointly between the Lancet and University College London (UCL) Institute for Global Health - described climate change as “the biggest global health threat of the 21st Century”. The Commission’s report noted that climate change will have its greatest impact on those who are already the poorest in the world, have the least access to the world’s resources, and who have contributed least to its cause. The vast majority of scientists agree that global warming is real, it’s already happening and that it is the result of human activity and not a natural occurrence¹⁴. During the 21st century, the earth’s average surface temperature rises are likely to exceed the realistic target threshold of 2°C above preindustrial average temperature. Even 2° C rise cannot be considered “safe” it would mean that low lying island nations will be flooded. :-

The study of past climate has shown us that our current global climate is extremely sensitive to human-induced climate change. The burning of fossil fuels since the beginning of the industrial revolution has already caused climate change; with clear evidence for a 0.75°C rise in global temperatures and 22 cm rise in sea level during the 20th century. The Intergovernmental Panel on Climate Change predicts that global temperatures by 2100 could rise by between 1.1°C and 6.4°C. Sea level could rise by between 28 cm and 79 cm – an order of magnitude more if the melting of Greenland and Antarctica accelerates - during the same period. In addition, weather patterns will become less predictable and the occurrence of extreme climate events, such as storms, floods, heat waves and droughts, will increase. The potential effects of global warming on human society are devastating, including drastic changes in health, agriculture, the economy, water resources, coastal regions, storms and other extreme climate events, and biodiversity³.

The impacts of global warming will increase significantly as the temperature of the planet rises. The severity of floods, droughts, heat waves and storms will worsen. Coastal cities and towns will be especially vulnerable as sea level rise will increase the effects of floods and storm surges. The increase of extreme climate events coupled with reduced water-security and food-security will have a severe effect on public health of billions of people.

Fast population growth, fuelled by high fertility, hinders the reduction of poverty and the achievement of other internationally agreed development goals. While fertility has declined

¹⁴ Maslin, M. Global Warming; A Very Short Introduction. Oxford: Oxford University Press, 2009.

throughout the developing world since the 1970s, most of the least developed countries still have total fertility levels above 5 children per woman. Yet, population is perhaps the most neglected dimension of climate change.

Responding effectively to climate change requires an international political solution; without a Post-2012 agreement there will inevitably be huge increases in global carbon emissions and devastating global warming. Massive investment in alternative/renewable power sources and low carbon technology will also be required to provide the means of reducing world carbon emissions. Policy planning should include preparing for the worst and *adapting*¹⁵. If implemented now, a lot of the costs and damage that could be caused by changing climate can be *mitigated*¹⁶.

Evidence

The chairman of the Intergovernmental Panel on Climate Change, R.K.Pachauri has said “the impacts of climate change will fall disproportionately upon developing countries and the poor persons within all countries, thereby exacerbating inequities in health status and access to adequate food, clean water and other resources¹⁷”. The impacts of climate change will be further compounded by numerous other stressors; low adaptive capacity to sudden changes is often characterised by poverty, underdeveloped economies, poor health, and limited scientific and technological capabilities. Inasmuch as population growth at a regional level and high fertility at a household level underwrite these factors, they will make adaptation to climate change harder. Population growth impedes progress towards achievement of the Millennium Development Goals and sustains poverty¹⁸. Poverty is the central phenomenon that underscores vulnerability to climate change¹⁹.

Population growth multiplies vulnerabilities and compromises capacity to adapt to climate change. Practical examples may be drawn from a series of developing country owned reports; the **National Adaptation Programs of Action** (NAPAs). At the time of the first published study²⁰ of population issues in the NAPA reports in early 2009 a total of 40 Least Developed Country (LDC) governments had submitted to the UN Framework Convention on Climate Change (UNFCCC) for funding of adaptation projects. The NAPA reports are distinctive as ‘Southern led’ in that they were created by LDC governments in a consultative way with civil society and local groups, although the process is not without problems, and it could be improved to ensure that local knowledge and perspectives drive the priority actions identified.

¹⁵ Adaptation refers to preparing for and coping with the impacts of climate change

¹⁶ Mitigation refers to tackling the causes of climate change through actions that reduce greenhouse-gas emissions or help remove gases from the atmosphere.

¹⁷ UK Department for International Development (2008) “Degrees of Separation”

¹⁸ African Foundation for Population and Development and Population Action International, evidence cited in: *Return of the Population Growth Factor: its impact upon the Millennium Development Goals*. Report of Hearings by the All Party Parliamentary Group on Population, Development and Reproductive Health, 2007

¹⁹ Prof. Chris Witty, Department for International Development. Panel Discussion at Chatham House (2009)

²⁰ Bryant, L, Carver, L, Butler, C. & Anage, A. 2009. “Climate Change and Family Planning: LDCs Define the Agenda” in WHO Bulletin. 2009;87:852–857 World Health Organisation.

The reports document the most pressing vulnerabilities to climate change impacts and urgent adaptation priorities. The main themes relating population growth to climate change adaptation that emerge from these reports are that:

1. Rapid population growth acts in tandem with climate change to deplete key natural resources, like; water, fuel and soil fertility
2. Rapid population growth can cause a significant increase in demand and often mismanagement of natural resources that are compromised and in decline due to environmental variability and climate change.
3. Population growth heightens human vulnerability to climate change in a spectrum of ways, namely forcing people to migrate to areas that are either environmentally marginal or more at risk to the negative impacts of climate change²⁰.

A great majority of these reports (37 out of 40) refer to population growth as a significant factor that exacerbates the harmful impacts of climate change. This figure is significant because the perspective of population issues in the Least Developed Countries themselves has been unrepresented in the scientific climate literature¹⁷. In this context, human vulnerability is increased because, according to the developing countries themselves, population growth impacts on fresh water availability, land degradation and soil erosion through over-grazing, deforestation and migration to coastal areas, which are themselves vulnerable and exposed to climate change through rising sea levels, floods and cyclones.

Case Studies

- The National Adaptation Report from **Sudan** describes how high population growth coupled with increasing consumption of fresh water is expected to act together with unpredictable rain patterns to exert extreme water stress on local populations.
- The authors of the **Ugandan National Adaptation Report** identify population pressure as a significant driving force behind over-cultivation of arable land and deforestation resulting in soil degradation and lower agricultural yields. High population also leads to high rates of migration from degraded areas to other areas under environmental stress.
- The **Rwandan** NAPA describes how this process leads to critical levels of land degradation. The population of Rwanda is expected to more than double by 2050 in a country where there is already a shortage of arable land per capita.
- Population pressure contributes to migration and drives development of environmentally vulnerable areas like coastal regions. The coastal population in the Bagamoyo district in **Tanzania** is expected to double in as little as twelve years. The Tanzanian NAPA describes how rising sea levels are already impacting on fresh water availability by flooding natural waterways and wells with salt water compromising the sole source of domestic water supply. Policy makers in this region are concerned about the subsequent knock-on impacts of populations forced to migrate to other areas already experiencing environmental degradation and the possible risks of social conflict.

- **Mozambique** is a country where about 60% of the population lives in the coastal zone... These areas are experiencing rapid population growth, inadequate, sporadic land-use planning and limited financial funding. Therefore, the control of land-use in the coastal zone and the development of strategies for the protection against erosion are becoming urgent.

NAPA reports show that several countries already specifically identify population policies as part of a range of adaptation priorities (6 out of 40: **Ethiopia, Gambia, Kiribati, Malawi, Samoa, Uganda**). Samoa's adaptation efforts for example seek to promote the shared interests between government departments like the health and environmental ministries with a view to creating more cost-effective investment. Therefore the national policy on population and sustainable development is accepted as part of the major environmental management strategy. Despite these six country Reports explicitly identifying links between population policies and climate change adaptation priorities none so far have been developed into specific programmes for implementation, nor does such action look likely in the future. This may partly reflect the bias towards short-term project development. Additionally despite UNFCCC recommendations for multi sector engagement, final project specification tends to be controlled by an environmental sector ministry.

Other shortcomings¹⁷ of the NAPAs process are:

- **time delays** between NAPA submission to the UNFCCC, and project implementation;
- **confusion** between funding agencies and streams (leading to further delays in actually delivering the funds), and
- **systematic underestimation of project costs**. Therefore analysis of the Reports here serves more as a useful indicator of LDC concerns with rapid population growth and environmental change, rather than a robust framework upon which population policy is likely to be incorporated into adaptation funding in the immediate future.

LEM Ethiopia - a citizens movement seeking to break the vicious cycle between population and environmental damage

Population growth in Ethiopia resulting in soil degradation, dwindling land holdings and low agricultural productivity provokes landlessness (or near landlessness) and creates pressure for poor people to move to either environmentally marginal or urban areas. This renders them more vulnerable and likely, out of desperation to exploit new resources in an unsustainable way, leading to a vicious cycle of poverty and degradation.

LEM Ethiopia (Environment and Development Society of Ethiopia) an Ethiopian citizens movement, partnering with national and international institutions, government and donor agencies seeks to bring attention to the connection between population and the environment and break this vicious cycle.

“If Ethiopia is to escape poverty, all actors must consider how environmental conservation combined with family planning initiatives can increase the success of development efforts”

FISHING FOR FAMILIES

IPOPCORM (Integrated Population and Coastal Resource Management project) aims to improve the quality of life of fishing-dependent communities while maintaining the integrity of life-sustaining coastal habitats. With operations research, IPOPCORM tested whether taking an integrated approach generates statistically significant improvements in coastal resource management outcomes and reproductive health/family planning outcomes by delivering these services in an integrated fashion, as opposed to delivering either intervention in isolation. PATH Foundations Philippines Inc. (PFPI) implemented the study in three separate islands off Palawan, Philippines, applying a different approach — either an integrated approach or reproductive health/family planning intervention only or coastal resource management only — on each island in nine barangays (wards).

Results showed that the integrated approach had a significantly higher positive impact on several reproductive health, food security and coastal resource-management indicators compared to the stand-alone projects. Although the integrated approach cost more to implement than either of the nonintegrated approaches, the combined cost of fielding the independent RH (reproductive health) intervention and the independent CRM (coastal resource management) intervention was greater than the cost of the integrated IPOPCORM intervention. The study concluded that integrated IPOPCORM interventions are cost efficient and yield higher impact on both human and ecosystem health outcomes compared to sectoral approaches. The implications of the study suggest that it will be difficult to ensure long-term sustainability of conservation and prevent overuse of coastal resources unless integrated forms of coastal management that combine conservation with family planning are delivered simultaneously”.

http://www.pfpi.org/PDF/ECSP_Focus_Apr08Castro.pdf

Key Messages

At the moment one third of the world's population lives within 60 miles of a shoreline and thirteen of the world's twenty largest cities are located on a coast. Human activity exerts major pressures and can render a coastline more vulnerable to the impacts of climate change. Billions could be displaced in environmental mass migration. Brian O'Neill, earth scientist at the National Center for Atmospheric Research, and leading climate scientist researching this relationship, has posed the question "how much easier would it be to reach a fixed reduction in emissions with a lower population pathway rather than a higher one?"

Population growth is an important factor in both climate mitigation and adaptation strategies. Due to inequities in per capita consumption - the number of tonnes of CO² emitted every year by the average Kenyan is 1.3, while the average Briton emits 10.8 tonnes every year (in the USA the figure is 24.3), it seems obvious that family planning's greatest potential contribution to climate change mitigation is in the developed world, and this is true. However, given the legitimate right of developing countries to develop economically, carbon emissions in developing countries will rise, and will rise more quickly in countries with relatively high population growth rates.

Nevertheless, for the immediate future, population growth is a more significant factor for effective climate change adaptation strategies, since rapid population growth will make adaptation to the effects of climate change more difficult, and more expensive. While the developed world hesitates to link population growth with climate change, the relationship is clear to several developing countries, which have themselves identified population growth as a significant factor confounding their attempts to adapt to climate change.

Key Recommendations

DFID could publicly and actively support family planning as part of a climate change response, and use its convening power and international credibility to influence national and international policy discourse in this direction.

Options include: -

- Ensuring that 'population' and its importance in relation to climate change is discussed at the most influential levels (national, including Treasury, Department for Trade and Industry; and international, including at inter-governmental fora).
- Increasing commitment of political leaders and policy makers to family planning through advocacy and policy dialogue as well as supporting family planning champions.
- Ensuring that core climate change funding (from national and international sources) includes streams for family planning/reproductive health programmes and activities, particularly in respect of funding available for NAPAs.
- Supporting expansion and scale-up of family planning programmes and funding, including for commodities security, infrastructure support and the retention and training of staff

- Building capacity for policy makers to understand the linkages between population and climate change.
- Holding national governments and political leaders accountable for the climate-change and population-related commitments they make.
- Work with key development agencies to raise the issue of population growth in their development work as complementary to the work of DFID/the UK government.
- Convening a conference with donors and the international health and development community to find common ground and approaches that will seek to address the perennial sensitivities for many LDC nations around family planning/fertility control and the mismatch between what appears appropriate and effective as a national/international strategy and what feels right to an LDC household/personal survival strategy.
- Supporting those regions more subject to weather-related extremes to programme early-warning systems which can help to provide forecasts concerning food shortages and to increase communities' preparedness for extreme weather events.
- Supporting the expansion of locally-led adaptive responses to climate change, including collective action for natural resource management, that have been already proven to be successful.
- Supporting efforts to streamline the National Adaptation Programmes of Action process in order to ensure that approaches and priorities are informed and driven by local knowledge, skills and expertise.
- Supporting countries to include priority strategies in their National Adaptation Programmes of Action (NAPAs) that include expanding access to family planning services and to female education.
- Developing mechanisms and institutional means for engaging with the rural and urban poor in addressing poverty, population growth and climate-change adaptation strategies.
- Supporting countries to encourage "climate resilient" growth in, and development aid to, 'climate safe' cities (that will not be affected by coastal sea-level rises).
- Increasing funding for education of girls and women, and women's empowerment programmes.
- Encouraging diversification of heavily agrarian economies, including job-creation for female labour force.

Key Message 3

Climate change induced mass migration is likely to be significant, and must be recognized as a legitimate response to climate change.

Background and Rationale

"Large-scale population movement is likely to intensify as changing climate leads to the abandonment of flooded or arid and inhospitable environments," according to *The Lancet*. "The resulting mass migration will lead to many serious health problems both directly, from the various stresses of the migration process, and indirectly, from the possible civil strife that could be caused by chaotic movement of people."

Millions of people now living in low-lying coastal areas may need to leave their homes if sea levels rise as predicted by most climate-change experts. Protracted and severe droughts may drive more farmers from rural areas to cities to seek new livelihoods. Residents of urban slums in flood-prone areas may migrate to rural areas to escape danger. And in some instances, gradual environmental degradation may erase income-earning opportunities, driving some across national boundaries.

The reasons for which people migrate or seek refuge are complex, making it hard to forecast how climate change will affect the future of migration. Climate change nonetheless seems likely to become a major force for future population movement, probably mostly through internal displacement but also to some extent through international migration¹.

While many experts agree that climate change is expected to become one of the key factors prompting population movement in the next decades, there is still uncertainty about the scale and nature of the impacts of climate change and about the best policies and strategies for addressing the problem. One reason for the uncertainty is the dearth of reliable data. But despite the shortage of hard data, it is evident that environmental changes are already resulting in substantial human migration and displacement.

There are various estimates for the number of people already displaced by environmental changes, with 25 million being the most widely quoted figure²¹. This figure does not include a potentially greater number of people who moved as a result of gradual environmental changes, such as drought or soil erosion. The figure also does not take into account those who have been displaced by other adverse consequences of climate change, such as diminished food security.

Estimating future climate change-related population flows presents an even greater challenge, with figures ranging wildly from 50 million to 1 billion people by the middle of the

²¹ International Federation of Red Cross and Red Crescent Societies (2001). *World Disasters Report*, <http://www.ifrc.org/publicat/wdr2001/>, accessed 15 April, 2009; Conisbee, M. and Simms, A. (2003) *Environmental Refugees: The Case for Recognition*. London: New Economics Foundation

century, either within their countries or across borders, on a permanent or temporary basis²². The most widely used estimate of people to be displaced by environmental factors by 2050 is 200 million²³.

Suggestions that millions of environmental migrants are poised to flee developing countries to permanently seek safety and new lives in industrialized countries are misleading. Overall, environmental migration is—and is likely to continue to be—mainly an internal phenomenon, with a smaller proportion of movement taking place between neighbouring countries, and even smaller numbers migrating long distances beyond the region of origin.

The majority of environmental migrants have so far come from rural areas within the least developed countries. But in the future, there may indeed be unprecedented levels of environmentally induced migration out of urban areas, as rising seas threaten to inundate densely populated coastal areas, where 60 per cent of the world's 39 largest metropolises are located, including 12 cities with populations of more than 10 million²⁴.

Evidence

It is not only rapid population growth but rapid **urbanisation** that is causing problems for the poorest countries. While fertility in urban areas is generally much lower than in rural areas, in-migration can be high and by 2050 it is estimated that 80% of the world's population will live in urban areas, putting huge pressures on infrastructures important for health (water, sanitation, health services) as well as employment opportunities. Social support networks in urban areas are often weak as rural family bases are weakened. Informal urban settlements are growing and people living in them are often faced with severe health problems. Climate change could exacerbate these problems by increasing in-migration to urban areas from rural agricultural land that is threatened by climate change, or by increasing migration from very poor to moderately poor countries, thus increasing pressure on their infrastructures, as well as by direct impacts on the populations of coastal mega-cities.

In respect of adaptation, high population growth will increase vulnerability through acting synergistically with environmental change to threaten natural resource availability and agricultural systems upon which a high proportion of the developing world depends for subsistence and livelihood²⁵. Slowing population growth would reduce the numbers exposed to impacts, mitigate rates of migration and assist in adaptation efforts that strive to bolster already overstretched eco-systems. In cases of both climate change mitigation and adaptation there may be more direct means of addressing both, such as improving energy efficiency or in the case of adaptation through strengthening institutions like markets and

²² Myers, N. 1993. "Environmental Refugees in a Globally Warmed World." *BioScience*, 43 (11): 757-761; Christian Aid. 2007. "Human Tide: The Real Migration Crisis."

²³ Stern, N. 2006. "Part II: Impacts of Climate Change on Growth and Development." *The Economics of Climate Change: the Stern Review*. Cambridge: Cambridge University Press.

²⁴ Nicholls, R.J. and others. 2007. "Coastal Systems and Low-lying Areas—Climate Change 2007: Impacts, Adaptation and Vulnerability." Contribution of Working Group II to the *Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press

²⁵ UK Department for International Development (2008) "Degrees of Separation"

government agencies²⁶ and improving access to technology and early warning systems. But arguably the efficacy of any and all of these policies would be enhanced under a scenario of lower population growth.

Policies that address population growth rates in countries where per capita emissions are very high like the USA, which is expected to increase in size by 130 million by 2050²⁷ would in theory have an even more dramatic impact on CO₂ emissions than those in countries where consumption is low to moderate. However since a significant amount of population growth in the USA will be connected to immigration emphasizing this issue could have the effect of increasing discrimination experienced by immigrant groups.

The Stern report²³ clearly states that climate change threatens the basic elements of life for people around the world: access to water, food, health use of land and environment. Developing countries are the most vulnerable to climate change, primarily because the *impacts are worse* – they are flood and drought prone and a large share of the economy is in climate sensitive sectors, secondly because they have a *lower capacity to adapt* because of a lack of financial, institutional and technological capacity and access to knowledge. Climate change is likely to *impact disproportionately upon the poorest countries and the poorest persons within countries*, exacerbating inequities in health status and access to adequate food, clean water and other resources.

The IPCC has defined vulnerability to climate change as: ‘the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change. Vulnerability is a function of the sensitivity of a system to change in climate and the ability to adapt the system to changes in climate.’

Vulnerability to climate change is the risk of adverse things happening and operates as a function of three factors: -

- Exposure: Exposure is what is at risk from climate change (Population, Resources, Property) and it is also the climate change that an affected system will face (sea level temperature, precipitation, extreme events). The geography of many developing countries leave them particularly exposed to weather extreme;
- Sensitivity: (Biophysical effect of climate change, change in crop yield, runoff, energy demand. It considers the socioeconomic context, e.g., the agriculture system, grain crops typically are sensitive, manufacturing typically is much less sensitive);
- Adaptive capacity: Capability to adapt which is a function of wealth, technology, education, institutions, information, infrastructure, “Social capital”. *Having* adaptive capacity does not mean it is *used* effectively.
- A more detailed analysis of these factors and how they interact with population dynamics including urbanization, ageing etc can be found in Appendix I, including areas for future research and action.

²⁶ O’Neill, B. L. McKellar & W. Lutz (2001) Population and Climate Change. Cambridge University Press: New York

²⁷ UNFPA: 2008 State of the World’s Population Report.

Migration is a coping strategy employed by many rural communities, although often the poorest (often women and children) will not be able to exploit this strategy and move from one place to another²⁸. Migration associated with environmental decline is usually characterised by short distance and long-term movements, and while there are dire predictions for huge numbers of environmental refugees these very high figures are unlikely to materialise. However migrant groups are more vulnerable to a range of stressors including impacts from climate change and poor access to health care. The delivery of sexual and reproductive health care will become more difficult in the context of migrant populations, with negative results for maternal and child health and well-being. The impacts of slow-onset climate change are also more likely to affect politically and economically marginalised groups, especially where local institutions are unable to respond effectively to growing competition for resources.

Case Studies

Population migration due to climate-change will put increasing pressure on poor countries and scarce resources.

- **Bangladesh** represents the most critical example of this; sea-level rises will force the displacement of millions of people – who may migrate to neighbouring countries who are already poor (Pakistan, Afghanistan) or have high levels of poverty (India).
- **Niger** is another: already reliant on food-aid; widespread droughts set to worsen; population set to grow from 14million (2005) to 80 million in 2050 (assuming current fertility rates that are unchanged since 1950s); mass out-migration seems inevitable.

Key Messages

- Migration must be recognized as a legitimate response to climate change
- Immediate, short-term (and under-funded) disaster responses such as food-aid; refugee housing, are not a sustainable solution, but planning for changes in migration patterns and scale is lacking.
- Urbanization is another critical issue: 13 of the world's 20 largest cities are on a coast. Sea level rises mean mass out-migration. Yet current patterns of migration show it is these same urban 'hotspots' that are growing fastest. Currently one third of the world's population lives within 60 miles of a shoreline. There is an urgent need to encourage the growth of cities in climate-safe areas.

Key Recommendations

- DFID may wish to use its influence to ensure work with other governments to increase recognition of migration as a rational and legitimate response to climate change

²⁸ Cecilia Tacoli. 2009. "Crisis or Adaptation? Migration and Climate Change in a Context of High Mobility." *Environment and Urbanization* 21 (2): October

- Adequate resources will be needed for climate change refugees, and those suffering from pressures on resources resulting from population growth and other factors; for adaptation, particularly in the area of energy, and for dealing with mass migration, both internally and internationally.
- It is important to start planning for mass-migration caused by climate change
- Encourage growth in, and development aid to, 'climate-safe' cities.
- Investment and job-creation policies in poorest countries to capitalise on the 'population dividend' – including diversification of economic sectors to cope with climate-change challenges (e.g. less reliance on agriculture as a proportion of total outputs; for example Bangladesh has increased investment in its garment industry).

Key Message 4

Linking population dynamics, particularly population growth with climate change is sensitive; there is a need to forge consensus within the sexual and reproductive health and rights world and beyond on addressing this link in ways that emphasize the need for increased investment in family planning programmes that respect and protect rights, and ensuring that the link is made in ways that do not blame the South (where most population growth is taking place) for climate change which has clearly been caused by the significantly greater per capita consumption in the North.

Background and Rationale

In May 2009 The Lancet Commission – a year-long Commission held jointly between the Lancet and University College London (UCL) Institute for Global Health - described climate change as “the biggest global health threat of the 21st Century”. The Commission’s report noted that climate change will have its greatest impact on those who are already the poorest in the world, have the least access to the world’s resources, and who have contributed least to its cause. The vast majority of scientists agree that global warming is real, it’s already happening and that it is the result of human activity and not a natural occurrence. During the 21st century, the earth’s average surface temperature rises are likely to exceed the realistic target threshold of 2°C above preindustrial average temperature. Even 2° C rise cannot be considered “safe” it would mean that low lying island nations will be flooded.

It is important that the links between population dynamics and climate change are examined and articulated within the context of a commitment to global equity, sustainable development, and the values enshrined in the July 2009 UK Government White Paper on International Development, Eliminating World Poverty: Building Our Common Future. In his Foreword to this document, Prime Minister Gordon Brown identifies “securing global justice” as one of his “top priorities”, and the White Paper pledges the government to “continue to act with confidence and determination to protect the world’s poorest, and to deliver real global justice”.

Any 21st century analysis of the relationship between population dynamics and climate change must begin with an acknowledgement that the overenthusiastic identification by “population control” advocates of population growth in the 1960s and 1970s as a negative force that must be rapidly reversed. This led to coercive programmes, particularly but not exclusively in India and subsequently in China which generated justifiable resentment. Partly because of this, advocates of sexual and reproductive health and rights focused for the last two decades of the twentieth century, and particularly since the 1994 International Conference on Population and Development more on respecting and protecting the right of access to services, rather than on a primary demographic rationale for increasing access to sexual and reproductive health and rights programmes. According to the UN World Population Prospects 2008 Revision²⁹, on 1 July 2009, the world population reached 6.8 billion with 5.6 billion (or 82 per cent of the world’s total) living in the less developed regions. According to the medium variant, the world population is projected to reach 9.1 billion persons by 2050. It should be noted that the median projection assumes expanded access to the family planning services the use of which are a key factor in reducing fertility³⁰. Investment in such services has declined over the past two decades for a variety of factors.

The complexities of the challenges posed by climate change demand a comprehensive response that recognizes that demographic dynamics include a wide range of factors in addition to population growth; these include migration, ageing, urbanization, household structure, and other issues relevant to climate change mitigation and adaptation strategies. Additional complexities include the consumption patterns and survival strategies of populations; the former highlights the need to look at carbon emissions in per capita terms, while the latter highlights the fact that survival strategies which result in deforestation and unsustainable practices can also impact on Climate Change. In a world in which one third of the world’s population lives within sixty miles of the sea, and, of the world’s 20 largest cities, 13 are located on a coast, the importance of reviewing population factors in respect of climate change becomes clear.

It is important to note that the identification of links between population dynamics, climate change, sexual and reproductive health and development, and of strategies that seek to address the nature of those links, can recognize that an association between factors may not indicate a causal link.

It is also important to recognize the basic human right of all individuals and couples throughout the world to have access to services that enable them to decide on the number and spacing of their children. In many contexts, having several children can be seen as an

²⁹ http://www.un.org/esa/population/publications/wpp2008/wpp2008_highlights.pdf

³⁰ World population in 2050 would be substantially higher if the decline in fertility projected in the medium variant fails to be realized. If fertility were to remain constant at current levels in all countries, world population would increase significantly by 2050, reaching 11 billion. In the high variant, where fertility is assumed to remain mostly half a child higher than in the medium variant, the world population in 2050 would reach 10.5 billion persons. In the low variant, where fertility is projected to be half a child lower than in the medium variant, world population would still grow, but only to reach 8 billion by 2050. According to the low variant, the population of the least developed countries would still nearly double, to reach 1.5 billion by 2050, but the population of the more developed regions would decline to 1.1 billion. UN Population Division
http://www.un.org/esa/population/publications/wpp2008/wpp2008_highlights.pdf

intelligent survival strategy, at least from the perspective of the individual or couple. Caution must be exercised when reviewing global population growth rates; while it may be true that the Indian state of Bihar currently has a population the size of Germany, and, with present growth rates, will be the current size of the USA in 50 years, it should also be remembered that, in the last century, the prospect of one billion people in China was widely believed to lead inevitably to mass starvation. Equally, as is demonstrated in other sections of this report, reluctance to link family planning in the developing world with climate change, because of the complexities of the association, should not blind policy-makers to the identification of population growth by several developing countries in National Adaptation Programmes of Action as a factor confounding efforts to adapt to the effects of climate change.

The legacy of “population control” programmes casts a long shadow. There is frequently suspicion about the motivation of those who seek to put in place family planning programmes, particularly in developing countries where cultural, social or religious practices also militate against “artificial” or “foreign” methods of reducing fertility. Barriers to the acceptability of family planning take many forms, including religious opposition, and legal and policy prohibitions, despite overwhelming evidence that maternal mortality and morbidity can be significantly reduced by increasing access to family planning services. There remain contradictions from community and national leaders who oppose both abortion and increasing access to the family planning services that could prevent those pregnancies. The result is often the subsequent exposure to high maternal morbidity and mortality rates, which can be even higher if women resort to abortion in settings where this is not safe.

Recent publicity on links between population growth and climate change have had the tendency to polarize the issue, with advocates for significant reductions in carbon emissions identifying population growth as, at best, a distraction from the main issue as they see it, and, at worst, an attempt by the “population control” lobby to attract climate change funding for their work.

In fact, there are very few organizations that do not believe that reductions in both consumption in the North, and in global population growth are important; it is often a question of which they emphasize more, and what gets left out when organizations have to state their headline priorities.

Case Study: Contraction and Convergence

Climate change is driven, and its impacts are experienced, to different extents by different populations across the globe. Equity should therefore be maintained as a guiding principle around which climate policy is developed. The model of contraction and convergence seeks to develop a framework in which the finite biospherical capacity is equitably shared amongst all of the earth’s inhabitants. Contraction and convergence describes a process whereby the high emitters of green house gases contract the rates at which they consume fossil fuel energy and eventually converge at a sustainable level with those who need to increase their consumption above what they currently consume in order to achieve satisfaction of

necessary material and social needs. It has the advantage of explicitly recognizing the developing world's right to develop, and the likelihood that their per capita emissions will grow as a result of this process, and of identifying a globally equitable way of managing this within the context of a global need to reduce carbon emissions.

There is an important distinction to draw between the "luxury" and "survival" emissions produced between different populations and the patent and urgent need to address gross inequalities and widespread poverty experienced in many parts of the world. Addressing human development through stimulating economic activity and other means of improving human welfare will inevitably lead to increases in GHG emissions; there is hence an allowance for an increase in emissions from poor populations in the contraction and convergence model. The budget at which emissions should contract to is estimated to start at 450 CO₂ ppm (at the time that Kyoto was created), which may have to be revised downwards towards 350 ppm, this however doesn't account for any feedbacks triggered in the climate system which might mean that the budget would have to be set even more conservatively.

The convergence date sets 2100 as an approximation to reach a globally equitable distribution of energy consumption, though efforts should be focused on the earliest date possible, as we move past the point of equity for equity's sake towards the pursuit of equity for survival.

Since this model is based on equilibrium between per capita and total rates of emissions, population is a critical factor influencing its achievability. Population projections are central for the subject of negotiation, and increasingly so if the medium UN 2050 projections, upon which the contraction allowance was crafted are jeopardized as a result of a crumbling base of global family planning services resulting in stalling rates of fertility decline in many countries. Population is the major denominator of this model, largely determining how hard it will be to achieve a globally feasible and equitable per capita emission figure; at the global level, a larger world population means a lower, more difficult to achieve, number. Similarly it could prove counter-intuitive if it became in the interest of nations to stimulate population growth in order to increase their share of the global emissions budget in an absolute sense.

Key messages

The connection between Population Growth and Climate change is: -

Complex: Increased research over the past decade shows that increased investment in access to voluntary family planning programmes could make a positive impact on mitigation and adaptation strategies, there is also no doubt that the key driver of climate change is the relatively high level of carbon emission in the developed world, where (apart from the USA, where it is mostly migration-driven) population growth is not a major issue. Demographic variables such as household size, age and sex composition and population density intensify the complexity of the relationship between population growth and climate change.

Controversial: While developing countries themselves are increasingly identifying population growth as a factor that compounds national efforts to adapt to climate change, it is not easy to position increased investment in family planning as an important strategy in the face of climate change. In a scenario within which the industrialized North is not radically reducing its carbon emissions, advocating reduced population growth in the South risks appearing to blame climate change on that population growth, instead of recognizing that it is precisely those countries which will suffer the most as a result of climate change. It is also vitally important to advocate family planning programmes that respect and protect human rights; historically those which have been undertaken with the objective of reducing fertility have not always reflected these values in the ways that services have been offered; coercive family planning programmes have no place in international development programmes of any kind.

Critical: While regional differences in per capita carbon emissions must be recognized, alongside the legitimate economic aspirations of developing countries, and it is plainly wrong to seek to blame the South for causing climate change, which has been driven by the actions of the North, it is also important to recognize that the populations in the developing world are far more vulnerable to the effects of climate change.

National Adaptation Programmes of Action (NAPA) UNFCCC (dealt with in more detail elsewhere in this paper, but relevant to the sensitivity issue, since they show that, while the North hesitates about linking population growth to climate change, those links are visible and clearly identified by the developing world as relevant)

- Outline top priorities for adaptation and specific localized vulnerabilities to climate change
- Well over half of them refer to population growth/density as a factor that makes coping with the changes that climate change will bring much harder.

Five most frequently mentioned factors that will be made worse by population growth and climate change

- Population pressure on fresh water availability
- Population affecting soil degradation/erosion – implications for agriculture
- Shortage of land per capita/over grazing
- Deforestation
- High population density/migration to coastal areas, thereby increasing vulnerability

Key recommendations

DFID has a strong record of handling and leading on sensitive issues/influencing bilateral partners, World Bank, WHO, UN etc.

- DFID may wish to facilitate high-level dialogue to increase understanding among political leaders of the significance of the population/climate change link

- Underscore these links at relevant governmental and intergovernmental fora on climate change, progress on the MDGs etc.

Key Message 5

Despite evident need for family planning services, there is a lack of global funding for & attention to family planning; funding for family planning has been declining over the past 15 years, despite the known contribution of sexual and reproductive health and rights to the achievement of the MDGs.

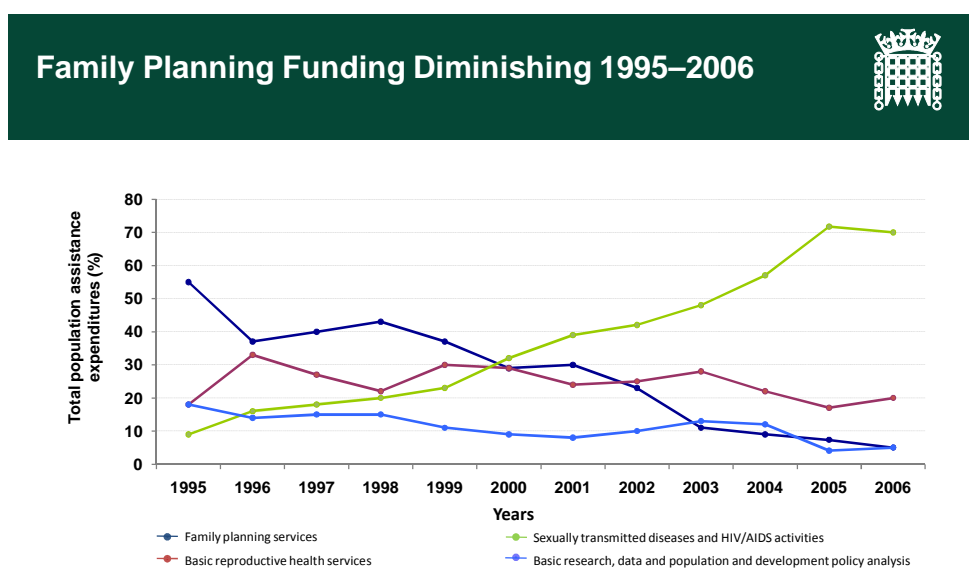
Background and Rationale

Despite global agreement in 1994 at the International Conference on Population and Development on the value of sexual and reproductive health and rights for a wide range of international development priorities, funding for family planning services has declined over the last 15 years. This has, in part, been due to the lack of visibility of sexual and reproductive health and rights in the Millennium Development Goals framework – an omission that was partially addressed in 2005 by the addition of target 5B, under the maternal health goal, to achieve universal access to sexual and reproductive health by 2015.

Substantial evidence exists to demonstrate the contribution that sexual and reproductive health and rights can make to the MDGs. This evidence is summarized in Appendix II

Investment in family planning services has declined over the past fifteen years, as seen in Figure 2

Figure 2: Family Planning Funding 1995-2006



Source: Prof. Joseph Speidel, evidence to the Group, 2006.
Update: Population and Sustainability Network compiled from financial resource flows for demographic activities 2006;

www.resourceflows.org

Evidence

Recent evidence³¹ suggests that: -

- An estimated 215 million women who want to avoid a pregnancy are not using an effective method of contraception, despite increases in use in recent years;
- Only about one-half of the 123 million women who give birth each year receive antenatal, delivery and newborn care (including routine care and care for complications), and many who get care do not receive all the components of care they need; and
- About 20 million women have unsafe abortions each year, and three million of the estimated 8.5 million who need care for subsequent health complications do not receive it.

Despite past gains, a number of countries have experienced little recent change in the use of modern family planning, and some continue to have very low levels of use. In Bangladesh, Kenya and Pakistan, use of modern methods appears to have stalled at about 47%, 32% and 20%, respectively, among married women of reproductive age. In a number of West African countries, such as Niger and Nigeria, fewer than 10% of married women practice modern contraception³².

If all women with an unmet need for modern contraceptives were to receive them, the cost of family planning services would increase from \$3.1 billion to \$6.7 billion.

Adding this amount to the cost of providing the recommended package of maternal health care to all pregnant women would bring total costs to \$24.6 billion for the developing world as a whole.

- The cost of providing the recommended maternal and newborn care package would decline by \$5.1 billion, from \$23.0 billion to \$17.9 billion, because of the large decline in the number of unintended pregnancies.
- Providing both services simultaneously would reduce costs from \$26.1 billion to \$24.6 billion—a net saving of \$1.5 billion, compared with investing in maternal and newborn care alone.
- The cost of providing both services to all women in developing countries who need them would be equivalent to an average yearly cost of \$4.50 per person (\$3.30 for maternal and newborn care and \$1.20 for contraceptive services).

³¹ Singh, Susheela, Darroch, J E, Ashford, L S, Vlassoff, M. Adding It Up: The Costs and Benefits of Investing in Family Planning and Maternal and Newborn Health. New York: Guttmacher Institute and UNFPA, 2009

³² Population Division, UN, World contraceptive use 2007, wall chart, New York: UN, 2008

Key messages

Increased investment in voluntary family planning programmes makes sense in terms of current international development priorities related to maternal, newborn and child health, and to the other MDGs.

Increased investment in voluntary family planning programmes also makes sense in terms of climate change mitigation, and in particular, adaptation strategies and programmes.

Key recommendations

DFID could call for increased investment in family planning as part of a climate change response. Specifically, it could: -

- Ensure that core climate change funding (from national and international sources) includes streams for family planning/reproductive health programmes and activities, particularly in respect of funding available for NAPAs.
- Support expansion and scale-up of family planning programmes and funding for:
 - Commodities security
 - Infrastructure support
 - Retention and training of staff
- Expand and scale-up family planning programmes as a response to the continuing high levels of unmet need that exist in most countries where population growth is highest.
- Sustain international funding for family planning programmes; funding has decreased over the last 15 years.
- Increase investment in girls'/women's education and empowerment - important factors for increasing demand for, and use of, family planning as well as contributing to a skilled labour force.

Key Message 6

Population dynamics have not been systematically integrated into climate change science; to date only limited analysis has taken place, and no Intergovernmental Panel on Climate Change (IPCC) Assessment Review to date has addressed the issue of population growth and dynamics, or the policy issues that they present. Research is urgently needed on the extent to which addressing population dynamics, including population growth, migration, urbanization, ageing, household composition etc can contribute to effective climate change mitigation and adaptation programmes.

Background and Rationale

To date only limited analyses have taken place that test the extent to which population will affect climate change³³. Those that have been performed are relatively recent and haven't yet found their way into mainstream climate thinking, thus contributing to speculation and contestation over how much climate change is caused by population growth. The most comprehensive modelling analysis to date has been completed by Brian O'Neill and colleagues, currently at the National Centre for Atmospheric Research in Colorado, and uses the most recent climate forecasts from the IPCC (The Intergovernmental Panel on Climate Change). The IPCC is the world's leading body on climate change consisting of over 2500 international scientists, and produced in 2000 a series of models or emissions pathways called the Special Report of Emissions Scenarios³⁴ or SRES in order to try to predict the dynamics of driving forces that will affect emissions up until 2100. These emissions pathways currently act as the benchmark on which all climate science is based and are due to be replaced by a new set of scenarios in the year 2010. The scenarios illustrate good consideration of demographics, but only in the limited sense of scaled population size. The scenarios identify population growth, economic growth and technological change, and changes in patterns of energy and land use as the major driving forces of CO₂ emissions. The treatment of population in the models has however come under considerable review. While the different emissions pathways in the models vary according to population variables, and generally demonstrate positive association between population size and emissions outcomes, other significant and important variables like urbanisation, aging and household size were not accounted for³⁵. Despite this, no IPCC Assessment Review to date has addressed the issue of population growth and dynamics and how or whether to create policy around them³⁶. Reasons for this are likely to be due to the historical differentials in global responsibility for climate change acting as a major political and diplomatic stumbling block³⁷.

Key message for DFID

There is very little research completed or literature available drawing explicit links between population growth, dynamics and vulnerability to climate change. There are obvious associations to draw however building on the known links between population and migration, urbanisation, poverty, environment, health and education, in fact most areas of development focus. There is ample cause therefore to assume that in as much as rapid population growth and high fertility or poor sexual and reproductive health negatively impact on these areas,

³³ Bloom D., Williamson J.G. (1988) 'Demographic transitions and economic miracles in emerging Asia, *World Bank Economic Review* Vol,12: 419-455.

³⁴ Naki'cenović et al 2000. Special Report on Emissions Scenarios. A Special Report of Working Group III of the Intergovernmental Panel on Climate Change. Cambridge, UK: Cambridge University Press.

³⁵ O'Neill, B, F L MacKellar, and W Lutz. 2004. "Population, Greenhouse Gas Emissions, and Climate Change." In Lutz, W, W C Sanderson and S Scherbov (Eds.). *The End of Population Growth in the 21st Century: New Challenges for Human Capital Formation and Sustainable Development*. London: IIASA and Earthscan, Pp. 283-314.

³⁶ Jiang, L. & K. Hardee (2009) "How do Recent Population Trends Matter to Climate Change?" *Population Action International*: Washington

³⁷ Bongaarts, J., B. O'Neill and S. Gaffin (1997) "Global Warming Policy: Population Left Out in the Cold?" in *Environment* Vol. 39 No. 9 (40-41)

human vulnerability will be exacerbated and capacity to adapt undermined. There may be other or more direct ways of addressing these questions, but if any of these routes would work better under a scenario of lower fertility, slower population growth or better sexual and reproductive health, then returns on investment in these areas would be significantly increased.

Key Recommendations

There are still many unknowns in the population-climate change field and DFID has a leading role to play in supporting research that will provide the evidence-base for sustainable policy decisions on future development strategies. DFID could fund and act on better data/research on population-related impacts of climate change, and adaptation potentials, at country, community and household levels. Specifically, but not exhaustively, these could include: -

- Develop robust measures of vulnerability to climate change;
- Analyse and quantify how demographic factors (e.g. growth rates, spatial distribution, education levels) affect adaptation potential of populations;
- Identify how best to mitigate the effects of rapid population growth in poor countries through development of models for different scenarios (taking population structure; water availability; food and shelter requirements; labour markets; other demographic factors etc.);
- Collect disaggregated data on urban demographic patterns (age, sex, mortality, migration) in order to identify climate change vulnerability and develop appropriate adaptation strategies;
- Map characteristics of migrant flows (including seasonal patterns) – duration, destination, composition – in order to aid adaptation strategies for sending and destination areas;
- Map availability of water according to spatially vulnerable groups over time, to identify adaptation strategies;
- Examine whether population pressures affect equity and distribution of water pricing;
- Evaluate efforts to integrate family planning and environmental activities to secure environmental sustainability;
- Examine whether, and to what extent, rapid population growth impedes agricultural growth and distribution;
- Identify factors influencing demand for family planning/smaller family sizes (assess impact of mass media, social marketing, community-based distribution etc.);
- How are family planning programmes most effectively delivered? As stand-alone services or integrated in primary/other SRH care?
- Document experiences of people affected by climate change, including coping strategies developed, and the role of fertility reduction/family planning;

- Build demographic research capacity in the South to support local climate-change impact-modelling and adaptation development;
- Examine the role, and accountability, of global, regional and national institutions in supporting (or blocking) adaptation policies, strategy-development and funding.
- Examine workable alternatives to the current carbon-based growth and development paradigm.

Reflections of Key Informants

As part of compiling this document, a selection of experts, policy-makers and population and climate change professionals were invited to reflect on the interaction between population and climate change. They responded to a range of questions, and their views are reflected in Appendix III; below is a selection of their recommendations to DFID.

“Simply raising the whole issue of population growth and development, from a scientific angle, will be very useful. There has been a deafening silence from all development agencies on this issue”

".. the issue of population is disgracefully ignored... it warrants a plenary at virtually every major environmental conference"

"The issue of population growth cannot be separated from the issue of so-called "environmental refugees" or "climatic migrants"

“Ensuring that Population and its importance in relation to climate change is discussed at the most influential levels to bring about joint action”

“Increasing funding for education (especially of girls) and for family planning programmes to compensate for disinvestment over recent years, despite the many well known benefits for well being of women and families”.

“A real commitment to developing the mechanisms and institutional means for engaging with the rural and urban poor in addressing poverty and its causes”

“Focus on reproductive health services in areas where interest in among women and couples in managing their fertility is high; coupled with integrated approach to health, development and climate change to make DfID a pioneer in ODA in the areas that matter most”.

“Building capacity for policy makers to understand the linkages between population and climate change, and holding national governments and political leaders accountable for the commitments they make”.

Appendix I: Mapping the interaction between Population and Climate Change Adaptation

Introduction: Population, Poverty and Adaptation

The effects of climate change being evident on a global scale, its negative impact is likely to be felt more severely in developing countries, particularly by those communities highly dependent on natural resources and which have a limited capacity to cope with climate variability and extremes. Climate change increases poor people's vulnerability by adversely affecting their health and livelihood, thus undermining growth opportunities (Hulme et al. 2001; Davinson et al. 2003; Fields, 2005). The warming of Africa is expected to exceed that of the world as a whole.

The third IPCC (2001) assessment report confirmed that the poorest people are most at risk of climate-change shocks, and they identified a range of poverty-related climate change impacts, including a reduction of crop yields due to decreased water availability affecting food security, and major impacts on employment, income, and economic growth, human displacement, and the exposure of millions of people to health risks (IPCC, 2001).

The Stern report (2006) clearly states that climate change threatens the basic elements of life for people around the world: access to water, food, health use of land and environment. Developing countries are the most vulnerable to climate change, primarily because the impacts are worse – they are flood and drought prone and a large share of the economy is in climate sensitive sectors, secondly because they have a lower capacity to adapt because of a lack of financial, institutional and technological capacity and access to knowledge. Climate change is likely to impact disproportionately upon the poorest countries and the poorest persons within countries, exacerbating inequities in health status and access to adequate food, clean water and other resources.

The IPCC (2001:1) defined vulnerability to climate change as: 'the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change. Vulnerability is a function of the sensitivity of a system to change in climate and the ability to adapt the system to changes in climate.'

Vulnerability to climate change is the risk of adverse things happening and operates as a function of three factors: -

- **Exposure:** Exposure is what is at risk from climate change (Population, Resources, Property) and it is also the climate change that an affected system will face (sea level temperature, precipitation, extreme events). The geography of many developing countries leave them particularly exposed to weather extreme;

- **Sensitivity:** (Biophysical effect of climate change, change in crop yield, runoff, energy demand. It considers the socioeconomic context, e.g., the agriculture system, grain crops typically are sensitive, manufacturing typically is much less sensitive);
- **Adaptive capacity:** Capability to adapt which is a function of wealth, technology, education, institutions, information, infrastructure, “Social capital”. Having adaptive capacity does not mean it is used effectively.

Amongst many other socio, political, and physical factors population dynamics underscore these three factors of sensitivity in the following ways: -

Exposure

Population Growth in Vulnerable Areas: Urbanisation

Population dynamics will affect the distribution of people exposed to the impacts of climate change. Population growth, particularly in urban and coastal centers, driven both by natural increase from fertility rates and migration determines that there will be higher numbers of people at risk to climate hazards which include floods, cyclones, landslides, rising sea levels affecting water sources, heavy rainfall and post disaster outbreaks of waterborne and vector borne diseases (Balk et al 2009). Population density will also affect how societies organize themselves, for instance the types of housing and location; many urban communities in Latin America are particularly vulnerable to sudden and extreme weather events through the prolific occurrence of poorly built and informal structures on steep slopes, or low lying land which are also badly serviced with infrastructure and sanitation (Hardoy and Pandiella 2009 cited in Balk 2009). The city planning of many urban centers in the developing world also tends to cluster economic activity close to the shore; this means that disasters through rising sea level rise, floods and extreme weather events take a sharper economic toll (Balk et al).

Migration

Migration to ecologically marginal areas can be associated with population growth, thereby sustaining exposure to vulnerability (UNEP 2008). Migration is a coping strategy employed by many rural communities, though worthy to note that the poorest (often women and children) will not be able to exploit this strategy and move from one place to another (WEDO 2007, Tacoli 2009). Migration associated with environmental decline is usually characterised by short distance and long-term movements, and while there are dire predictions for huge numbers of environmental refugees these very high figures are unlikely to materialise (Tacoli 2009). However migrant groups are more vulnerable to a range of stressors including impacts from climate change and poor access to health care. The delivery of sexual and reproductive health care will become more difficult in the context of migrant populations, with knock-on effects for maternal and child well being. The impacts of slow-

onset climate change are also more likely to affect politically and economically marginalised groups, especially where local institutions are unable to mediate growing competition for resources (Tacoli).

Aging Populations

If the fertility of a population declines and it reaches demographic transition relatively rapidly, the age structure will change to become older as there are less and less born into the young cohorts relative to the older ones. While this is more of an immediate concern in More Developed Regions, it will become important for countries that reduce their fertility very quickly, like many emerging economies. An older population might increase a population's exposure to climate change impacts, through increasing vulnerability and placing additional strains on existing services like healthcare that will be required to upscale in the face of climate change.

Areas for Future Research and Action

- There is a need for more finely disaggregated spatial city-specific demographic data like age, sex, mortality and migration rates in order to improve ability to decipher vulnerability to climate change and develop effective adaptation strategies in most vulnerable areas.
- There is high rate of unintended pregnancy in urban centers in developing countries, which implies voluntary family planning programmes could help ease the levels of unplanned/ unintended fertility and thus also the adaptation burden in the future.
- From this perspective, the specific characteristics of migrant flows – duration, destination and composition - are essential to understand their impact on sending and destination areas, and to develop appropriate policies.
- Clarification of the linkage between migration and violence is needed; conflict and displacement is likely to fuel competition and tension over resources and the need for enhanced conflict resolution skills and strategies.

Sensitivity

Agriculture

While the World Trade Organization and world trade in general has more influence on the financial success of agriculture in developing countries than climate change in the near future, agriculture systems and the implications for knock-on effects are arguably the most at risk to climate change. On a global scale, population growth, changing dietary patterns and increases in income will lead to increase demand for food and it is expected that in order to meet rising demand, production will have to increase three or four fold by 2050 .

Given that intensive agricultural systems (in combination with land use and waste) are ecologically damaging and a significant contributor to climate change (35% of GHG emissions), there is hence acute need for the improvement in the technological and distributive aspects of future global food systems in order to provide for a growing population at minimal environmental cost.

In Africa, researchers predict that climate change may force out of production some regions that rely on agricultural (Kurukulasariya et al. 2006). In Ethiopia for example, the economy so heavily agriculturally based, rainfall is estimated to account for 93% of year-to-year variation in GDP (IMF, 2005 cited by Woodward), and variability of rainfall can reduce the overall level of GDP by one-third, and increase poverty by around two-thirds (World Bank, 2006). According to a review study on the effect of climate change on African agriculture has the lowest level of productivity and the semi-arid condition make agriculture challenging. Those agronomic studies show that yields could fall dramatically if costly adaptation measures are not implemented (Dinar, et al). At the same time population growth might impede agricultural adaptation to climate change through a variety of ways particularly in Africa. The agricultural sector is the least efficient and heaviest consumer of water use (totaling 70% of global freshwater use, industry occupies 23% and domestic water use only 8%) (World Resources Data cited by Falkenmark and Widstand in O'Neill 2001). Population growth will therefore give rise to increasing demand for water in the sector that is least water efficient.

Climate Change is likely to have the greatest impact on the smallholder and subsistence farmer and in regions and communities that are already most vulnerable to food insecurity and malnutrition. Inasmuch as population dynamics can undermine agricultural resilience, through over cultivation, shrinking land holdings, soil erosion, and increased demand for water use it will heighten sensitivity to the impacts of climate change. There is ongoing debate over the direct causal link between demographic pressure and environmental damage. What is notable is the capacity for institutions to mediate a significant amount of negative impacts. Therefore there is an important question as to whether population growth and high fertility rates impede the creation of effective institutions to enhance agricultural growth and distribution²¹. This warrants further research.

Areas for Future Research and Action

- At the household level high population growth may impede the productivity of food systems, acting synergistically with climate change to sustain food insecurity. Therefore it could be argued that investments in voluntary family planning programmes that might lower fertility would in the long run increase the resilience of agricultural systems and hence act as an adaptation strategy.

- However, in some contexts, particularly among communities in West Africa, high fertility is perceived an essential coping strategy. Action and research should be pursued that identifies the conditions for high desired family size.
- Action should be simultaneously directed towards improving technological, infrastructural, economic and market conditions that bolster livelihood resilience and promote alternative income opportunities for communities with degrading or dwindling land holdings due to population growth.
- Identifying constraints for expanding farming particularly among small-hold/middle holding farmers

Environmental Stability

There is abundant evidence on an anecdotal basis where population pressure through rapid population growth is identified as a core factor that exacerbates problems in managing natural resource including tropical deforestation, soil erosion, overgrazing and overfishing of coastal waters. However the effects of population growth will be mediated through other factors like poverty, market economics, macroeconomic policies and institutions. Cross sector frameworks that seek to address the complex dynamics of environmental decline address the co-dependencies between population-health-environment, working on the principle that communities cannot “exercise adequate stewardship over natural resources when their basic needs are not met.”

Areas for Future Research and Action

- There are many examples whereby conservation and environmental groups are joining forces with reproductive health providers, seeking to address the causal dynamics of environmental degradation rather than the symptoms. Efforts should be directed at researching the feasibility of up scaling such projects whereby there is increased overlap between traditionally fragmented sectors.

Deforestation

While deforestation impacts negatively on agriculture (through surface run off etc) the direct causal relationship between population growth and deforestation is contested. Studies conclude that it is difficult to draw any causality between demographic pressure and deforestation- while the two are correlated on a macro level, evidence that shows population links to deforestation on a micro (household and community) are scant (Carr 2005). It is likely that while ameliorating population growth might help reduce pressure on forests the effect will be modest because of so many other conditioning factors, like commercial, governmental and economic factors (Bilsborrow 1992 cited ref 37). Where

population pressure is associated with deforestation, it is usually due to agricultural extensification, where landless cultivators expand into forested areas.

Water

Water availability will be determined by interactions between supply and demand. Population growth can greatly increase demand for water resources, especially through agriculture, which plays the dominant role for water demand globally at 70% (including irrigation)²⁴. Importantly though, it won't necessarily be the population growth in the local environment that is using this water, but rather demand from elsewhere, often from MDCs that requires water for agricultural export. However, by 2050 up to two thirds of the world will be water stressed, many in the poorest countries experiencing rapid rates of population growth (UNEP). Population growth gives rise to scarcity, which some have argued should be reflected in suitable water pricing, however there would be obvious problems associated with distributional equity and access. The UN World Development Report 2009 explicitly acknowledges the detrimental impact of population growth as a, if not the, major factor in water supply and sanitation pressures: "Countries that have experienced gains in the number of people with access to water supply and sanitation services since 2009 may see these gains eroded by population growth"

Areas for Future Research and Action

- Research should be focused on whether population pressure prevents authorities from dealing with equity and distributional challenges of pricing water effectively⁴⁵
- There is greater need to draw detailed information of availability of water according to spatially vulnerable groups over a period of time

Adaptive Capacity

The impact of poor sexual and reproductive health and absent or substandard family planning on development indices of social capital and development like the MDGs, has been illustrated in the table above. Adaptive capacity to impacts of climate change will depend on social capital derived from good health, a resilient income, adequate information and education and strong governance, also known as the Healthy, Wealthy, Wise and Well Governed (H3WG) index . In respect to the impacts of climate change and SRH, gender inequality is also an important factor to consider. High fertility at the household level and population growth at the regional level can undermine these types of social capital.

Health

At the household level, poverty is opposed to good health. Studies show that households characterized by high fertility and low incomes are also more likely to experience poor health. Additionally households with high fertility are more likely to be low income (Merrick

2001). Population is therefore linked to health through poverty. Specifically; high fertility is associated with close birth spacing and this has detrimental effects on the health of women and children (APPG PD&RH). In the context of climate change, poor maternal and child health will be significant by increasing susceptibility to potentially higher prevalence of malaria (O'Neill)

At the national level rapid population growth is associated with straining scarce health resources (O'Neill). The Government of Uganda in their National Adaptation Programme of Action (more of which are explored below) states:

“The high population and growth rate of Uganda is not matched with growth in health services and wealth. Similarly, the high population puts additional stress on the natural resources and weak health infrastructure. Climate change imposes additional burden on the health services (human stress and capital) with consequences of loss of human lives, particularly the most vulnerable age groups, the young and the elderly.”

Though, also important are; gross inefficiencies and inequalities in distribution of available health care and education resources, for example the bias of curative hospital care rather than primary care (Jiminez 1989 cited in O'Neill 2001).

Livelihoods

At the household level: Women prevented from participating in labor force at the household level, much time taken up with collecting energy sources

At the regional level, the creation of alternative job opportunities is a big problem for governments.

Education

At the household level high fertility might prevent girls from attending school, through limiting family resources making it is less likely for parents to be able to invest thus widening educational gaps between boys and girls (APPG PD& RH). But this relationship is also bi-directional since those with low levels of schooling will also likely have higher fertility. However in some instances women with little or no education can make use of family planning services, when suitable services are made available (John Cleland personal communication). Population and high fertility will thus affect rates and levels of education.

At the regional level population growth can undermine educational services Specifically (i) the numbers of teachers and schools may have to double in a short period to account for population growth and the inclusion of those currently excluded and (ii) the domestic revenue needed to support salaries and other costs must be raised from the economically active population of adults which is much smaller than in OECD countries as well as being much poorer.

Governance

Population growth at a regional level, through a series of different pathways may have important implications for security and governance. While the World Bank's definition of "fragile states" does not encompass "demographic pressures," almost all of the 33 states presently on the list have high fertility rates; only 5 states have total fertility rates under 4. While empirical studies show no systematic relationship between rates of population growth and the outbreak of conflict many have drawn association between very youthful age structures and skewed dependency ratios leading to difficulties in maintaining social stability or labour absorption. Numerous studies have concluded that countries with a large youth bulge proportion experience a high risk of political violence and civil strife (Leahy et al., 2007; Urdal, 2006. Cincotta)

Gender Equality

Empirical studies have not yet emerged on the relationship between gender and climate change but it is generally understood that climate change will exacerbate existing gender inequalities and that this will have important knock on effects for livelihoods, coping with change including: wealth, access to information, access to resources, understanding and having access to technologies and education. Amongst other crucial factors like education the delivery of sexual and reproductive health services and family planning can help bolster female autonomy.

In Summary

There is very little research completed or literature available drawing explicit links between population growth, dynamics and vulnerability to climate change. There are obvious associations to draw however building on the known links between population and migration, urbanisation, poverty, environment, health and education, in fact most areas of development focus. There is ample cause therefore to assume that in as much as rapid population growth and high fertility or poor sexual and reproductive health negatively impact on these areas, human vulnerability will be exacerbated and capacity to adapt undermined. There may be other or more direct ways of addressing these questions, but if any of these routes would work better under a scenario of lower fertility, slower population growth or better sexual and reproductive health, then returns on investment in these areas would be significantly increased.

Appendix II: Connections between MDGs, population growth, sexual & reproductive health in the context of climate change

Millennium Development Goal	Connections to Population and sexual & reproductive health in the context of climate change
<p>Goal 1: Eradicate extreme poverty and hunger</p>	<p>There is increasingly strong evidence that poverty reduction is facilitated by a slowing of population growth. In the world's poorest countries poverty gains made in the 1990s have slowed or even reversed as population growth has significantly increased.</p> <p>For a variety of reasons, disparities between rich and poor in terms of average number of children have increased in the last decade.</p> <p>While the % people in extreme poverty has marginally declined, the real numbers have increased with an extra 55 million people living in extreme poverty in 2004 compared with 1990.</p> <p>It is unclear whether food production is able to keep pace with exponentially growing populations. Food security, especially in Africa, is additionally being threatened by climate change – this has been reflected in higher food prices which the UN predicts will push a further 100million people into poverty, mostly in sub-Saharan Africa and SE Asia (UN MDG Report 2008). Intergovernmental Panel on Climate Change predicts that 600million extra people could be affected by malnutrition by 2080 as a result of climate change.</p>
<p>Goal 2: Achieve universal primary education</p>	<p>Rapid population growth undermines gains in basic education since in high population growth countries (the world's poorest) numbers of school-age children can double every 20 years. 30% the world's population is under 15; assuming class sizes of 40, an extra 2 million school teachers per year are required just to stand still. Many countries in sub-Saharan Africa have primary school completion rates under 50%.</p> <p>Indirectly, climate change affects educational attainment in many ways.</p> <p>Climate change is likely to exacerbate poverty and poorer children of both sexes are less likely to attend school than rich children.</p> <p>Climate-change-related loss of livelihoods (social, natural, physical, human and financial capital) may reduce opportunities for full-time education.</p> <p>Climate-related displacement and migration can reduce access to education, although both of the last two have the potential to lead to increases: eg Maasai in Tanzania investing in education because of loss of traditional livelihoods (Bishop PhD 2007)</p>
<p>Goal 3: Promote gender equality and empower women</p>	<p>“the ability of women to control their own fertility is absolutely fundamental to women's empowerment and equality”</p> <p>Good progress in gender equity of school enrolment, but slower improvements in completion. Countries with a high contraceptive use have a higher proportion of girls in secondary schools.</p> <p>Demand for contraception is growing but so is unmet need because of lack of FP services and is highest in sub-Saharan Africa where population growth rates are highest.</p> <p>Climate change is expected to exacerbate current gender inequalities.</p> <p>Depletion of natural resources and decreasing agricultural productivity may place additional burdens on women and girls' health and reduce their ability and their time available to participate in decision-making processes and income-generating activities.</p> <p>Climate-related disasters have been found to have a more severe impact on female-headed households.</p>

<p>Goal 4: Reduce child mortality</p>	<p>High fertility and high infant mortality are strongly associated: short birth intervals increase child mortality.</p> <p>Access to safe drinking water, which is directly affected by rapid population growth and climate change, is also strongly associated with child mortality.</p> <p>Intergovernmental Panel on Climate Change predicts that an extra 1.8 billion people could be living without enough water by 2080 as a result of climate change.</p> <p>Direct effects of climate change include increases in heat-related mortality and illness associated with heat waves – which particularly affect infants.</p>
<p>Goal 5: Improve maternal health</p> <p>And improve access to comprehensive sexual and reproductive health services</p>	<p>High fertility massively increases a woman’s lifetime risk of dying from pregnancy related causes. Maternal mortality is up to eight times higher in sub-Saharan Africa than anywhere else in the world. The risk of dying from pregnancy/childbirth complications is greatest in countries with unmet need for FP and high fertility rates.</p> <p>Lack of skilled birth attendance and emergency obstetric care are also associated with maternal mortality.</p> <p>The distribution of vector- and waterborne diseases is likely to change with climate-change – pregnant women and children are particularly susceptible to these diseases.</p>
<p>Goal 6: Combat HIV/AIDS, malaria and other diseases</p>	<p>While in many settings HIV spread has been slowed, globally numbers of people infected continue to rise. Population growth has a negative impact on gaining control over HIV/AIDS spread through: increased urbanisation; persistence of poverty.</p> <p>The HIV epidemic does not have a substantial impact on population growth rates in high fertility countries, even in those countries with a high HIV prevalence.</p> <p>Climate change may increase the prevalence of some vector-borne diseases (e.g. malaria) and vulnerability to water- or food-borne diseases.</p>
<p>Goal 7: Ensure environmental sustainability</p>	<p>Climate change will alter the quality and productivity of natural resources and ecosystems, some of which may be irreversibly damaged, and these changes may also decrease biological diversity and compound existing environmental degradation.</p> <p><i>‘Population change is directly linked to climate change’ (2006, Sir David King, Chief Scientific Advisor to UK Government).</i></p> <p>Reversing the loss of environmental resources cannot be achieved in the context of rapid or even moderate population growth without addressing the demographic factor.</p> <p>More than 1 billion people do not have access to safe drinking water</p> <p>2.5 billion lack access to basic sanitation services</p> <p>78% world’s fisheries are unsustainable</p> <p>13 million hectares/year are deforested</p>
<p>Goal 8: Develop a global partnership for development (governance, aid, trade)</p>	<p>Climate change related conflict (over water, fertile lands etc.) is predicted to increase. This could be compounded by rapid population growth since some data suggest a link between rapid population growth and civil unrest.</p> <p>Climate change is a global issue and the response requires cooperation and good governance from all countries, especially to help poorer countries adapt to the adverse impacts of climate change.</p>

Sources: UNICEF 2008 ‘The Bases for Action’; UNFPA

Appendix III: Responses from key experts to questions about population and Climate Change.

Methodology

A list of key experts in the field was compiled (see appendix) together with a number of questions on which we sought their views. Most respondents emailed answers to the questions we posed; in a few cases responses were obtained or expanded by phone.

Broadly, the questions (below) addressed: -

- a) the link between population and climate change
- b) priorities for research
- c) priorities for family planning programmes and
- d) the most important policy areas for leadership and action by DfID. This question related to climate change and the development needs of poorer countries.

Findings

A. The link between population and climate change

Questions about the link between population and climate change elicited a wide range of views which reflect many of the key concerns and sensitivities surrounding discussion of climate change and population.

None of the respondents disputed that population is relevant to vulnerability and adaptation to the impacts of climate change, but views on the link between population and mitigation of climate change, or reducing GHG emissions, clearly differed.

Some respondents (Musinguzi, O'Neill, Rapley, Engelman, Porritt, Guillebaud, Dyson, Warburton) emphasised that population dynamics are highly relevant to both mitigation and adaptation "because larger future world populations will face greater challenges than smaller ones in achieving climate-sustainable emissions...." (Engelman) and 'the total human impact on the earth system scales with population' (Rapley). In starker terms "China is on record for saying that it's one-child policy, which it estimates to have reduced population growth in China to date by 500 million Chinese (i.e. a total population now of 1.3bn instead of a projected 1.8bn without the policy) should be seen as contributing to its overall actions on climate change". (Warburton).

Other respondents considered that population is not a relevant factor for greenhouse gas (GHG) emissions, citing the lack of association at national level between growth of GHG emissions and growth of populations over the last 50 years (Satterthwaite). The latter view, that climate change is driven by the consumer behaviour, rather than simply population

number, rests on the enormous variation in GHG emissions between individuals with high consumption levels in developed nations with low fertility rates, and individuals with low or negligible consumption in poor nations with high fertility rates. Most respondents rejected the 'either/or' notion that leads to a focus on *either* high consumption, low fertility (developed) countries *or* low consumption, high fertility countries, preferring to address population and climate change in both developed and developing countries. "While a single African may use 1/100th of the resources and cause 1/100 of the emissions of a W European, there are far fewer resources available to that African in most cases. One of the reasons is that there are too many demands on the limited resources due to high populations, but often the resources are poorly managed in the first place and thus extremely vulnerable to CC. What needs to be recognised is that a global common understanding of resources, population and responsibility is required to make the right decisions about population planning (Johnston)". Several respondents acknowledged the uncertainty about 'the relative contribution of changes in population, consumption pattern and technology of consumption' over the medium to long term (Satia), Despite these uncertainties, it is argued that 'we know enough already to conclude with fairly high probability that population-related policies that lead to lower fertility would make the climate problem easier to solve' (O'Neill).

Another area of general agreement was that population and climate change is a 'tremendously sensitive' (Engelman) and 'highly emotive subject', in which it is 'difficult to hold a reasoned discussion about the issues as a result of historic baggage (Rapley). 'Even those who take climate change seriously are terrified of the population connection, worrying it may brand them as racist or in denial about the greater contribution of developed countries to the atmospheric load of GHG' (Engelman). Hardee suggested that there was more resistance to linking population with climate change last year than this, although some people still believe that it is not worth talking about anything other than consumption in the West in relation to climate change. Others commented that environmental agencies and organisations could be particularly opposed to addressing population issues (Satia, Porritt).

The policy implications of such sensitivity are reflected in views expressed by O'Neill. "I do not think it is a good idea for population to play a direct role in climate change policy (e.g., in explicitly entering the dialogue about commitments to future emissions reductions). In the context of the climate policy dialogue, I believe it is best to see population as one aspect of sustainable development. Development that occurs in a more sustainable manner puts us in a better position to address the climate issue (both in terms of mitigation and adaptation). I see the population-climate link as more directly relevant to population policy (rather than to explicit climate policy). That is, one can make a well supported argument that climate-related environmental benefits are an additional justification for population-related policies. A good case can be made for such policies without reference to environmental benefits, but these additional benefits make the case even stronger". Or,

more succinctly, 'We need therefore very good arguments to bring on board developing countries'...' to realise that even if they are not contributing much to climate change now, they still need to address their high population growth rates if we are to mitigate their increasingly significant contribution to climate change in future' (Musinguzi). Hardee argued that the SRH community should reach a consensus on the appropriateness of including FP/RH as an important component of adaptation strategies, versus advocating for stronger FP/RH programmes in their own right. "My view is that we within the [SRH] community who understand the history of family planning and the evolution in the field that led to the 1994 ICPD and the need for rights based, voluntary programs, need to be a very active part of the dialogue on strategies for climate change mitigation and adaptation, precisely so that programs remain rights based. Universal access to RH is a target under the MDG and it should be a strategy for adaptation to climate change". (Hardee)

B. Key research priorities included

- Forward scenario planning. This requires multidisciplinary expertise to select regions or countries, for example, in Africa, taking account of population structure, water availability, food and shelter requirements, labour market and other demographic factors and then identify how best to mitigate the effects of population growth through different modelling scenarios. Most populations in Africa are set to double, whatever action is taken now, so the key question is how will they cope with that situation? (Cleland)
- Studying the effect of particular population-related policies on demographic and socio-economic outcomes e.g. how would investment in family planning affect fertility rates (and therefore population growth and age structure) in different parts of the world over time? How would investments in education affect fertility and population growth rates, economic growth and consumption levels? What is the net effect of such changes? (O'Neill)
- How do demographic factors affect the ability of populations to adapt to the impacts of climate change? Factors like growth rates, spatial distribution, and education levels are often thought to be relevant, but little specific, quantitative research exists (O'Neill).
- What are the key blocks to progress in combating climate change at international, regional and local levels. This must include institutional blockages, e.g. within the UN programme, and local barriers to successful implementation of voluntary family planning (Rapley).
- Renewed research focus on health economic arguments, including estimating the cost-effectiveness of family planning on a range of outcomes linked to the MDGs (Haines)

- How can poverty issues be addressed in a zero carbon economy? What is the role of technology, lifestyle and public health goods? e.g. strengthening primary health care (Haines)
- To what extent, and how, should family planning programmes be integrated to improve effectiveness? Should they be stand-alone services or integrated with primary care (Haines)
- How can uptake and / or delivery of voluntary family planning be improved among the poorest sectors e.g. through training community advocates? (Haines)
- We need to know more about the experiences of people living in countries hard hit by climate change – people’s views of climate change, their own vulnerability and resilience, coping strategies and how their communities and governments can strengthen adaptation to climate change. These studies need to address population, fertility and access to reproductive health and family planning as part of adaptation strategies (Hardee).
- More research is needed on the global and national policies related to adaptation and the institutions guiding development of adaptation policies and funding mechanisms (Hardee).
- Influence of new factors in people’s decisions about family size: risks associated with future climate change; opportunities of future remittances associated with migrations of grown-up off-springs; what (climate-related) factors control migrations and remittances; information flows allowed by internet and cell phones and their influence on livelihood strategies; how does diversification in livelihood strategies (allowed by urbanisation, globalisation...) allow decreasing vulnerability to climate change (Lambin).
- Clarification of the links between carbon emissions and population growth, and what the nature of those linkages is, would be useful. (N.B, even if there isn’t a direct link between climate and population, that is not to say that there aren’t other very important socio-environmental reasons to tackle over-population, including female empowerment and over-exploitation of resources). (Warburton)
- Related to the research priorities is a need to build academic capacity in demography, particularly in the South, so that research / modelling about population growth and its implications for health, poverty, climate change and sustainability does not flow in a single direction from North to South (Cleland Dyson and Haines).

C. Priorities for family planning

The need to target resources in two regions - South Asia and Sub-Saharan Africa - that have the highest population growth was clearly stated. The proportion of women who want no more children or who want to delay childbearing for at least 2 years remains high in Africa and has changed little in last two decades. Meeting this unmet need for family planning remains a very high priority (Cleland, Satia). It was suggested that voluntary population programmes be linked with poverty alleviation and gender programmes (Satia); others argued for funding to be spent on a wider range of services, within which sexual & reproductive health, primary care and environmental improvements are all highly important (Satterthwaite, Haines).

Within FP specifically, the following priorities were proposed:

- Mass media promotion to legitimise smaller family sizes e.g. soap operas on TV or drama can be very successful in changing attitudes (Cleland)
- Strong social marketing (where it doesn't already exist) in urban and peri-urban populations to distribute contraceptive pills and condoms (Cleland)
- Community-based schemes to intensify face-to-face education about and provision of family planning. Easier to be successful on a small scale with charismatic local people – key issues lie in scaling up such schemes (Cleland).
- Improve infrastructure for, and ensure secure supplies of, family planning in rural areas and provide a better choice of methods (Musinguzi)
- Improve training, deployment and retention of health care workers in family planning, and provide incentives to provide high quality services

D. Key policy areas for DfiD include

- Ensuring that Population and its importance in relation to climate change is discussed at the most influential levels to bring about joint action (Cleland, Rapley, Dyson, Satia). (Simply raising the whole issue of population growth and development, from a scientific angle, will be very useful. There has been a deafening silence from all development agencies on this issue. It has been interesting to see the press reaction (very mixed) to David Attenborough's decision to become president of the Optimum Population Trust, which has brought the attention to the fore again (Warburton).
- Increasing funding for education (especially of girls) and for FP programmes to compensate for disinvestment over recent years, despite the many well known benefits for well being of women and families (O'Neill, Porritt).

- A real commitment to developing the mechanisms and institutional means for engaging with the rural and urban poor in addressing poverty and its causes (Satterthwaite).
- Express focus on reproductive health services in areas where interest in among women and couples in managing their fertility is high; coupled with integrated approach to health, development and climate change to make DfID a pioneer in ODA in the areas that matter most (Rapley).
- Increasing commitment of political leaders and policy makers to family planning through advocacy and policy dialogue as well as supporting FP champions (Musinguzi).
- Building capacity for policy makers to understand the linkages between population and climate change (Musinguzi).
- Holding national governments and political leaders accountable for the commitments they make (Musinguzi).

Finally, all responses were in agreement with the quote from Manmoham Singh. ‘This means pursuing strategies that facilitate technological leap-frogging so that developing county economies can move more quickly to low carbon paths. But it also puts a priority on development policies such as those related to population, which have benefits not only for the well being of individuals, but also for the climate’ (O’Neill). Most low-income individuals / households in low-income countries are unlikely to increase their per capita emissions beyond a ‘fair-share’ level of around 2 ton per year should their needs be met to allow them to get out of poverty (Satterthwaite).

Questions and informants

A. Link between population and CC

Do you consider population to be a relevant factor in relation to climate change?

Have you encountered resistance to the concept of linking population growth to climate change?

B. Research

Can you identify an essential research gap that must be tackled (without which action is unlikely to be effective)?

C. Family planning programmes

If there were a very large cash injection for family planning programmes how, in specific terms, should that money be used?

What barriers do you see to the acceptability of family planning programmes, and how would you like to see DfID, or others, tackle these?

D. Leadership by DfID

What are the policy areas where you would like to see DFID take a lead among international donors and intergovernmental agencies?

Finally, what would you consider an appropriate response to Manmohan Singh (India's Prime Minister) "As responsible members of the international community, we recognize our obligation to preserve and protect our environment. But climate change cannot be addressed by perpetuating the poverty of the developing countries

Expert informants:

John Cleland	Professor of Medical Demography, LSHTM, UK
Tim Dyson	Professor of Population Studies, LSE, UK
Robert Engleman	Vice-President for Programmes, Worldwatch Institute, USA
John Guillebaud	Emeritus Prof. of Family Planning and RH, UCL, UK
Andy Haines	Director, London School of Hygiene and Tropical Medicine, UK
Karen Hardee	Vice-President of Research, Population Action Int'l, USA
Peter Johnstone	Responded on behalf of Wilmot James, academic, South Africa
Eric Lambin	Professor of Geography, Univ.of Louvain, Belgium, and Stanford
Aubrey Meyer	Emeritus Professor of Natural History, University of Edinburgh, UK
Jotham Musinguzi	Director, Partners in Population and Development Africa Office, Uganda
Brian O'Neill	Climate Scientist, <u>Institute for the Study of Society and Environment, USA</u>
Jonathan Porritt	Former Chair of the UK Sustainable Development Commission, UK
Chris Rapley	Director, Science Museum; former Director of British Antarctic Survey, UK
Jay Satia	Professor, Health Management, former Exec Director, ICOMP, Malaysia ...
David Satterthwaite	Senior Fellow, Human Settlements, Int'l Institute for Env. And Dev., UK
John Warburton	DFID China team