Hong Kong's Vulnerability to Global Climate Change Impacts

An Oxfam Report on 2010 Public Survey and Policy Recommendations

Oxfam Hong Kong

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Commissioned Study:
The Kadoorie Institute, The University of Hong Kong
Public Opinion Programme, The University of Hong Kong

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Executive Summary

There has been a growing concern worldwide about the impacts of global climate change. However, in Hong Kong much of the debate on climate change remains focused on environmental and economic issues. There is much less understanding of and interest in the social impacts of global climate change in this city. It is unclear who in Hong Kong would be affected by the impacts of climate change and how well or inadequate our existing capacity is to respond and adapt to the potential impacts, what the key factors or barriers would be for mitigation and adaptation, and who is going to pay for such adaptation measures and how.

In an attempt to answer these questions, Oxfam Hong Kong commissioned a study by the Kadoorie Institute and the Public Opinion Programme at the University of Hong Kong to provide a better understanding of Hong Kong's vulnerability to global climate change impacts with a particular focus on the social impacts of climate change. This Oxfam report aims:

1. to develop a **framework** to understand and analyse the social dimensions of climate change in Hong Kong. This framework, which is based largely on social science theories and existing empirical data, is intended to link key concepts regarding the relationships between climate change impacts, social groups, and policy measures;
2. to **consolidate local evidence** that recent observed changes in climate have already caused **social impacts** and affected various social groups in Hong Kong;
3. to report the **latest findings of an Oxfam survey** about Hong Kong public's attitudes towards climate change impacts; and
4. to provide **policy recommendations**.

This report is structured into four sections:

Section 1: an **introductory** section about the linkages between climate change, social impacts and vulnerability. This section will introduce a framework that can guide the design of our survey and policy analysis. This section also consolidates **local evidence** on the social impacts of global climate change in Hong Kong, and highlights reasons for concern.
Section 2: this section reports the **key findings of a survey** commissioned by Oxfam. The findings provide the latest data about Hong Kong people's understanding, perceptions, attitudes and behavior in relation to global climate change and its impacts in Hong Kong. The findings also reflect Hong Kong people's assessment and preferences on Hong Kong policies for climate change.
Section 3: this section examines the major **weaknesses** of Hong Kong government's current initiatives on climate change.
Section 4: this section contrasts **good practices** in cities in other developed countries with Hong Kong practices and approaches, and provides a set of **policy recommendations** for policymakers.

Methodology:

This is a report on a study undertaken by the Kadoorie Institute (KI), and the Public Opinion Programme (POP) at the University of Hong Kong. There are two major sources of data: (1) a review of existing studies, reports and news clippings; (2) data collected from a public opinion survey conducted by the POP.

Key findings:

1. The available local evidence strongly indicates that Hong Kong is vulnerable to climate change impacts such as more frequent heatwaves, increased risks of flooding and disruption of the transport system. A broad range of social groups appear to be affected in ways that require government initiatives that cut across many policy areas ranging from energy to social welfare and public health;
2. The Oxfam survey finds a ***citywide consensus*** that climate change is a ***serious threat*** to humans. Most Hong Kong people see climate change as a problem causing ***social*** impacts. There appears to be a disappointment with Hong Kong government measures to combat climate change problems. There is recognition that Hong Kong shares responsibility for climate change impacts in developing countries; and
3. There are major limitations in the Hong Kong government's action in addressing the issues of climate change. Hong Kong should learn from good practices in other countries and cities.

Policy recommendations:

The Hong Kong government should:

1. emphasise the social aspects of climate change in a holistic, long-term climate change policy framework. This policy framework should mainstream climate change into all major policy areas from energy to public health and social welfare. Such a policy framework should also include both adaptation and mitigation measures, and a greenhouse gas emission reduction target;
2. strengthen the health and occupational safety systems;
3. facilitate stakeholder engagement, local capacity building and climate change education; and
4. explore the setting up of a climate fund to assist developing countries to adapt.

In issuing this report, Oxfam hopes to draw attention to the social dimension of climate change impacts in this world-class city, and promote stakeholder engagement on these important issues for Hong Kong. Taken together, the review of local evidence, survey findings and policy analysis presented in this report may be useful to the Hong Kong government in setting climate change policies and in formulating government initiatives.

1. Introduction: climate change, social impacts and vulnerability

> "The underprivileged communities will be impacted much more owing to their inability to cope with the impact of weather extremes becoming more frequent. This is the recipe for increasing social instability."
>
> — **Lam Chiu-ying**
> Former Director of Hong Kong Observatory
> (Lam, 2006)

1.1. Science of Global Climate Change

There is worldwide recognition across governments that global climate change is the most serious environmental problem that faces human beings today (IPCC, 2007; Tokyo Metropolitan Government, 2007). The IPCC's 4th Assessment Report asserts that a rise of 2-3℃ or more in the average global temperature from the 1990 level is highly likely to produce adverse effects in almost all areas of the world. It also emphasises the need to drive the world's CO_2 emissions downward by 2015-2020 (IPCC, 2007).

The Stern Report, Nicholas Stern's review for the Chancellor in the UK on the 'Economics of Climate Change' published in 2006, demonstrated that the cost of swift action to reduce carbon emissions will be small (1% or less of national income) but that the costs of doing nothing and then trying to tackle the problems that emerge later will be much higher (Greater London Authority, 2007).

1.2. The Framework: Understanding the implications on Hong Kong by Building the Linkages between Climate Change, Vulnerable Groups and Government Initiatives

Cities are both the main contributors to and victims of global climate change. Cities currently use over two-thirds of the world's energy and account for more than 70% of global CO_2 emissions (IEA, 2008). Cities, which are home to half the world's population (Corfee-Morlot *et al.*, 2009), are particularly vulnerable to climate change impacts. About 80% of cities are located on coasts and by rivers, exposing them to rising sea levels and storm surges due to climate change (Bulkeley *et al.*, 2009; Corfee-Morlot *et al.*, 2009). Cities are also vulnerable to changes in the supply of water, food, energy and other resources as well as urban heat island efforts (Bulkeley *et al.*, 2009; Corfee-Morlot *et al.*, 2009).

The social impacts of climate change are a major policy issue as they involve diverse actors, multi-faceted policy domains and complex interactions. The social impacts however have been overlooked while climate policies in Hong Kong have been preoccupied with environmental and economic concerns. Oxfam's 2009 report "Suffering the Science: Climate Change, People, and Poverty" is instructive in filling this gap (Oxfam, 2009). The report provides some useful evidence of how global climate change is already causing social impacts on people and is linked with issues ranging from food supply to public health and national security (*Box 1*).

Box 1: Key Findings of Oxfam Report
"Suffering the Science: Climate Change, People, and Poverty"

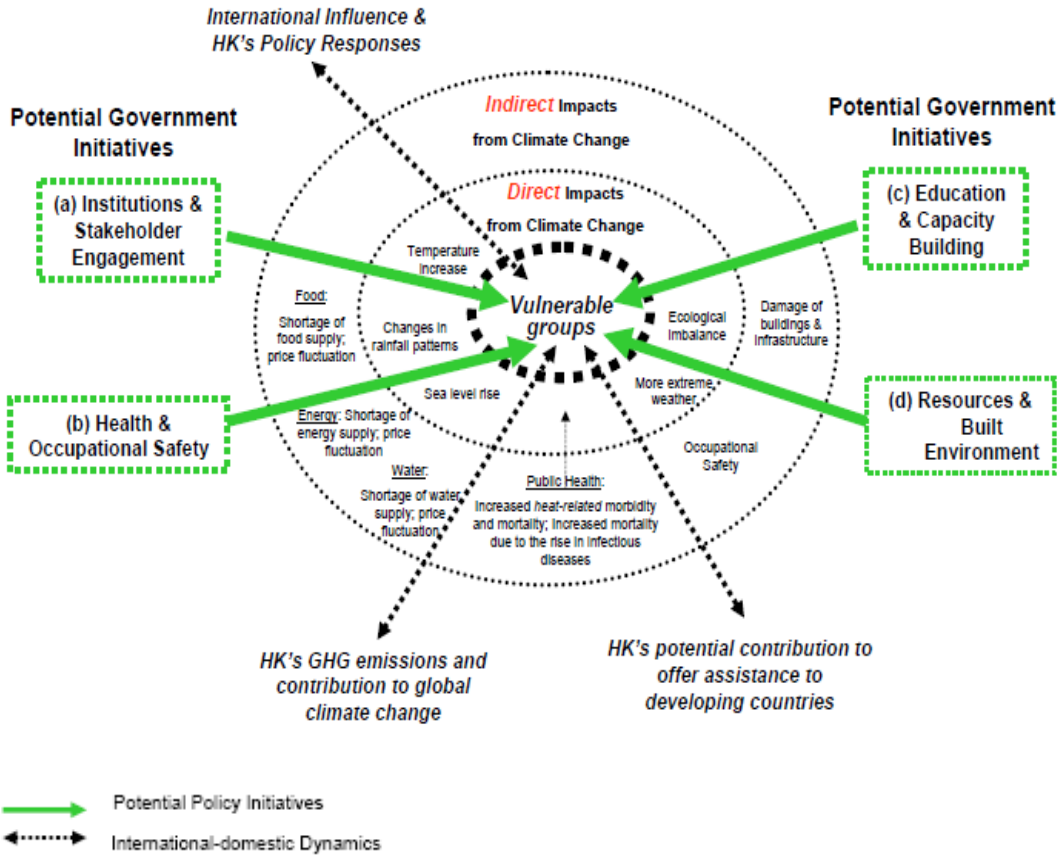
- It is estimated that 26 million people have already been displaced because of climate change.
- 375 million people may be affected by climate-related disasters by 2015.
- 200 million people may become "climate-change refugees" – who are displaced because of climate change - each year by 2050 because of hunger, environmental degradation, and loss of land.
- Several major cities that are dependent on water from mountain ranges face collapse.

(Source: Oxfam, 2009)

The linkages between vulnerable groups, climate change impacts and policy-making in Hong Kong remain poorly understood. As such, it is useful to develop a framework in order to identify the key elements, draw out the linkages between them, and try to make sense of the complexity. A scanning of the literature and reports indicates that there are important linkages between climate change impacts and vulnerabilities as well as the climate-policy interface (see for example Corfee-Morlot *et al.*, 2009; Kamal-Chaoui and Robert, 2009; Turner II *et al.*, 2003). This report therefore has developed a framework, the "Vulnerability and Adaptation Framework" (*Figure 1*).

This framework is a conceptual model that can help to focus our analysis on the key elements and dimensions of climate change in the context of Hong Kong, to guide the questionnaire design (*Section 2*), and to devise policy recommendations (*Section 4*).

Figure 1: The "Vulnerability and Adaptation Framework": the Linkages between Vulnerable Groups, Climate Change Impacts, and Potential Government Initiatives in Hong Kong



(Sources: Corfee-Morlot *et al.,* 2009; Dawson, 2007; IEA, 2001; IPCC, 2001, 2007; Kamal-Chaoui and Robert, 2009; Stern, 2006; Turner II *et al.*, 2003; WPO, 2008)

The framework has five integral elements:

1. **Vulnerable groups**: Vulnerability is the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes (IPCC, 2007). Vulnerability is a function of exposure, sensitivity and resilience, and depends on factors such as wealth, technology, education, information, skills, infrastructure, access to resources and management capabilities (IPCC, 2007). This framework defines vulnerable groups as those social groups in Hong Kong who have less ability to adapt, and are or will be affected more than others by climate change impacts;

2. **Direct and indirect impacts:** The impacts of climate change can be both direct and indirect (Corfee-Morlot *et al.*, 2009). **Direct** impacts are those impacts of climate change that directly link to changes in climate, such as sea level rise, temperature increase, more heatwaves and changes in rainfall patterns. **Indirect** impact are those impacts of climate change which often result from the interactions between direct impacts of climate change and the built environment and social-economic pressures (Dawson, 2007). Examples of indirect impacts include shortage of supply and price fluctuations in food, energy and water; asset losses due to mean sea level rise; increased mortality and morbidity from heat-related health risks and vector borne diseases (Corfee-Morlot *et al.*, 2009);

3. **Potential government initiatives/ measures**: this framework identifies four main types of government initiatives which the Hong Kong government may deploy to mitigate climate change impacts on vulnerable groups. Those government initiatives are categorised as: (a) **institutions and stakeholder engagement** – which include target-setting, organisational arrangements, appropriate pricing signals for resource management (Bulkeley *et al.*, 2009; Jollands *et al.*, 2009; Rosenzweig and Solecki, 2010); (b) **health and occupational safety** (IFRC, 2004; Livingstone, 2006); (c) **education and capacity building** (Jaffe *et al.*, 2001); (d) **resources and built environment** including integrated water management and green building design (Sussman *et al.*, 2010; Vörösmarty *et al.*, 2000);

4. **International-domestic dynamics:** this framework highlights the international drivers and pressures on Hong Kong to address climate change impacts as a key factor influencing the policy-making process. This international-domestic dynamic also emphasises the role of Hong Kong in this global problem – Hong Kong is an emitter of GHG while Hong Kong can also contribute to problem-solving through, for example, offering assistance to developing countries.

This framework is based on two major **assumptions**:

1. Climate change is expected to lead to direct and indirect impacts on vulnerable groups in Hong Kong;
2. There is a climate-policy interface: the Hong Kong government can deploy the identified policy initiatives to address climate change impacts effectively.

Box 2: Definitions/ Key Terminologies

Adaptive capacity (in relation to climate change impacts)
The ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damage, to take advantage of opportunities, or to cope with the consequences (IPCC, 2007).

Climate change
Any change in climate over time, whether due to natural variability or as a result of human activity (IPCC, 2007).

Climate change mitigation
Actions that reduce greenhouse gas emissions (Burch, 2010).

Vulnerability
The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes (IPCC, 2007). Vulnerability is a function of exposure, sensitivity and resilience (Turner II *et al.*, 2003)

1.3. The Social Impacts of Climate Change in Hong Kong: the Local Evidence

Knowledge about the social impacts of climate change in Hong Kong is essential for policy-making. A full consideration of social impacts on Hong Kong however is not available. There are few studies relating to the social impacts of climate change on Hong Kong. Existing information in this regard is scarce and lacks consolidation.

There are however a number of studies and some anecdotal evidence from government and non-government sources which are useful in informing us about the nature and scale of the problems. This section of the report therefore aims to consolidate existing local evidence on social impacts of climate change in Hong Kong.

It is important to note that the review of the local evidence is not a detailed examination of the magnitude of the social impacts. The studies and anecdotal evidence cited also vary in their levels of detail and credibility. However, this review is intended to outline the breadth and magnitude, and the complexity of the social impacts relating to climate change in Hong Kong.

The review of the local evidence of the observed social impacts of climate change in Hong Kong is summarised in *Table 2*. **This review sends out these key messages:**

(1) ***The "Knowns":*** The local evidence suggests that -

- Hong Kong has been/will be **impacted by global climate change**. Hong Kong is affected by *direct* impacts such as the increase in average temperatures and total rainfall, rise of mean sea level, changes in the frequency of occurrence of extreme weather events (Leung *et al.*, 2007; Lee *et al.*, 2008; Ginn *et al.*, 2010; Lee *et al.*, 2010a) and *indirect* impacts such as more heat-related deaths and more infectious diseases (Yip *et al.*, 2007; Fung, 2004) (*Table 1*);

- There are strong indications of potentially **substantial negative climate impacts including social impacts** in Hong Kong. A study commissioned by the Environmental Protection Department for example has estimated that for 1ºC increase in temperature, the electricity consumption by Hong Kong households would increase by about 9 percent, and the economic costs caused by using more electricity would amount to HK$1.7 billion (Fung, 2004). It was estimated that a heavy rainstorm in 2008 caused widespread disruption to business and numerous landslides and flooding that cost Hong Kong about HK$578 million (Greenpeace China, 2009);

- Climate change has impacted or will **impact various social groups** including the elderly, people with chronic diseases, people who work outdoors, and those who live in cubicle apartments, through various ways and to varying degrees (Yip *et al.*, 2007; Leung, 2010; The Standard, 2010).

Box 3: Key Facts about Climate Change in Hong Kong (2008)

Hong Kong's local greenhouse gas (GHG) emissions: 42 million tonnes CO_2 equivalent per annum in 2008, which accounted for around 0.1 % of global emissions.

GHG emissions per capita: about 6 tonnes

Major emitters of GHG: power generation accounts for more than 67 % of Hong Kong's GHG emissions. More than 50 % of the electricity is generated by coal burning.

(Sources: Environment Bureau 2010b)

(2) ***The "unknowns":*** Although this report has synthesised the information that is available about global climate change impacts in Hong Kong, there are several areas that we need to know more about. These include:

- The magnitude of the social impacts in Hong Kong: e.g. in what ways and to what extent has global climate change caused problems in Hong Kong? How much of the social problems such as heat strokes and tariff increase is or may be caused by global climate change impacts? What is the magnitude of the aggregate impacts across various social groups and different policy areas?

- Assessment of Hong Kong's vulnerability to climate change;

- Knowledge about existing capacity to respond to climate change: e.g. how are different social groups presently responding and adapting to climate change impacts?

- Policy assessment of potential measures and scenarios: what policy initiatives can be introduced to enhance Hong Kong's capacity to respond, mitigate and adapt to climate change?

Table 1: Local Evidence on the Direct and Indirect Impacts of Climate Change in Hong Kong

	Hong Kong Evidence	Sources
***Direct* Impacts**		
Temperature	From 1885 to 2009, there was a rise of about 0.12°C per decade in the annual average temperature in Hong Kong. The rate of increase in annual average temperature became faster in the latter half of the 20th century.	Hong Kong Observatory (Ginn *et al.*, 2010)
	Compared with the 1980-1999 average of 23.1°C, the annual mean temperature in Hong Kong in the decade 2090-2099 is expected to rise by 4.8°C according to the middle-of-the-road projection.	Hong Kong Observatory (Leung *et al.*, 2007)
Rainfall	The annual rainfall recorded at the Hong Kong Observatory from 1885 to 2009 shows a long term increasing trend at a rate of about 24 mm per decade.	Hong Kong Observatory (Ginn *et al.*, 2010)
	The average annual rainfall in Hong Kong is expected to increase during the latter half of the 21st century. The year-to-year variability in rainfall would also increase in the 21st century with more extremely wet and extremely dry years.	Hong Kong Observatory (Lee *et al.*, 2008)
Extreme weather	The number of hot nights (daily minimum temperature at or above 28 °C) shows an increasing trend between 1947 and 2009 while cold days (daily minimum temperature at or below 12 °C) shows a decreasing trend in the same period.	Hong Kong Observatory (Ginn *et al.*, 2010)
	The frequency of heavy rain (days with hourly rainfall greater than 30 mm) and thunderstorms increases by 0.4 day and 1.8 days per decade respectively in post war years (1947-2009).	Hong Kong Observatory (Ginn *et al.*, 2010)
	In the 21st century, the annual number of hot nights (days with a minimum temperature of 28°C or above) and very hot days (days with a maximum temperature of 33°C or above) is expected to continue to increase. On the other hand, the annual number of cold days (days with a minimum temperature of 12°C or below) is expected to decrease further.	Hong Kong Observatory (Leung *et al.*, 2007)
Sea level	During the period 1954 to 2009, the mean sea-level in the Victoria Harbour has risen about 14 cm (or an average rate of about 2.6 mm per year).	Hong Kong Observatory (Lee *et al.*, 2010)
***Indirect* Impacts**		
Energy supply and prices	For 1ºC increase in temperature, the electricity consumption by Hong Kong households would increase by about 9%, and the economic costs caused by using more electricity would amount to HK$1.7 billion. The estimated economic costs were HK$3.3 billion and HK$5.5 billion for a 2 and 3ºC temperature rise respectively.	Environmental Protection Department (Fung, 2004)
Flooding	With an anticipated further rise in the sea-level during the 21st century, the frequency and scale of sea flooding caused by storm surges would very likely increase.	Hong Kong Observatory (Lee *et al.*, 2010a)
Water supply	Both the rainfall variability and water demand are expected to increase in the 21st century.	Hong Kong Observatory (Lam, 2007) Hong Kong Observatory (Lee *et al.*, 2010b)
Heat-related mortality	Mortality is related to hot weather in Hong Kong. "Excess" deaths associated with hot weather in Hong Kong are found to occur when the daily maximum Net Effective Temperature (NET) exceeds 26, and the mortality increases sharply thereafter as NET increases. And the elderly are more vulnerable than other age groups in hot weather.	Environmental Protection Department (Yip *et al.*, 2007)
More infectious diseases	Temperature rise will increase the transmission of dengue fever and malaria in Hong Kong.	Environmental Protection Department (Fung, 2004)
	Higher temperature and relative humidity are associated with a higher activity of influenza A in Hong Kong.	Faculty of Medicine, The Chinese University of Hong Kong and Hong Kong Observatory (Chan *et al.*, 2009)
Damage of building and infrastructure	Changes in sea level, temperatures and precipitation will have impacts on ecology, human health, transport infrastructure and utilities in Hong Kong.	Civic Exchange (Tracy *et al.*, 2006)
	The total economic cost of a heavy rainstorm on 7th June in 2008 is HK$578 million. The heavy rainstorm broke the record of Hong Kong's heaviest rainfall. It is reported that the rainstorm caused 162 landslides, 622 flood reports, two deaths and widespread disruption to businesses.	Greenpeace China (Greenpeace China, 2009)

1.4. The Reasons for Concern about Climate Change in Hong Kong

The reasons for Hong Kong policy-makers to be concerned about climate change are many.

Reason 1: Hong Kong's dependence on imports of food and resources leave it particularly exposed to climate change impacts

It is evident that Hong Kong has been and will be affected by climate change, and the impacts are costly (*Section 1.3*). The impacts are an issue of concern for policymakers because there are several local characteristics that make Hong Kong particularly vulnerable to climate change impacts. Hong Kong is highly dependent on the Mainland and other countries - especially neighbouring countries - for water, energy and food supplies (Warren-Rhodes and Koenig, 2001). About 70 percent of Hong Kong's water supply, for example, comes from Dongjiang water in the Mainland (LegCo, 2010). Climate change impacts in other countries will also affect Hong Kong indirectly.

Furthermore, as a coastal city, Hong Kong is vulnerable to climate change impacts such as flooding (Tracy *et al.*, 2006). The high density of urban development and large demand for energy, transport and communication services to support our economy also make Hong Kong particularly vulnerable (Environment Bureau, 2010).

Reason 2: Uneven distribution of impacts may worsen social instability

Impacts of climate change will vary across Hong Kong society. This is because the vulnerability of an individual would be a function of various factors including his or her character, exposure and adaptive capacity (IPCC, 2001; McEvoy *et al.*, 2006). It is also because vulnerability to climate change can be magnified by the presence of other stresses (IPCC, 2007).

The elderly, people with chronic diseases, people who work outdoors or with high work intensity are particularly vulnerable to heat stroke (Kjellstrom *et al.*, 2009; Yip *et al.*, 2007). The uneven distribution of climate change impacts across the Hong Kong population is particularly an issue of social concern as income disparities in Hong Kong have attracted growing public attention (Kwok, Undated).

Reason 3: Hong Kong: a global city and our global responsibility

Hong Kong emitted about 42 million tonnes of CO_2 in 2008, which account for about 0.1 percent of global carbon dioxide emissions (Environment Bureau, 2010b). However, Hong Kong's carbon footprint becomes even more considerable when the environmental impacts of our imports are taken into account. A study has found that Hong Kong has the second highest carbon footprint per capita in 2001 among 73 economies – a carbon footprint that was larger than those of major economies including the United States, and second only to Luxembourg (Hertwich and Peters, 2009). The study also found that Hong Kong's high carbon footrprint was partly due to the city's large volume of imports, with only 17 percent of emissions from domestic activities (Hertwich and Peters, 2009).

As a global citizen, Hong Kong should honour its pledge to cooperate with the international community to combat climate change. Hong Kong is a wealthy and prosperous city, with GDP per capita ranked 25th in the world in 2008 (World Bank, 2010). In light of our relative affluence, Hong Kong is in a good position to play a more significant role in the global community to combat climate change.

2. Findings of Oxfam 2010 Survey: Hong Kong Public's Attitudes towards Climate Change Impacts

In June 2010, Oxfam Hong Kong carried out a survey of the Hong Kong public's attitude to climate change. This survey contributes to a better understanding of the knowledge, perceptions and behavior of Hong Kong people on climate change impacts. This section reports the major findings from the Oxfam survey.

While there are some surveys on public attitudes to climate change in Hong Kong (for example POP, 2008; WPO, 2008), these tend to focus on general perception only. The Oxfam survey fills the gaps. It was structured around a set of questions addressing four objectives:

- To know whether Hong Kong people see climate change impacts on vulnerable groups as a serious problem;
- To know how Hong Kong people assess the Hong Kong policymakers' performance on climate change measures; whether Hong Kong people believe that it is possible for the Hong Kong government to take action to tackle climate change in Hong Kong; what kind of policies will be welcomed;
- To know whether Hong Kong people are willing to take personal action/ take up their own responsibility. Are they taking personal actions to reduce climate change? Are they willing to pay?; and,
- To know whether Hong Kong people see helping to mitigate climate change impacts in neighbouring countries as Hong Kong's responsibility.

The general picture that emerges from the survey is that Hong Kong people see climate change as a serious problem. Most Hong Kong people are aware of the social impacts of global climate change in Hong Kong; and it is a problem that they feel requires more policy initiatives.

Methodology:

This survey was commissioned by Oxfam Hong Kong and carried out by the Kadoorie Institute (KI) and the Public Opinion Programme (POP) at the University of Hong Kong. KI was responsible for the questionnaire design and policy analysis. The survey was carried out by POP which was also responsible for data analysis. A survey of 512 respondents was conducted between 21 and 22 June 2010 by POP. Target respondents of the survey were the Cantonese-speaking population of Hong Kong of age 16 or above. The overall response rate of the survey was 66.4 percent. A detailed survey report prepared by POP is included in *Appendix 1*.

Key survey findings:

(1) Hong Kong public's understanding of climate change impacts

The survey finds that there is a **consensus among Hong Kong people that climate change has already posed a serious problem, and Hong Kong has been affected by climate change**. 92% of the respondents see climate change as already posing a threat to humans, of which some 60% **strongly agree** that climate change poses a threat.

The survey also asked the respondents their opinion on the causes of global climate change. Most respondents (about 85%) believe that climate change is mainly caused by human activities such as burning coal for electricity rather than by natural processes.

(2) Hong Kong public's perceptions on climate change impacts

Public awareness on climate change impacts in Hong Kong is **very high**. About 96 % of respondents consider Hong Kong has already been affected by climate change.

It is interesting to find out that most Hong Kong people are able to **recognise the social impacts**, not only the economic and environmental dimensions, of climate change. The survey asked the respondents whether they agree that climate change will cause certain changes which include "hotter summers and shorter winters", "higher health risks and mortality due to extreme weather such as heatwaves", "more frequent typhoons and flooding", "energy price fluctuation", "shortage of water supply" and "shortage of food supply". Most respondents think that climate change may cause such changes (ranging from about 76 percent to 89 percent for each of the mentioned changes).

It is however important to note that public awareness about the **indirect** impacts of climate change is high, but less marked when compared with that of the direct impacts. The number of respondents who agree that climate change would cause changes that are indirect in nature, such as "energy price fluctuation" (77%) and "shortage of water supply" (76%) were lower. A considerable number of respondents did not associate climate change with those *indirect* impacts. Approximately 10 percent and 13 percent of the respondents did not agree that climate change might cause "energy price fluctuation" and "shortage of water supply" respectively.

The survey asked the respondents **who is considered more vulnerable** than others by climate change impacts. Most respondents agree that "elderly people" (90%), "people who work outdoor (94%)", "people with long-term illness (92%)" and "people living in cubicle apartments or 'cage home' (87%)' are or will be affected more than others by climate change impacts.

This survey also asked the respondents about their **perceived reasons for the social impacts** of climate change in Hong Kong. Most respondents agree that "poor living conditions such as living in cubicle apartments (83%)" and "people do not have the knowledge about climate change (71%)" are the major reasons why some socio-economic groups are more vulnerable to climate change impacts. Moderate numbers of respondents agree that "people do not have adequate community support (63%)" and "the inadequacy of weather forecasts and public health systems (52%)" as the major reasons.

However, considerable numbers of respondents disagree that "the inadequacy of weather forecast and public health systems (32%)", "people do not have adequate community support (23%)" and "people do not have the knowledge about climate change (20%)" are the major reasons why some social groups in Hong Kong cannot cope with climate change impacts.

(3) Hong Kong public's opinion on Hong Kong government's initiatives on climate change

There appears to be a disappointment about the Hong Kong government's initiatives in addressing climate change problems. Respondents, however, appear to be optimistic that the Hong Kong government can mitigate climate impacts through policy initiatives. There are strong indications that more radical policy measures, including setting greenhouse gas emission reduction targets and legislation to protect outdoor workers, would be welcomed by Hong Kong people.

A majority of the respondents (64%) disagree that the Hong Kong government "has a clear strategy to deal with climate change impacts". This number includes 27 percent who "strongly disagree" that the Hong Kong government has a clear climate change strategy.

Respondents are of the view that the Hong Kong government can mitigate climate impacts through policy initiatives. “Setting greenhouse gas emission reduction targets (89%)”, “legislation to protect outdoor workers who work under extreme weather conditions” (82%) and “strengthening the public health system and social protection to deal with potential threats of climate change (77%)” are the three policy measures that are most welcomed by the respondents.

A somewhat smaller proportion of respondents (57%) agree that the government can “provide more support to local agricultural industries for the stability of food supply and prices” to mitigate climate change impacts.

(4) Hong Kong public’s perception in relation to public engagement

There is a **substantial gap between a high level of awareness and a low level of interest** in participation in relation to climate change among the survey respondents. As reported in earlier sections, as many as 96 percent of the respondents agree that climate change has already affected Hong Kong; but they do not appear to be interested in playing a more active role in Hong Kong climate change policies. About 64 percent of them were not interested in being involved in the formulation of climate change policies. Moreover, although the Hong Kong government has recently commissioned a consultancy study on climate change policies for Hong Kong, which is a major climate change initiative, 81 percent of the respondents are not aware of the study.

(5) Hong Kong public’s behavior and willingness to pay to combat climate change

Hong Kong people generally are willing to take personal action and pay more for goods and/or services if these will help combat climate change. Most respondents say they have **taken personal action** to help combat climate change. “Choose an environmentally friendly way of transportation” (68%), “conserve water” (64%) and “energy saving” (62%) are the most common practices that the respondents said they did a lot.

There are strong indications of the respondents’ willingness to pay more for goods and/or services if these will help combat climate change problems. Most respondents (80%), as individuals, were **willing to pay more** to combat climate change problems. This number included 47% who were willing to pay between HK$50 and $100 each month to tackle climate change. A considerable number of respondents (13%) were willing to pay HK$200 or above to combat climate change.

(6) Hong Kong public’s perception on Hong Kong’s responsibility to offer support to developing countries to mitigate their climate change impacts

There is recognition among our respondents that Hong Kong shares responsibility for climate change impacts in developing countries. A considerable number of respondents (64%) agree that GHG emissions in Hong Kong indirectly have a negative impact on the livelihood of poorer people in developing countries - that is up 7 points from an Oxfam survey carried out two years ago (POP, 2008). More than half of the respondents (58%) thought the Hong Kong government should provide financial assistance to support developing countries tackle climate change.

3. Challenges for policymakers in Hong Kong

3.1. What has been done?

The Hong Kong government has implemented many policy initiatives which have the potential to reduce GHG emissions. A comprehensive review of these initiatives can be found elsewhere (for example EPD, 2008). Domestically, Hong Kong has also introduced measures that cover areas from energy efficiency to renewable energy, from landfill gas utilisation to greening, from public awareness promotion to education (EPD, 2008). A major initiative is the recent release of the consultation paper of Hong Kong's first climate change strategy in September 2010 (Environment Bureau, 2010b). A key element of the strategy is a proposed GHG emission reduction target to reduce carbon intensity by 50-60 % below the 2005 level by 2020.

Internationally, Hong Kong has been cooperating with other cities and countries in addressing global climate change impacts through, for example, the Kyoto Protocol and the C40 Large Cities Climate Leadership Group (C40) (EPD, 2008).

The responsibility to address climate change issues in the Hong Kong government resides mainly with the Environmental Bureau. An Inter-departmental Working Group on Climate Change under the lead of Environmental Protection Department has been set up (EPD, 2008).

3.2. Major weaknesses in Hong Kong government's approach to addressing the climate change issues

Hong Kong however **has not developed an effective approach** to climate change mitigation and adaptation.

The Hong Kong government has been slow in responding to climate change challenges. It is only in the recent consultation paper that the government has for the first time proposed a target for GHG emission reductions (Environment Bureau, 2010). Although the Hong Kong government has committed to the APEC's energy intensity target (to reduce energy intensity by 25% by 2030 from the 2005 level) earlier in 2007 (Ng *et al.*, 2010), this APEC target is more appropriate for developing economies but not for service-based, developed economies such as Hong Kong (Ng *et al.*, 2010).

Although some initiatives have achieved emission reduction in Hong Kong, these have been limited. Hong Kong's GHG emissions increased from 39.2 millions tonnes in 1990 to 42 million tonnes in 2008 (Environment Bureau, 2010b; EPD, 2010). The city's energy consumption increased by an average 1.3 percent annually between 1995 and 2005 (Yau, 2008).

There is currently little prospect that the government can act on the scale required and at the pace needed. The Energy Efficiency Registration Scheme for Buildings, a voluntary energy efficiency program initiated by the Electrical and Mechanical Services Department, is a good example showing how limited such achievements are. In more than 10 years between 1998 and 2010, only 1145 building venues involving 2808 installations were issued registration certificates (EMSD, 2010).

Another example is road congestion charges. While a charging system has been discussed in Hong Kong for years, congestion charges have been introduced in a number of cities including London, Stockholm, Singapore and Milan and Seoul (Kamal-Chaoui and Robert, 2009; Jollands 2008).

Moreover, the problem of poor coordination across government departments can be illustrated by the introduction of government electricity bill subsidies in 2008 as an example (*Box 4)*. The government was criticised for considering those subsidies in isolation,

overlooking the problem that the subsidies in effect would make power tariffs cheaper, and thus encourage electricity consumption rather than energy saving.

The general public also appears to be disappointed by the overall performance of the government on climate change, with about 64% of our survey respondents disagreeing that the government has a clear strategy to deal with climate change impacts (*Section 2, (3)*).

Box 4: Government Electricity Subsidies Blamed for Encouraging Electricity Consumption rather than Promoting Energy Efficiency

As an initiative to ease inflationary pressures, the Hong Kong Government offered a HK$3,600 electricity subsidy in the 3rd quarter in 2008 to each domestic electricity user account.

In the three months from September to November 2008, electricity consumption by domestic households in Hong Kong recorded an 18% increase over the same period in 2007. The electricity consumption increase meant an increase of GHG emissions of 450,000 tones.

Although the Hong Kong government has pointed out that electricity consumption may be affected by other factors such as warm weather, local green groups have criticised the electricity subsidy program for creating incentives for consuming more electricity.

(Source: Cheung, 2009)

The ineffectiveness of government initiatives to reduce GHG emissions appears to reflect a number of weaknesses in the existing approach. These major weaknesses are an absence of leadership, institutional weaknesses and a failure to involve civil society and business effectively.

Lack of leadership

The absence of leadership in the Hong Kong government appears to be a major impediment limiting the government's ability to develop a holistic and ambitious approach to tackling climate change impacts.

Cities in other developed countries appear to have taken approaches that are much more ambitious. Many cities such as Los Angeles, New York, Los Angeles, San Francisco, Tokyo and Melbourne have declared their commitment to **leading the nation** in fighting global warming. They have set ambitious GHG emission reduction targets and action plans ahead of national initiatives (City of Los Angeles, 2007; Lawson *et al.*, 2010) (*Box 5*).

Box 5: A Comparison of Political Commitments in Setting GHG Emissions Reduction Targets between Hong Kong and Other Global Cities

Hong Kong

In September 2010, the Hong Kong government for the first time proposed a target on reducing GHG emissions. The proposed target is to reduce carbon intensity by 50-60 % below the 2005 level by 2020. This proposed target means a reduction of GHG emissions from 42 million tonnes in 2008 to between 28-34 million tonnes in 2020, representing a 19-33% reduction compared to 2005 level (Environment Bureau, 2010b).

This target however is less ambitious than that required of developed economies by the United Nations.

Other Global Cities

Globally, cities in developed countries have set ambitious GHG emission reduction targets:

Cities	GHG Emission Reduction Targets	Reference Year
Los Angeles	35% by 2030	1990
New York	30% by 2030	2005
London	60% by 2025	1990
Tokyo	25% by 2010	2000
Sydney	50% by 2030 and 70% by 2050	1990

(Data source: "City Based Climate Change Action Plans", Global Carbon Project, http://www.gcp-urcm.org/Resources/CityActionPlans, accessed on July 10, 2010)

Institutional weaknesses

The scale and nature of climate impacts will require action at all levels of government and policy coordination across government agencies. However, institutional inertia appears to be a key impediment in the policy area of climate change. There is a lack of high-level direction in combating global climate change in Hong Kong. Policy initiatives on mitigating climate change impacts have been poorly coordinated, and on some occasions have even worked against each other.

The organisational structure in the Hong Kong government in dealing with climate change lacks high-level leadership. The Inter-departmental Working Group on Climate Change under the lead of the Environment Bureau has 21 members, comprising 5 bureaux and 16 departments. It is tasked to co-ordinate and promote actions to address climate change (EPD, 2008). However, the Environment Bureau which currently leads the working group lacks the institutional capacity to steer policy coordination across departments. The electricity bill subsidies introduced in 2008 discussed in the preceding section (*Box 4*) is a good example to illustrate the challenge of policy coordination under the current institutional structure.

Box 6: Memberships of Inter-departmental Working Group on Climate Change

- Environment Bureau (Energy and Sustainable Branch)
- Development Bureau (Works Branch)
- Transport and Housing Bureau (Transport Branch)
- Food and Health Bureau
- Education Bureau
- Economic Analysis and Business Facilitation Unit of the Financial Secretary's Office Environment Department
- Hong Kong Observatory
- Electrical and Mechanical Service Department
- Housing Department
- Planning Department
- Agriculture, Fisheries and Nature Conservation Department
- Architectural Services Department
- Buildings Department
- Civil Engineering and Development Department
- Drainage Services Department
- Food and Environmental Hygiene Department
- Department of Health
- Home Affairs Department
- Leisure and Cultural Services Department
- Transport Department
- Water Supplies Department

Ineffective public engagement

The Hong Kong government currently has not developed an effective approach to engage the public to address climate change issues. Although the public awareness on climate change impacts is generally high in Hong Kong (96% agree that climate change has already affected Hong Kong), our survey finds that the public are not interested in contributing to the formulation of climate change policies for Hong Kong (65% are not interested in taking part in formulating climate change policies) (*Section 2, (3)*).

The substantial gap between a high level of awareness and a low level of interest in participation among Hong Kong people may be due to an absence of effective channels to allow the public to demand government action or offer their ideas on climate change mitigation and adaptation. The Hong Kong government's recent study on climate change policies has revealed that the government has failed to effectively engage the public. This commissioned study is the most significant government initiative on climate change in recent years. The consultants are required to conduct stakeholder engagement exercises on both climate change adaptation and mitigation (Environment Bureau, 2010a). However, about 80 percent of our survey respondents do not know that the government has commissioned a consultancy study on climate change policies for Hong Kong.

Worldwide, public participation is an important process for effective policy-making for climate change (see for example Dawson, 2007). Opportunities are there for the Hong Kong government to formulate more effective strategies to engage the public.

4. Policy Recommendations

This section presents our policy recommendations in areas where the Hong Kong government can formulate more effective measures to cope with climate change impacts. Our recommendations address both the overall climate change strategy and the mitigation and adaptation strategies for the social impacts of climate change.

This set of policy recommendations is based on our framework (*Figure 1*), survey findings (reported in *Section 2*) and a review of international good practices (summarised in *Table* 2). Those good practices are numbered and are referred to accordingly in this section. The review provides insights into what kind of systems is more likely to work.

It is important to note that some city governments appear to be much more proactive than the Hong Kong government in responding to climate change challenges. These proactive governments have acted very differently from Hong Kong policymakers in at least three important ways. First, quite a number of city governments appear to recognise that **local governments can lead the nation** in fighting global climate change. Second, many of them **recognise the important role that the wider society** can play in complementing the government efforts in responding to climate change. Those cities therefore have put a lot of effort into local capacity-building. Third, those governments also appear to be much more **competent in using a combination of policy instruments** to achieve their climate change policy objectives, reflecting a strong emphasis on using more economic and information-based approaches to supplement traditional command-and-control type of instruments, and voluntary measures.

Our policy recommendations are centered on four themes on the basis of our framework (*Figure 1*): institutions and stakeholder engagement, health and occupational safety, education and capacity building, and resources and built environment. Our specific recommendations are:

4.1. A Holistic Approach that Mainstreams Social Impacts of Climate Change

The government should emphasise the **social** aspects of climate change in a holistic, long-term climate change policy framework. Such a holistic policy approach should take into account the direct and indirect as well as social, environmental and economic impacts of climate change. Such an approach to climate change is needed to better assess the risks and impacts, set policy objectives and targets, prioritise strategies, and devise effective climate change measures.

Strategic priority 1: mainstreaming social impacts into Hong Kong's climate change policy

This policy framework should place social impacts at the core of climate change policy, and mainstream climate change into major policy areas from energy to public health and social welfare. Such a policy framework should also include both adaptation and mitigation measures. It will be important to emphasise both the **benefits of climate change measures** such as better public health, a more stable society, new green job opportunities; as well as the costs of not taking adequate actions to deal with climate change;

Strategic priority 2: strengthening leadership

The Hong Kong government should strengthen its leadership in combating climate change and should pay attention to the following:

- Hong Kong has been a **passive follower** of the Chinese government in combating climate change. Hong Kong should be able to take a more **proactive leadership** role for the country. Cities such as New York have demonstrated leadership in fighting climate change (*Good Practice 1*);

- Such a framework should include a GHG emission reduction **target**. An ambitious target is needed to signal the government's leadership and a direction to mobilise resources to meet the target. The ambitious targets that have already been set by many other cities (*Box 5*) should provide good reference points for Hong Kong policymakers;
- The Hong Kong government should strengthen its **competencies in deploying a portfolio of reinforcing policy instruments** in order to enhance capacity in achieving ambitious climate targets. Hong Kong tends to rely on moderate and voluntary measures in reducing GHG emissions. But in contrast, cities such as London and New York have demonstrated their competencies in using more radical policy instruments such as economic instruments like congestion fees to complement voluntary measures and direct government intervention (*Good Practices No. 2-6)*. Improvements in built environment and resource conservation can help mitigate climate change impacts and adaptation. The integration of risk assessments of climate change and land-use planning is critical (*Good Practice 18*);

Strategic priority 3: enhancing institutional capacity

Institutions such as task forces and institutions that facilitate scientific inputs in decision-making are found to be particularly critical in other cities' experiences. The New York City Panel on Climate Change is a good example (*Good Practices No. 7*). Regionally, experiences such as the Covenant of Mayors in the European Union and some transnational municipal networks in Australia (*Good Practices No. 8 and 9*) provide good examples of the way regional institutional structures can create political commitments and incentives to cities to lead the national governments in fighting climate change. There are opportunities for Hong Kong and the larger Pearl River Delta Region to establish such **regional institutions**. A key element of such regional institutions should be a new incentive structure that encourages cities to go beyond the Chinese central government's targets and commitments.

4.2. Health and Occupational Safety

Climate change impacts such as increased flooding and heatwaves are expected to place greater demands on Hong Kong's emergency systems, and on the government's responses to emergencies. However the present system concerning emergency preparedness in Hong Kong is already inadequate. The Very Hot Weather Warning system established by the Hong Kong Observatory and the provision of temporary shelters by the Home Affairs Department do not take into account climate change explicitly and lack the holistic approach needed.

Hong Kong requires systems that promote more responsive government and early actions by government departments, health authorities and relevant organisations to reduce the impact of those problems on Hong Kong people, especially those vulnerable groups such as the elderly people and those who work in heat-stress conditions.

Strategic priority 1: establishing heat alert system and heatwave emergency plan

The government should establish a comprehensive system that can prepare for and protect Hong Kong people from the negative impacts of climate change including heatwaves, flooding, and changing patterns of infectious diseases. A key function of such systems should be to identify the vulnerable groups and assess the impacts to prioritise preparedness efforts. The Heatwave Plan for England can provide good reference points for Hong Kong policymakers (*Box 7*).

Box 7: The Heatwave Plan for England (*Good Practice No. 10*)

A heatwave plan has been set up in England. A Heat-Health Watch system, as a core element of the plan, operates in England from June to September each year. During this period, the Met Office may forecast heatwaves. The Heat-Heath Watch system comprises four levels to trigger different levels of response from the Department of Health and other bodies.

Level 1: Awareness
The Department of Health disseminates advice to the public and health care professionals. Primary Care Trusts and borough Social Services identify who is at risk and review staffing levels in case of high demand.

Level 2: Alert
The Met Office alerts the Department of Health and other organisations that it forecasts that heat thresholds are to be exceeded for three days ahead. Warnings are broadcast to the public via television and radio weather reports. More specific information is released to health and social care professionals and additional information is targeted at those at risk.

Level 3: Heatwave
The Met Office confirms that threshold temperatures have been attained and provides a forecast on how long they will last. Health advice is issued through targeted media channels. Additional support for the highly vulnerable is commissioned through the Primary Care Trusts and borough Social Services. Primary Care Trusts and NHS Trusts will ensure that hospital services are prepared for any rise in admissions.

Level 4: Emergency
This is reached when a heatwave is so severe and/or prolonged that its effects extend outside health and social care, such as power or water shortages, and/or where the integrity of health and social care systems is threatened. At this level, illness and death may occur among the fit and healthy, and not just in high-risk groups and will require a multi-sector response at national and regional levels.

(Source: Dept of Health, 2010; Mayor of London, 2010)

Strategic priority 2: Information as a policy tool

Emergency preparedness plans or systems are a critical tool for risk management. Information such as potential risks and impacts of climate change for example can become useful risk communication and information tools. Information about ways to improve preparedness is also important for local communities to better prepare for the impacts.

Philadelphia's Heatwave Preparedness Plan is a good example demonstrating how emergency preparedness plans can save lives from climate change impacts through better information dissemination.

Box 8: Philadelphia's Heatwave Preparedness Plan
(*Good Practice No. 11*)

The US city of Philadelphia estimated that it saved 117 people during heatwaves from 1995 to 1998 through a Hot Weather Health Watch Warning System, which comprises a number of integral elements including:

- Using mass media to encourage friends and neighbors to visit elderly people daily
- Activating a telephone hotline to provide information and counseling
- Organising visits by health authorities to people requiring attention
- Informing care homes of a high-risk heat situation
- Increasing fire department and hospital emergency staffing
- Implementing daytime outreach services to homeless people

(Sources: IFRC, 2004; Livingstone, 2006)

4.3. Stakeholder Engagement, Local Capacity Building and Education

The Hong Kong government should recognise that effective climate change initiatives should be a joint effort among government, civil society and business. Opportunities exist for the Hong Kong government to partner with society in various ways. The government should recognise that effective decision-making relies upon continuous dialogue between stakeholders, especially in vulnerable communities. Experiences in other cities have also shown that local communities can develop successful partnerships with the government and business to cope with climate change impacts. The NYC° Cool Roofs programmed in New York is a good example showing how government-business-community collaboration can work (*Good Practice 12*)**.**

Strategic priority 1: empowering

The government should take up a more facilitating role in engaging the wider society. The London Climate Change Partnership (*Good Practice 13*) is a good example to show how a government took the initiative to establish a platform for scientists, government, environmentalists, developers, people from the public health sector and other stakeholders to collaborate and develop London's climate strategy.

Local capacity can be built up through **funding, free services and training**. Sources of funding have been critical to enhance local capacity to address climate change impacts. Provision of a "climate change adaptation fund" (Bulkeley *et al.*, 2009) and the Green Municipal Fund provided by the Government of Canada (*Good Practice No. 14*) are good examples.

Another practical way to promote public participation is the use of virtual reality tools. A virtual reality "decision-theatre" was pioneered in Phoenix in the USA to support stakeholder engagement and evidence-based decision-making (*Good Practice 15*).

Strategic priority 2: partner with NGOs to educate

The Hong Kong government, particularly the Environmental Protection Department and Hong Kong Observatory have made some important contributions to educating the public about climate change impacts. There are opportunities for the government to strengthen collaboration with NGOs to inform and educate the wider community about better ways to adapt to climate change impacts.

A major difficulty for climate change education is that people have not encountered any climate change impacts phenomena which they can connect with their personal experiences. Oxfam's educational program of 'Hunger Banquet' events is one example how NGOs can play an important role in raising public awareness through re-establishing the connections between individuals and issues which have indirect impacts on them.

4.4. Explore the setting up of a climate fund to assist developing countries to adapt

China has committed to acting as a responsible global citizen in responding to the climate change challenges. President Hu Jintao announced at his speech at the 2009 United Nations Summit on Climate Change that China would make her best endeavours to offer support to other developing countries to adapt to climate change (Xinhua, 2009).

As one of the wealthiest cities in China, Hong Kong should explore ways to play a more proactive role in assisting developing countries to adapt to climate change. Hong Kong may explore the feasibility of setting up a "climate change adaptation fund".

Hong Kong at present provides grants for disaster relief outside Hong Kong through the Disaster Relief Fund (DRF). The DRF however responds to climate change-related disasters in a relatively reactive manner. A climate change adaptation fund, in contrast, could provide opportunities for Hong Kong to play a more proactive role through assisting the developing countries to build up their capacity to adapt to climate change impacts. The "India Endowment for Climate Change in South Asia", planned to be set up by the Indian government, should provide good reference points for Hong Kong policymakers (*Box 9*).

Box 9: India Endowment for Climate Change in South Asia

Indian prime minister Manmohan Singh announced at the 16th South Asian Association on Regional Cooperation (SAARC) in April 2010 that India would set up a fund to assist South Asian countries in meeting adaptation and capacity-building needs.

SAARC was established in 1985 by Bangladesh. Its members include Bhutan, India, Pakistan, Sri Lanka, Nepal, Maldives and Afghanistan. There are nine observers to the forum including China, the European Union and the United States.

(Source: Singh, 2010)

Table 2: Good Practices of Climate Change Initiatives in Cities

Initiatives	No.	Cities/ Countries	Illustration
Leadership	1.	New York	Good practice: leadership The Mayor's Office of New York City, under the high-level direction of Mayor Bloomberg, has formulated PlaNYC – a comprehensive programme in the area of climate change and sustainability for New York. The PlaNYC laid out a long-term vision and set clear objectives and goals (City of New York, 2010).
	2.	Seoul	Good practice: competence in using economic instruments Congestion fees. Result – between 10%-20% of CO_2 emissions savings (Jollands, 2008).
	3.	Oslo, Norway; Vaxjo, Sweden	Good practice: government procurement LEDs for traffic signals and public lighting. Achievement: between 50%-70% of street lighting CO_2 emissions (Jollands, 2008).
	4.	Tokyo	Good practice: competence in using regulation and reinforcing policies A city mandate/ordinance requiring that all households meet certain building standards when they are sold, transferred or renovated. This ordinance with various specific measures has reduced residential energy consumption by over 13 %, annually reduced CO_2 emissions by over 5,000 tons and allowed households to save up to US$ 450 on their energy bills. http://www.c40cities.org/bestpractices/buildings/berkeley_standards.jsp
	5.	Tokyo	Good practice: regulation for greening rooftops Under the Nature Conservation Ordinance, the Tokyo Metropolitan Government has required greening rooftops and wall surfaces for new grounds and buildings that have a ground surface of over 1,000 sq m scheduled for construction since April 2001. As a result, 54.5 hectares of rooftops were greened as at 1 January 2005 (Wong, 2006).
	6.	New York	Good practice: regulation New York City has updated its building code to require cool roofs, that is, rooftops with a reflective white coating, for all new construction and re-roofing (City of New York, 2010).
	7.	New York	Good practice: task force established to strengthen policy implementation **New York City Panel on Climate Change** (NPCC) The NPCC was convened by Mayor Michael Bloomberg and was launched in 2008. The NPCC is a panel of experts in climate science, social sciences, economics, risk management and law. It is to advise on issues related to climate change and adaptation, and is funded through a grant from the Rockefeller Foundation. The NPCC has prepared a set of climate change projections for New York City, and has examined how climate change has the potential to affect the city. It has suggested approaches to create an effective adaptation program (City of New York, 2010).
	8.	Cities in EU's member states	Good practice: cities to lead the national governments The **Covenant of Mayors** (European Union) is to promote cities to go beyond the EU's objectives in CO_2 emission reductions. It is a voluntary programme to promote leadership in cities. In the *Covenant of Mayors'* (CoM) own words, the initiative is "a commitment by signatory towns and cities to go beyond the objectives of EU energy policy in terms of reduction in CO_2 emissions through enhanced energy efficiency and cleaner energy production and use". The main idea behind the CoM was originally to reach out to cities to improve energy efficiency on a local level. It was extended to overall CO_2 emissions reductions policies. Expected impacts include "creating stable local jobs" as well as "increasing citizens' quality of life" and "addressing crucial social issues". http://www.eumayors.eu http://www.indiaenvironmentportal.org.in/files/mlg_final_web.pdf
	9.	Australia	Good practice: trans-municipal institutional arrangements for better leadership Transnational municipal networks such as ICLEI CCP or the Climate Alliance have provided opportunities for municipalities to lead – for example, to be the first to complete a particular performance measure, or to develop particular projects – and have also developed means of recognising and rewarding leadership – including the Climate Alliance Climate Star award and CCP Australia's 'outstanding council initiative' award (Bulkeley *et al.*, 2009).

Health & Occupational Safety	10.	England	Good practice: emergency preparedness plan **The Heatwave Plan for England** In England, there is a detailed heatwave plan prepared by the National Health Service to protect health and reduce harm from heatwaves. The plan consists of 4 levels of heatwave warning; and responsibilities of different departments and social services at different levels are clearly described. This helps society prepare for extreme weather and respond quickly to heatwaves in order to reduce excess death rates (Dept of Health, 2010).
	11.	Philadelphia	Good practice: emergency preparedness plan **Philadelphia's Heatwave Preparedness Plan** The US city of Philadelphia estimated that it saved 117 people during heatwaves from 1995 to 1998 through a Hot Weather Health Watch Warning System, which comprises a number of integral elements including: using mass media to encourage friends and neighbors to visit elderly people daily; activating a telephone hotline to provide information and counseling, organising visits by health authorities to people requiring attention; informing care homes of a high-risk heat situation; increasing fire department and hospital emergency staffing; implementing daytime outreach services to homeless people (Sources: IFRC, 2004; Livingstone, 2006).
Stakeholder Engagement, Capacity Building & Education	12.	New York	Good practice: government-business-society collaboration **NYC°Cool Roofs programme** In 2009, Mayor Michael Bloomberg and former Vice President Al Gore launched **NYC°Cool Roofs programme.** This initiative mobilises volunteers to coat New York City's existing roofs which are typically dark in color with reflective white coatings. Nearly 250 volunteers came together in 2009 to coat 100,000 square feet of roofs in Long Island city. Participating buildings include businesses and government departments (City of New York, 2010).
	13.	London	Good practice: partnership to facilitate science-based decision-making **London Climate Change Partnership** is a platform that allows stakeholders to work together in preparing London for climate change impacts. Being coordinated by the Greater London Authority, it comprises over 30 organisation, with representation from climate scientists, government, environment, developers, finance and health sectors. With the aim of helping London understand and prepare for climate change impacts, this group assists in the development of London's climate change adaptation strategy and other policies as appropriate, including by responding to key consultations undertaken by the government. It also helps stakeholders in London to be aware of climate change impacts and help them develop appropriate adaptation measures. Website: London Climate Change Partnership: http://www.london.gov.uk/lccp/
	14.	Canada	Good practice: green municipal fund The *Federation of Canadian Municipalities'* (FCM) *Green Municipal Fund* (GMF) is a long-term, sustainable source of grants and below-market loans for municipal governments and their partners. The Government of Canada endowed FCM with CAD 550 million to establish GMF to support municipal initiatives across Canada that benefits the environment, local economies and quality of life. The fund offers grants and below-market loans. http://www.indiaenvironmentportal.org.in/files/mlg_final_web.pdf
	15.	Phoenix, USA	Good practice: empowerment through visual techniques A virtual reality "decision-theatre" was pioneered in Phoenix in the USA to support stakeholder engagement and evidence-based decision-making (Dawson, 2007).
	16.	Espaces Info Energie, France	Good practice: capacity-building through provision of free technical advice and information dissemination The *Espaces Info Energie* offer independent and free energy efficiency advice to individuals and small companies, according to priorities set in annual Action Programmes by the national, regional and departmental governments. The programme is on a voluntary basis. It promotes information dissemination on energy efficiency. http://www.ademe.fr; http://www.indiaenvironmentportal.org.in/files/mlg_final_web.pdf
	17.	Austin, USA	Good practice: education support by policies Austin uses a combination of rebates, education and regulation to reduce water usage. http://www.c40cities.org/bestpractices/water/austin_conservation.jsp
Built Environment & Resource Conservation	18.	South Korea	Good practice: integration of urban planning and climate change risk assessment The Korean government collaborated with other Asian countries to conduct flood hazard mappings of their respective river basins, which has strengthened the ability to map flood prone areas and integrate flood risks into land-use planning (Bulkeley *et al.,* 2009)

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Appendix 1

香港大學民意研究計劃

市民對氣候變化影響意見調查

調查報告

鍾庭耀、彭嘉麗、
李偉健及吳紫盈聯合撰寫

2010 年 7 月 26 日

本報告內所有資料的版權由樂施會及香港大學民意研究計劃聯合擁有。本調查由港大民研計劃獨立設計及執行，與香港大學立場無關。港大民研計劃所有研究工作由民研計劃總監鍾庭耀博士負責。

目錄

第一部分 研究背景

1.1 樂施會於 2010 年 4 月委託香港大學民意研究計劃進行《市民對氣候變化影響意見調查》，以探討及瞭解本港市民對氣候變化的影響及舒緩措施等的意見。訪問對象為年齡 18 歲或以上，並操粵語的香港居民。

1.2 本調查報告所述問卷由民研計劃諮詢樂施會後獨立設計，而調查的所有操作、數據收集及分析均由民研計劃負責，不受任何機構影響。換句話說，雖然問卷內容主要源自樂施會的構思，民研計劃在今次調查的設計及運作上絕對獨立自主，結果亦由民研計劃全面負責。

第二部分 調查設計

2.1 本調查以電話訪問形式進行，所有資料均由研究組的訪問員以電腦輔助電話訪問系統（簡稱 CATI）收集，系統能即時處理資料並作出合併。為確保資料的質量，訪問期間除有督導員現場監督外，研究組亦會進行電話錄音、畫面擷取及即時視象監察，以確保訪問員的表現及質素。

2.2 為使抽樣誤差減至最低，調查首先以隨機方法從研究組的住宅電話號碼資料庫中，抽取部分住宅電話號碼作「種籽」號碼，再用「加一減一；加二減二」的方法產生另一組號碼混合使用，以減低因忽略非登記住戶而出現的誤差。在過濾重覆號碼後，所有電話號碼再以隨機排列方式混合成為最後樣本。

2.3 調查的訪問對象為年齡 18 歲或以上，並操粵語的本港居民。訪問員在成功接觸目標住戶後，再從住戶內符合條件的成員中以出生日期抽取一人接受訪問。調查於 **2010 年 6 月 21 至 22 日**進行，透過電話成功訪問了 **512 名**符合資格的市民。整體回應比率為 **66.4%**(表二），標準誤差則少於 2.2%，亦即在 95%置信水平下，各個百分比的抽樣誤差為少於正負 4.4 個百分比。

2.4 為增加調查結果的代表性，所有原始數字已經按照政府統計處提供 2009 年終全港人口年齡及性別分佈初步統計數字，以「加權」方法作出調整。報告內的數據皆以「加權」樣本為準。

第三部分 調查結果

調查結果簡述如下，詳細數據請參閱頻數表（附錄二）。

3.1 對全球氣候變化的認識

3.1.1 是次調查結果顯示，八成半(85%)被訪者「同意」全球氣候變化是由人類活動，例如燒煤發電及汽車排放所造成，而不是自然現象。另有 6%表示「一般／一半半」，而持相反意見的亦只有 7%。至於氣候變化是否已經開始對人類構成威脅，超過九成(92%)表示「同意」此說法，而表示「一般／一半半」及「不同意」的則分別只有 3%和 5% (表三至四)。

3.1.2 當問到氣候變化有否對香港造成影響時，逾九成半(96%)被訪者都表示「有」，只有極少數給予否定答案(3%)或表示「不知道／難講」(1%，表五)。

3.1.3 就上題表示氣候變化「有」對香港造成影響的被訪者，訪問員再讀出六句句子，並逐一詢問他們是否同意。結果發現，全部句子均有超過七成被訪者表示認同。當中，各有 89%同意氣候變化會引致「夏天愈來愈熱，冬天愈來愈短」和「糧食供應短缺及不穩定」。同樣地，各有 87%同意氣候變化會引致「更頻繁的颱風和水浸」和「由極端天氣(例如熱浪)所引發的疾病及更高的死亡率」。與此同時，約四分三有關被訪者相信氣候變化會引致「能源價格波動」(77%)和「水源短缺」(76%)。相反，表示不同意上述句子的比率只有 4%至 13%不等，詳細數據請見表六至表七。

3.2 氣候變化對本港社群的影響

3.2.1 調查的第二部分續問認為香港「有」受氣候變化影響的被訪者，樣本基數為 491 人。首先，絕大多數有關被訪者同意四類本地社群較一般人容易受氣候變化影響，包括戶外工作者、長期病患者、長者、板間房／籠屋居民，比率分別為 94%、92%、90%和 87% (表八至表九)。

3.2.2 至於甚麼原因令該四類社群較容易受氣候變化影響呢？結果顯示，最多人認同「居住環境惡劣，如住板間房」是令這些社群較容易受氣候變化影響的原因，數字高達 83%。其次，分別有 71%和 63%認為是因為「對氣候變化缺乏認識」和「無足夠的社區支援」。另方面，認同「天氣預報及公共醫療應變系統不完善」乃導致本港社群較容易受氣候變化影響的則只有52%，而表示不同意此說法的亦是最多，達 32% (表十至表十一)。

3.2.3 當被問到是否同意香港政府已有清晰政策去應付氣候變化的影響時，約四分一人(23%)表示「同意」，不足一成(8%)表示「一般／一半半」，近三分二則持相反意見(64%，表十二)。

3.2.4 訪問員接著讀出四個建議，並逐一詢問有關被訪者是否同意政府可以透過實施這些方案去減緩氣候變化。結果發現，近九成（88%）同意「訂立減少溫室氣體排放目標」以減緩氣候變化的影響。其後是「立法保障工人於極端天氣下的職業安全」和「加強公共衞生防護機制及社會保障」，分別有82%和 77%表示認同。與此同時，只有 57%同意透過「加強對本土農業的支援，有助穩定糧食供應及價格」來減緩氣候變化的影響 (表十三至表十四)。

3.3 對減緩氣候變化的行動及制定氣候變化政策之參與

3.3.1 問卷最後一部分集中探討所有被訪者本身對減緩氣候變化的行動及對制定氣候變化政策之興趣。訪問員讀出五項個人行為，包括「選擇乘搭較環保的交通工具如地鐵」、「節約用水」、「節約能源」、「支持志願團體對抗氣候變化的行動」和「購買有機食物及綠色產品」，然後逐一詢問被訪者於過去一年進行上述行為的頻率。結果，較多人表示會「經常」「選擇乘搭較環保的交通工具如地鐵」、「節約用水」和「節約能源」，比率分別有 68%、64%和 62%。至於「購買有機食物及綠色產品」和「支持志願團體對抗氣候變化的行動」，則分別有 45%和 31%被訪者表示「偶爾」進行；然而，同時有高達三成被訪者「完全沒有」「支持志願團體對抗氣候變化的行動」，亦有兩成「完全沒有」「購買有機食物及綠色產品」(表十五)。

3.3.2 當被問到願意付出多少以協助減緩氣候變化時，19%被訪者表示每月願意付「港幣$10」，21%選擇「港幣$50」，26%「港幣$100」，13%則願意付「港

幣$200 或以上」。此外，各有約一成被訪者表示「不願意」(8%)和「不知道」(12%)。若以 410 位願意付出金錢的被訪者計算，每人每月平均願意付港幣$82 去減緩氣候變化(樣本誤差: +/-$6.2，表十六)。

3.3.3 調查亦發現，超過八成(81%)被訪者表示「不知道」香港政府正委託顧問公司進行氣候變化政策的研究，只有 19%表示「知道」。此外，整體樣本中只有四分一人(25%)表示有興趣透過氣候變化的政策諮詢過程，向政府表達意見，屬少數；7%表示興趣「一般／一半半」，而接近三分二人則明確表示「沒有興趣」參與(64%，表十七至表十八)。

3.3.4 最後，訪問員讀出三句關於氣候變化對發展中國家影響的說法，並詢問所有被訪者同意與否。數據顯示出，72%被訪者同意自己的「生活模式有份造成氣候變化」，64%同意「香港排放的溫室氣體間接令發展中國家的人民生活變差」，而同意「香港政府應提供財政援助，支持發展中國家減緩氣候變化的影響」的，則佔少於六成(58%；表十九至表二十)。

第四部分 結語

4.1 是次調查的結果明確反映出，絕大多數市民正視全球氣候變化對人類的影響，他們不但認同它是人為所致，更加同意它對人類已經構成威脅，香港當然不能倖免。

4.2 全球氣候變化的影響眾多，當中包括「夏天愈來愈熱，冬天愈來愈短」、「糧食供應短缺及不穩定」、「更頻繁的颱風和水浸」、「由極端天氣所引發的疾病及更高的死亡率」、「能源價格波動」及「水源短缺」，調查中的樣本認同上述各項說法的比率亦高達 76%至 89%不等。

4.3 與此同時，大多數被訪者同意四類本地社群，分別為戶外工作者、長期病患者、長者、板間房／籠屋居民，較一般人容易受氣候變化影響。主要原因是因為他們的「居住環境比較惡劣」，其次為他們「對氣候變化缺乏認識」及「缺乏足夠的社區支援」。

4.4 至於減緩措施方面，市民普遍同意政府可透過「訂立減少溫室氣體排放目標」以減緩氣候變化的影響，隨後的是「立法保障工人於極端天氣下的職業安全」和「加強公共衞生防護機制及社會保障」等。個人行為方面，超過六成被訪市民表示於過去一年經常「選擇乘搭較環保的交通工具如地鐵」、「節約用水」和「節約能源」，而較少人有「支持志願團體對抗氣候變化的行動」和「購買有機食物及綠色產品」。另方面，被訪者每人每月平均願意付出港幣$82 去支持減緩氣候變化的工作。

4.5 總括而言，本港市民對全球氣候變化的認知及關注度與日俱增，乃不容置疑的事實。個人行動的配合以及對參與政策討論的興趣則似乎尚有改善的空間。不論如何，各界人士及當權者也應各司其職，以減緩氣候變化的影響。

附錄一

樣本資料

表一　詳細樣本資料

	頻數	百分比
確定為不合資格的電話號碼	**4,365**	**40.6%**
傳真機號碼	404	3.8%
無效電話號碼	3,567	33.2%
電話轉駁號碼	48	0.4%
非住戶電話號碼	316	2.9%
技術問題	15	0.1%
被訪者不合資格	15	0.1%
未能確定是否具合資格被訪者的電話號碼	**2,669**	**24.8%**
電話線路繁忙	231	2.1%
電話無人接聽	1,992	18.5%
電話錄音	85	0.8%
密碼阻隔	46	0.4%
言語不通	112	1.0%
被訪者於篩選題前中斷訪問	196	1.8%
其他線路問題	7	0.1%
確定具合資格被訪者的電話號碼，但未能進行訪	**3,200**	**29.8%**
家人拒絕接受訪問	2	0.0%
被訪者拒絕接受訪問	12	0.1%
預約跨越調查期限	3,129	29.1%
未能完成整個訪問	49	0.5%
其他問題	8	0.1%
成功樣本	**512**	**4.8%**
合計	**10,746**	**100.0%**

表二　整體回應比率之計算方法

$$\text{整體回應比率} = \frac{\text{成功訪問樣本}}{\text{成功訪問樣本} + \text{未完成整個訪問樣本*} + \text{合資格而拒絕受訪樣本}^{\wedge}}$$

$$= \frac{512}{512 + 49 + 196 + 2 + 12}$$

$$= 66.4\%$$

* 包括「只完成部分訪問」及「被訪者於篩選題前中斷訪問」

^ 包括「家人拒絕接受訪問」及「被訪者拒絕接受訪問」

附錄二

頻數表

表三　[Q1] 有意見認為全球氣候變化係由人類活動，例如燒煤發電及汽車排放所造成，而唔係自然現象。請問你同唔同意呢個講法？（追問程度）

		頻數		百分比	
非常同意		283		55.2	
幾同意	) 同意	154	) 436	30.0	) **85.2**
一般／一半半		30		5.8	
幾不同意		24		4.7	
非常不同意	) 不同意	12	) 36	2.3	) 7.0
唔知／難講		10		2.0	
合計		512		100.0	

表四　[Q2] 又有意見認為氣候變化已經開始對人類構成威脅。請問你同唔同意呢個講法？（追問程度）

		頻數		百分比	
非常同意		305		59.6	
幾同意	) 同意	167	) 473	32.7	) **92.3**
一般／一半半		14		2.8	
幾不同意		16		3.0	
非常不同意	) 不同意	8	) 24	1.6	) 4.6
唔知／難講		1		0.3	
合計		512		100.0	

表五　[Q3] 你認為氣候變化有冇對香港造成影響？

	頻數	百分比
有	491	**95.8**
無	17	3.4
唔知／難講	4	0.8
合計	512	100.0

Q4 至 Q8 為只問 Q3 中答「有影響」的被訪者，樣本為 491 人。

表六　[Q4] 咁你同唔同意以下呢 d 講法？[以 5 等量尺表示]

	a) 氣候變化會引致夏天愈來愈熱，冬天愈來愈短	b) 氣候變化會引致糧食供應短缺及不穩定	c) 氣候變化會引致更頻繁的颱風和水浸

	頻數	百分比	頻數	百分比	頻數	百分比
非常同意	283	**57.6**	243	**49.6**	228	**46.5**
幾同意	156	31.8	195	39.7	201	41.0
一般／一半半	12	2.5	23	4.7	14	2.8
幾不同意	22	4.4	17	3.4	15	3.1
非常不同意	5	1.0	6	1.3	6	1.3
唔知／難講	13	2.7	6	1.3	26	5.3
合計	491	100.0	491	100.0	491	100.0
缺數	*0*		*0*		*0*	

	d) 氣候變化引致既極端天氣(例如熱浪)會引發的疾病及更高的死亡率		e) 氣候變化會引致能源價格波動		f) 氣候變化會引致水源短缺	
	頻數	百分比	頻數	百分比	頻數	百分比
非常同意	232	**47.3**	165	33.6	203	**41.5**
幾同意	196	39.9	212	**43.2**	170	34.8
一般／一半半	23	4.8	25	5.1	19	3.9
幾不同意	24	4.8	42	8.6	54	10.9
非常不同意	3	0.6	6	1.1	9	1.7
唔知／難講	13	2.7	41	8.3	35	7.1
合計	491	100.0	491	100.0	490	100.0
缺數	*0*		*0*		*1*	

表七　[Q4] 咁你同唔同意以下呢 d 講法？[以 3 等量尺表示]

	a) 氣候變化會引致夏天愈來愈熱，冬天愈來愈短		b) 氣候變化會引致糧食供應短缺及不穩定		c) 氣候變化會引致更頻繁的颱風和水浸	
	頻數	百分比	頻數	百分比	頻數	百分比
同意	439	**89.4**	438	**89.3**	429	**87.4**
一般／一半半	12	2.5	23	4.7	14	2.8
不同意	27	5.4	23	4.7	22	4.4
唔知／難講	13	2.7	6	1.3	26	5.3

合計	491	100.0	491	100.0	491	100.0
缺數	*0*		*0*		*0*	

	d) 氣候變化引致既極端天氣(例如熱浪)會引發的疾病及更高的死亡率		e) 氣候變化會引致能源價格波動		f) 氣候變化會引致水源短缺	
	頻數	百分比	頻數	百分比	頻數	百分比
同意	428	**87.2**	377	**76.8**	374	**76.3**
一般／一半半	23	4.8	25	5.1	19	3.9
不同意	26	5.4	48	9.8	62	12.7
唔知／難講	13	2.7	41	8.3	35	7.1
合計	491	100.0	491	100.0	490	100.0
缺數	*0*		*0*		*1*	

表八 [Q5] 我會讀出一 d 香港社群，請問你同唔同意佢地較一般人容易受氣候變化影響？[以 5 等量尺表示]

	a) 戶外工作者		b) 長期病患者	
	頻數	百分比	頻數	百分比
非常同意	281	**57.3**	264	**53.7**
幾同意	181	36.9	186	37.9
一般／一半半	10	1.9	17	3.5
幾不同意	10	2.1	13	2.7
非常不同意	1	0.3	5	1.1
唔知／難講	7	1.4	5	1.0
合計	491	100.0	491	100.0

	c) 長者		d) 板間房或籠屋居民	
	頻數	百分比	頻數	百分比
非常同意	250	**50.9**	232	**47.2**
幾同意	191	38.9	197	40.2
一般／一半半	24	4.8	18	3.7
幾不同意	15	3.0	20	4.1
非常不同意	8	1.6	14	2.8
唔知／難講	4	0.8	10	2.0
合計	491	100.0	491	100.0

表九　[Q5] 我會讀出一 d 香港社群，請問你同唔同意佢地較一般人容易受氣候變化影響？[以 3 等量尺表示]

	a) 戶外工作者		b) 長期病患者	
	頻數	頻數	頻數	百分比
同意	462	**94.2**	450	**91.7**
一般／一半半	10	1.9	17	3.5
不同意	12	2.4	19	3.9
唔知／難講	7	1.4	5	1.0
合計	491	100.0	491	100.0
	c) 長者		d) 板間房或籠屋居民	
	頻數	百分比	頻數	百分比
同意	441	**89.8**	429	**87.4**
一般／一半半	24	4.8	18	3.7
不同意	23	4.6	34	6.9
唔知／難講	4	0.8	10	2.0
合計	491	100.0	491	100.0

表十　[Q6] 跟著我會讀出一 d 原因，請問你同唔同意呢啲原因令香港既社群較容易受氣候變化影響？[以 5 等量尺表示]

	a) 居住環境惡劣，如住板間房		b) 對氣候變化缺乏認識	
	頻數	百分比	頻數	百分比
非常同意	176	36.0	104	21.4
幾同意	231	**47.2**	241	**49.3**
一般／一半半	22	4.6	33	6.7
幾不同意	34	6.9	74	15.1
非常不同意	16	3.2	22	4.4
唔知／難講	10	2.1	15	3.0
合計	489	100.0	488	100.0
缺數	*2*		*3*	
	c) 無足夠的社區支援		d) 天氣預報及公共醫療應變系統不完善	
	頻數	百分比	頻數	百分比
非常同意	94	19.2	86	17.5

幾同意	213	**43.6**	171	**34.8**
一般／一半半	40	8.1	49	10.0
幾不同意	88	18.0	128	26.2
非常不同意	24	4.9	30	6.0
唔知／難講	30	6.2	27	5.5
合計	489	100.0	491	100.0
缺數	*2*		*0*	

表十一　　[Q6] [以 3 等量尺表示]

	a) 居住環境惡劣，如住板間房		b) 對氣候變化缺乏認識	
	頻數	頻數	頻數	百分比
同意	407	**83.3**	345	**70.7**
一般／一半半	22	4.6	33	6.7
不同意	49	10.1	96	19.6
唔知／難講	10	2.1	15	3.0
合計	489	100.0	488	100.0
缺數	*2*		*2*	
	c) 無足夠的社區支援		d) 天氣預報及公共醫療應變系統不完善	
	頻數	百分比	頻數	百分比
同意	307	**62.8**	257	**52.4**
一般／一半半	40	8.1	49	10.0
不同意	112	22.9	158	32.2
唔知／難講	30	6.2	27	5.5
合計	489	100.0	491	100.0
缺數	*2*		*0*	

表十二　　[Q7] 你同唔同意香港政府已有清晰政策去應付氣候變化既影響呢？

		頻數		百分比	
非常同意		50		10.2	
幾同意	) 同意	63	) 113	12.8	) 23.0
一般／一半半		38		7.8	
幾不同意		181		37.0	
非常不同意	) 不同意	133	) 314	27.1	) **64.1**
唔知／難講		25		5.2	
合計		491		100.0	

表十三　　[Q8] 請問你同唔同意政府可以透過以下既行動，減緩氣候變化既影響？[以 5 等量尺表示]

	a) 訂立減少溫室氣體排放目標		b) 立法保障工人係極端天氣下既職業安全	
	頻數	百分比	頻數	百分比
非常同意	229	**46.7**	179	36.6
幾同意	205	41.8	222	**45.3**
一般／一半半	15	3.0	25	5.1
幾不同意	22	4.5	44	8.9
非常不同意	9	1.7	12	2.4
唔知／難講	12	2.4	8	1.6
合計	491	100.0	490	100.0
缺數	*0*		*1*	

	c) 加強公共衛生防護機制及社會保障，減低氣候變化的威脅		d) 加強對本土農業的支援，有助穩定糧食供應及價格	
	頻數	百分比	頻數	百分比
非常同意	155	31.7	106	21.7
幾同意	223	**45.5**	174	**35.6**
一般／一半半	29	6.0	36	7.4
幾不同意	42	8.6	103	21.0
非常不同意	16	3.2	40	8.2
唔知／難講	25	5.1	30	6.0
合計	490	100.0	490	100.0
缺數	*1*		*1*	

表十四　　[Q8] 請問你同唔同意政府可以透過以下既行動，減緩氣候變化既影響？[以 3 等量尺表示]

	a) 訂立減少溫室氣體排放目標		b) 立法保障工人係極端天氣下既職業安全	
	頻數	百分比	頻數	百分比
同意	434	**88.5**	401	**81.9**

一般／一半半	15	3.0	25	5.1
不同意	31	6.2	55	11.3
唔知／難講	12	2.4	8	1.6
合計	491	100.0	490	100.0
缺數	*0*		*1*	

	c) 加強公共衞生防護機制及社會保障，減低氣候變化的威脅		d) 加強對本土農業的支援，有助穩定糧食供應及價格	
	頻數	百分比	頻數	百分比
同意	378	**77.2**	281	**57.3**
一般／一半半	29	6.0	36	7.4
不同意	58	11.8	143	29.3
唔知／難講	25	5.1	30	6.0
合計	490	100.0	490	100.0
缺數	*1*		*1*	

Q9 至 Q15 為詢問所有被訪者。

表十五　　[Q9] 過去一年，你有幾經常進行以下既行動？

	a) 選擇乘搭較環保的交通工具如地鐵		b) 節約用水		c) 節約能源	
	頻數	百分比	頻數	百分比	頻數	百分比
經常	345	**67.5**	329	**64.2**	319	**62.4**
偶爾／一時時	97	19.1	154	30.1	169	33.1
冇乜	37	7.3	14	2.7	14	2.8
完全冇	19	3.8	11	2.1	5	1.0
唔知／難講	12	2.4	4	0.8	4	0.8
合計	511	100.0	512	100.0	512	100.0
缺數	*1*		*0*		*0*	

	d) 支持志願團體對抗氣候變化的行動		e) 購買有機食物及綠色產品	
	頻數	百分比	頻數	百分比
經常	92	18.0	71	13.8
偶爾／一時時	157	**30.8**	230	**44.9**
冇乜	99	19.4	98	19.2
完全冇	154	**30.0**	101	19.7
唔知／難講	9	1.8	12	2.4
合計	512	100.0	512	100.0

表十六　　[Q10] 個人來說，你願意每個月俾幾多錢去減緩氣候變化？

	頻數	百分比
港幣$10	99	19.4
港幣$50	108	21.1
港幣$100	135	**26.3**
港幣$200 或以上	68	13.3
不願意	42	8.2
唔知／難講	60	11.8
合計	512	100.0
平均數	**$82**	
中位數	$50	
樣本誤差	+/- $6.2	
基數(只包括願意付款者)	410	

表十七　　[Q11] 你知唔知道香港政府正委託顧問公司進行氣候變化政策的研究？

	頻數	百分比
知道	98	19.1
唔知道	414	**80.9**
合計	512	100.0

表十八　　[Q12] 你有冇興趣參與氣候變化既政策諮詢過程，向政府表達意見，例如參加相關既公眾研討會?

		頻數		百分比	
非常有興趣	) 有興趣	10	) 130	2.0	) 25.4
幾有興趣		119		23.3	
一般／一半半		38		7.4	
冇乜興趣	) 冇興趣	184	) 329	35.9	) **64.3**
完全冇興趣		145		28.4	
唔知／難講		15		3.0	
合計		512		100.0	

表十九　　[Q13-Q15] 請問你同唔同意以下呢 d 講法？[以 5 等量尺表示]

	Q13 我個人的生活模式有份造成氣候變化		Q14 香港排放的溫室氣體間接令發展中國家的人民生活變差		Q15 香港政府應提供財政援助，支持發展中國家減緩氣候變化既影響	
	頻數	百分比	頻數	百分比	頻數	百分比
非常同意	112	22.0	100	19.5	67	13.2
幾同意	254	**49.8**	226	**44.2**	228	**44.6**
一般／一半半	32	6.3	29	5.7	43	8.4
幾不同意	62	12.2	92	18.0	94	18.4
非常不同意	37	7.3	36	7.0	54	10.5
唔知／難講	12	2.4	28	5.5	25	5.0
合計	511	100.0	511	100.0	511	100.0
缺數	*1*		*1*		*1*	

表二十　　[Q13-Q15] 請問你同唔同意以下呢 d 講法？[以 3 等量尺表示]

	Q13 我個人的生活模式有份造成氣候變化		Q14 香港排放的溫室氣體間接令發展中國家的人民生活變差		Q15 香港政府應提供財政援助，支持發展中國家減緩氣候變化既影響	
	頻數	百分比	頻數	百分比	頻數	百分比
同意	366	**71.8**	326	**63.8**	295	**57.8**
一般／一半半	32	6.3	29	5.7	43	8.4
不同意	99	19.4	128	25.0	148	28.9
唔知／難講	12	2.4	28	5.5	25	5.0
合計	511	100.0	511	100.0	511	100.0
缺數	*1*		*1*		*1*	

附錄三

被訪者背景資料

被訪者個人背景資料

有關調查數字已經按照政府統計處提供之 2009 年終全港人口的年齡及性別分佈的初步統計數字，以「加權」方法作出調整。

表二十一　性別

	原始樣本		加權樣本	
	頻數	百分比	頻數	百分比
男	227	44.3	236	46.1
女	285	55.7	276	53.9
合計	512	100.0	512	100.0

表二十二　年齡

	原始樣本		加權樣本	
	頻數	百分比	頻數	百分比
18 – 20	36	7.1	23	4.5
21 – 29	71	14.0	77	15.2
30 – 39	73	14.4	96	18.9
40 – 49	115	22.7	109	21.4
50 – 59	128	25.2	94	18.6
60 歲或以上	84	16.6	108	21.3
合計	507	100.0	507	100.0
缺數	*5*		*5*	

表二十三 教育程度

	原始樣本		加權樣本	
	頻數	百分比	頻數	百分比
小學或以下	56	11.0	59	11.7
中學	271	53.3	264	51.9
大專或以上	181	35.6	185	36.4
合計	508	100.0	508	100.0
缺數	*4*		*4*	

表二十四　職業

	原始樣本		加權樣本	
	頻數	百分比	頻數	百分比
行政及專業人員	140	28.1	143	28.6
文職及服務人員	110	22.0	112	22.4
勞動工人	41	8.2	37	7.4
學生	41	8.2	32	6.4
全職主婦	72	14.4	65	12.9
其他	95	19.0	111	22.3
合計	499	100.0	500	100.0
缺數	*13*		*12*	

附錄四

問卷

市民對氣候變化影響意見調查

調查問卷

2010 年 6 月 21 日

第一部分　自我介紹

喂，先生/小姐/太太你好，我姓 X，我係香港大學民意研究計劃既訪問員黎既，我地宜家做緊一項意見調查，想訪問下你對氣候變化問題既意見，我地只會阻你幾分鐘時間。請你放心，你既電話號碼係經由我地既電腦隨機抽樣抽中既，而你提供既資料係會絕對保密既，請問可唔可以呢？

可以
唔可以（終止訪問）

第二部分　選出被訪者

[S1]　請問你屋企而家有冇 **18 歲或以上**既人係度，因為我地要隨機抽樣，如果多過一位，請你叫即將生日果位黎聽電話。（訪問員可舉例說明：『即係有冇 6 月或未來三個月內生日既人係度？』）【如果戶中冇所屬年齡之對象，訪問告終；多謝合作，收線。】

有
冇　⟶ 訪問完成，多謝合作，拜拜。（skip to end）

第三部分　問卷主體部分

一. 對全球氣候變化的認識

Q1　有意見認為全球氣候變化係由人類活動，例如燒煤發電及汽車排放所造成，而唔係自然現象。請問你同唔同意呢個講法？（追問程度）

非常不同意
幾不同意
一般／一半半
幾同意
非常同意
唔知／難講
拒答

Q2　又有意見認為氣候變化已經開始對人類構成威脅。請問你同唔同意呢個講法？（追問程度）

非常不同意
幾不同意
一般／一半半
幾同意
非常同意
唔知／難講
拒答

Q3　你認為氣候變化有冇對香港造成影響？

有 (go to Q4)
無 (skip to Q9)
唔知／難講 (skip to Q9)
拒答 (skip to Q9)

Q4 咁你同唔同意以下呢 d 講法？（讀出 1-6 項，次序由電腦隨機排列；追問程度）

Q4a　氣候變化會引致夏天愈來愈熱，冬天愈來愈短
Q4b　氣候變化引致既極端天氣(例如熱浪)會引發的疾病及更高的死亡率
Q4c　氣候變化會引致更頻繁的颱風和水浸
Q4d　氣候變化會引致能源價格波動
Q4e　氣候變化會引致水源短缺
Q4f　氣候變化會引致糧食供應短缺及不穩定

非常不同意
幾不同意
一般／一半半
幾同意
非常同意
唔知／難講
拒答

二. 氣候變化對本港社群的影響

Q5　我會讀出一 d 香港社群，請問你同唔同意佢地較一般人容易受氣候變化影響？（讀出 1-4 項，次序由電腦隨機排列；追問程度）

Q5a　長者
Q5b　戶外工作者
Q5c　長期病患者
Q5d　板間房或籠屋居民

非常不同意

幾不同意
一般／一半半
幾同意
非常同意
唔認為有社群較容易受氣候變化影響 (skip to Q7)
唔知／難講
拒答

Q6　跟著我會讀出一 d 原因，請問你同唔同意呢啲原因令香港既社群較容易受氣候變化影響？（讀出 1-4 項，次序由電腦隨機排列；追問程度）

Q6a　居住環境惡劣,如住板間房
Q6b　無足夠的社區支援
Q6c　對氣候變化缺乏認識
Q6d　天氣預報及公共醫療應變系統不完善

非常不同意
幾不同意
一般／一半半
幾同意
非常同意
唔知／難講
拒答

Q7　你同唔同意香港政府已有清晰政策去應付氣候變化既影響呢？

非常不同意
幾不同意
一般／一半半
幾同意
非常同意
唔知／難講
拒答

Q8　請問你同唔同意政府可以透過以下既行動，減緩氣候變化既影響？（讀出 1-4 項，次序由電腦隨機排列；追問程度）

Q8a　加強公共衞生防護機制及社會保障，減低氣候變化的威脅
Q8b　立法保障工人係極端天氣下既職業安全
Q8c　加強對本土農業的支援，有助穩定糧食供應及價格
Q8d　訂立減少溫室氣體排放目標

非常不同意
幾不同意
一般／一半半
幾同意

非常同意
唔知／難講
拒答

三. 對減緩氣候變化的行動及制定氣候變化政策之參與

Q9　　過去一年，你有幾經常進行以下既行動？（讀出 1-5 項，次序由電腦隨機排列；追問程度）

Q9a　節約能源
Q9b　選擇乘搭較環保的交通工具如地鐵
Q9c　購買有機食物及綠色產品
Q9d　節約用水
Q9e　支持志願團體對抗氣候變化的行動

經常
偶爾／一時時
冇乜
完全冇
唔知／難講
拒答

Q10　個人來說，你願意每個月俾幾多錢去減緩氣候變化？（讀出 1-4 項，只選一項）

港幣$10
港幣$50
港幣$100
港幣$200 或以上
其他(請註明): _____
不願意
唔知／難講
拒答

Q11　　你知唔知道香港政府正委託顧問公司進行氣候變化政策的研究？

知道
唔知道
拒答

Q12　　你有冇興趣參與氣候變化既政策諮詢過程，向政府表達意見，例如參加相關既公眾研討會?

非常有興趣
幾有興趣
一般／一半半
冇乜興趣
完全冇興趣

唔知／難講
拒答

Q13-Q15　　最後，請問你同唔同意以下呢 d 講法？（讀出 1-3 項，追問程度）

Q13　我個人的生活模式有份造成氣候變化
Q14　香港排放的溫室氣體間接令發展中國家的人民生活變差
Q15　　香港政府應提供財政援助，支持發展中國家減緩氣候變化既影響

非常不同意
幾不同意
一般／一半半
幾同意
非常同意
唔知／難講
拒答

第四部分　個人資料

我想問你些少個人資料，方便分析，請你放心，你既資料係會絕對保密既。

[DM1] 性別

男
女

[DM2a]　年齡
_____（入實數）
拒答

[DM2b]【只問不肯透露準確年齡被訪者】年齡 (範圍)[訪問員可讀出範圍]
18-20 歲
21-30 歲
31-40 歲
41-50 歲
51-60 歲
61 歲或以上
拒答

[DM3]　　教育程度

小學以下
中學

預科
專上非學位
專上學位或以上
拒答

[DM4] 職業

專業人士／經理／行政人員 (請註明: _____)
商人／東主
白領人士
藍領人士
家庭主婦【skip to end】
全日制學生【skip to end】
失業【skip to end】
退休【skip to end】
其他（請註明）_____
拒答

多謝你接受訪問。如果你對呢個訪問有任何疑問，可以打熱線電話 xxxx-xxxx 同我地既督導員聯絡，或者喺辦公時間致電 xxxx-xxxx 向香港大學操守委員會查詢今次訪問既真確性同埋核對我既身份。拜拜！