



Climate change and the implications on human health: how health policies are being redrawn to prepare for the future risks of heat wave, heatstroke and infectious diseases.

Educational Resource File 4 (Supplementary educational material to be used in conjunction with the ACCC documentary.)

**Climate change and the implications on human health:** how health policies are being redrawn to prepare for the future risks of heat wave, heatstroke and infectious diseases.



This resource file accompanies the **Adapting to Climate Change in China** documentary and provides further background on some of the adaptation strategies being employed by communities in China. The purpose of this supplementary material is to promote wider discussion and to foster cross-cultural understanding of some of the key issues raised within the film.

Government leaders in China and beyond are paying attention to the impact of climate change on society. As we've seen in the previous resource files, extreme weather events and changing climate conditions including drought and changes in water supply are making it increasingly difficult for vulnerable rural communities to make a living. In this resource file we'll also see how climate impacts are affecting densely populated urban areas, such as the ACCC pilot province of Guangdong, which is one of the powerhouses of China.

Scientists in this province are studying how extreme climate events such as heat waves and cold spells increase the risk of illness and mortality and seeking to understand the links between climate change and the spread of infectious disease. This work involves developing projections of health implications for these temperature extremes and using them to make recommendations on adaptation measures that can be taken. This includes identifying the most vulnerable populations and regions,

and working with them through policy responses and awareness raising to reduce the risks. The health work under ACCC in Guangdong is part of ACCC's overall plan is to support China's response to the impacts of climate change with evidence-based adaptation strategies and support the Chinese government's response. Climate change research under ACCC has already influenced public health policy decisions in this area. Vulnerable people are already benefitting from such adaptive measures as early warning systems for extreme weather events and disease outbreaks, and relevant and tailored health advice to help them protect themselves in extreme temperatures. These adaptation measures are continually evolving as scientists and researchers learn more about the potential risks to human health from climate change.

**QUESTION TO CONSIDER:**  
What are the climate-related challenges for public health in your region or country?

## Monitoring the Spread of Disease

With a population of 96 million people, Guangdong is one of China's largest provinces. Amongst the climate impacts being felt in the Province are sea level rise, saltwater inundation and increased disaster risk, particularly for typhoons, coldspells and heat-waves. Researchers are currently studying the possible effects of these on human health. As a heavily populated coastal city and trading port which was badly hit by the SARS outbreak in 2002, the spread of vector-borne diseases is of particular concern.

Cai Songwu, from the Institute of Disinfection and Pesticidation at the Centre for Disease Control and Prevention in Guangdong, is an expert in the control of biological vectors – organisms like mosquitoes that transmit infections from one host to another.

Research has shown there is a close relationship between increased hours of sunshine and an increased risk of some diseases including hand-foot disease. The Centre's research shows that changes in climate including increased temperatures, humidity, rainfall and carbon dioxide emission affect the geographical distribution of vector organisms. Areas which were cooler in the past and less suitable for vector growth are now becoming warmer, potentially resulting in enhanced breeding and survival rates.

This means more people could become exposed to disease and has serious implications for provincial and central governments in their health policy and planning.

Guangdong is located in the tropical and subtropical area of southern China with a warm, rainy and humid climate which makes it suitable for vector organisms to breed. Mr Songwu said in the past, vector-borne infectious diseases broke out once every few years, but now they are almost an annual occurrence. Government leaders are now investing resources into the issue and a lot of work has been undertaken by researchers to help different regions prepare for the future. In the 1990s, for example, a monitoring network was established to examine vector organisms in five pilot cities in the North, South, East and West, and Central Guangdong. This project now incorporates 21 cities within the Province and the data collected is quickly fed back to the local government using an online system to enable public health experts to co-ordinate a response such as a public warning of a forecasted breakout.

**" With first-hand data, we are able to understand the breeding speed, growth and decline of biological vectors,"** said Cai.

**" Secondly, with this monitoring system in place, our centre can provide monthly reports of pest density and the report will be sent to health bureaus and authorities in charge in the 21 prefecture-level cities each month, so that all departments can get updates on pest density. That helps a lot in preventing and forecasting pest-borne infectious diseases, especially dengue fever."**

## Adapting to the malaria threat



# Malaria is high on the local Government's agenda in Guangdong

**The spread of this disease is closely linked to climate change, particularly in the aftermath of natural disasters such as floods and droughts.**

Pei Fuquan works at the Disease Prevention and Control Centre of Guangdong Province and researches parasitic disease control. Studies have shown that climate change has pushed up the annual temperature of the entire province and this has enhanced the breeding ground of mosquito-borne vectors. With rising temperatures, winter has become more suitable for mosquito breeding, which leads to higher mosquito density and an increased risk of the outbreak of malaria.

After considerable effort, Guangdong has virtually eliminated malaria except for occasional imported cases. However, mosquitoes have a widespread presence across the region and the risks remain. Migrant workers are considered one of

the highest at-risk groups because of their low-immunity, poor nutrition and limited access to protective equipment such as mosquito nets and prevention advice and so the local government has prioritised this group for disease prevention schemes. Other people considered at risk include those already suffering with serious illnesses, the elderly, children, and pregnant women because of their reduced capacity to fight off infection.

The Centre has a three-fold action plan: to review historical data to understand the impact of climate change on malaria; to strengthen prevention and control measures of the disease to eliminate it as part of a global responsibility under the UN; and finally to build a health emergency team to co-ordinate the response to malaria risks. It is also working with academies in other regions to share data on parasite-related malaria and help mitigate the risks of malaria across a wider geographical area.

## Protecting the public during heat wave

(Documentary 15:48-17:09)

**As well as looking closely at the threat of vector-borne disease, the ACCC project is also studying the direct impact of increasing temperatures on human health.**

What constitutes a heatwave is often set within country and in China, the Chinese Meteorological Administration has set the heat wave threshold at 35C in Guangdong. If an area endures this temperature or higher for three consecutive days, it can officially be regarded as a heat wave.

Heat waves are already a significant problem in Guangzhou, Guangdong's capital city, and are expected to remain so. Of the 66 heat waves recorded between 1951 and 2010 in the area, notable increases were observed during the last decade up to 2010. Meanwhile, data for 2006-2008 illustrates a significant link between daily maximum temperature, total mortality, cardiovascular disease, respiratory disease and cerebrovascular disease, particularly among the elderly.

ACCC's research indicates that heat waves of increasing intensity and duration are likely to increase the risk of mortality. Researchers are working closely with decision-makers to provide the information needed to develop better communication strategies and awareness systems and to reduce the adverse health impacts on the public.

Guangdong has a large migrant population, many of whom have moved to the province to find work in the construction industry. The health of these workers in particular is at risk, since construction workers spend long hours directly exposed to high temperatures on building sites. The Guangdong Center for Disease Control and Prevention is carrying out its own research to identify safer ways of working for vulnerable groups. This work has contributed to new adaptation strategies designed to protect Guangdong's workforce, implemented in June 2013. The new guidelines deem any workplace with a temperature above 35C as a 'high-temperature' workplace. This means employers now have a statutory duty take effective measures to lower the temperature of indoor workplaces to below 33C. Those who fail to adhere to the regulations must pay a high temperature allowance to employees from June to October. Employers are also duty-bound to provide employees with beverages to cool down. Luo Yuan is one of the researchers at the Guangdong Provincial Institute of Public Health, working on the ACCC project and directly with vulnerable groups.

**"Construction workers are the most vulnerable as they work at the open site and bear the brunt of heat wave,"** said Luo.

"We are here to assist them, passing on ways of heatstroke prevention, and trying to understand how they work every day. Sunlight and heat exposure is considerable for workers in such an open-air workplace. Such direct and strong heat exposure is bad for the health and makes people who are sick in the first place feel even worse. In the worst scenario it might lead to death. So construction workers are a very important vulnerable group we must study."

ACCC's research has assessed the vulnerability of various social groups to heat waves in terms of the risk of exposure and how susceptible they are to harm. The findings show vulnerability to heat waves differs across the 124 districts of Guangdong, with the economically undeveloped regions in the north more vulnerable to suffering negative health impacts than southern areas which are more economically developed. In addition, ACCC researchers analysed how people in Guangdong perceived the risk of heat wave and how they responded to it. The findings indicate a lack of awareness about the health risks associated with heat waves, especially among vulnerable populations such as the elderly and those from rural communities.

"We recognize that the vulnerability of this group comes from their low socio-economic status. Many workers are from the countryside. Their low adaptability to the local climate is a big concern," said Luo.

In response, researchers from ACCC have recommended the development of risk communication strategies and education and awareness projects at a provincial government level to

improve risk perception and to reduce the adverse impacts of heat waves. In addition, they have also recommended a closer examination of the effectiveness of various heat wave coping measures (particularly traditional coping strategies) such as drinking water and tea, opening windows and staying indoors in their ability to protect against heat stroke with the aim of reducing incidents and providing more accurate health advice to the public.

Since the 1970s, high temperatures have become more apparent in the province but previously such extreme temperatures lasted no more than 10 consecutive days. From 1998, the duration exceeded 20 days. Moreover, Guangdong is located in a subtropical zone, where the temperature is relatively higher than other places.

Under Guangdong's employee protection measures, employers are required to introduce flexible working hours in 'high temperature' workplaces to reduce heat exposure. This includes suspending outdoor work when temperatures reach 39C or above, restricting outside work to six hours per day and suspending activity between 12pm and 4pm on days where the maximum temperature reaches 37C but below 39C and finally shortening the period of time employees work continuously.

Although frequent and persistent heat waves are a major cause of concern, the researchers are confident that workers can and will adjust to the new climate.

"People are adaptive. The human body is the first to respond and spontaneously become more adaptive to high temperatures. It's an ability of self-adjustment," said Luo.

"In my opinion, the whole story has two sides. On the one side, the impacts are there and are becoming more potent. However, on the other side, physically they will be felt less as adaptive measures get more sophisticated."

### QUESTION TO CONSIDER:

**What are the social, economic or cultural factors that affect peoples' vulnerability to climate impacts in your country or area? What is being done to tackle them?**

## Case Study:

Lin Zhengsheng manages a construction project in Guangzhou's Pearl River New City

(Documentary 17:09-18:07)



Guangzhou has long hours of sunshine and intense humidity during the summer months.

From June through to September, the construction supervisor and his workforce are required to work in high temperatures but are protected under governmental guidelines if a heat wave hits. Workers now go to work earlier in the morning at 7am and clock off at 11am before returning at 3pm to reduce the consecutive hours they are exposed to the heat.

**" Under hot weather, we take steps to secure workers' basic health. First, we provide a room where workers can take a rest if they don't feel well after a long stay under the sun. Secondly, we implement a health and safety standard which states that the tea room should be provided to serve free herbal tea,"** he said.

"We've also designed a sprinkler system on the top of the roof of the workers' dorm which lowers the roof temperature and minimises the impact of high temperatures. In addition, each month we offer healthcare subsidies to workers who work in hot weather, as is required by the Guangzhou municipal government."

The workforce is mostly made up of migrant workers who have little knowledge on how to deal with heat waves especially as different regions endure different temperature peaks. To avoid any misunderstandings, project leaders tell new recruits how to stay cool and protect themselves and notice boards at the construction site including information on how to keep healthy and each day's maximum and minimum temperatures.

**" I've worked here for ten years, after I graduated from college. Guangzhou has raised its standard for heatstroke prevention in summer,"** said Lin. **"The rules are getting more stringent."**

### The future

The climate change research taking place in Guangdong has helped to strengthen emergency response planning and improve information-sharing. Guangdong established a new system for inter-departmental coordination following the SARS (severe acute respiratory syndrome) outbreak in 2002-2003 and the H1N1 influenza in 2009. This system promotes a more joined up approach between the Municipal Prevention Office, the healthcare department and the meteorological department so if a disease outbreak occurs, all the relevant agencies can work together.

However, further work is needed to increase China's resilience to the impact of climate change, particularly on human health. Song Tie, director of the public health emergency department of the Centre for Disease Control and Prevention of Guangdong Province,

said: "At present, China has not yet listed climate change as a priority for specific national development issues. Public awareness is still low. To increase it is one of our targets.

**" Higher temperatures and heat waves are very common in southern China. But residents seldom realise the risks of heat waves. Some think everything is fine if they drink more water. Others have low awareness of personal health care and go out and work with no protection. This needs to change. The change will start from their way of thinking. "**

"The public has few means of learning skills to protect themselves and as such they may not be able to escape from a disaster and chaos would happen as a result. But China is on its way to building a healthcare emergency system. It needs to be set up at different levels and include a comprehensive precaution and management mechanism that is compatible with the nature of the Chinese community."

Based on the project findings, ACCC researchers have put forward a series of recommendations to strengthen adaptation planning. These include developing monitoring systems to record the health impacts of climate change on the public, particularly in the vulnerable regions identified, establishing real time temperature warning systems based on the integration of meteorological and health data and emergency management plans and the launch of an action plan to promote public awareness of the potential risks of heat waves and the necessary adaptive measures required.

One of the strengths of the ACCC project is the integration of impact, risk and vulnerability assessments into adaptation planning in China. Research continues but the project has achieved notable progress already in bringing together both researchers and decision-makers across multiple sectors to develop a unified response to climate change. A number of lessons have also been learned including the need for an information sharing mechanism across sectors and the integration of multidisciplinary expertise into health impact assessment and adaptation planning. This valuable experience is being shared with other developing countries in an effort to reduce their own vulnerability to the effects of climate change.

### MUTUAL LEARNING:

If you have a case study to share on climate and health work, please go to [www.ccadaptation.org.cn](http://www.ccadaptation.org.cn)





## BIBLIOGRAPHY

This Resource File has been developed by the INTASAVE Partnership for the Adapting to Climate Change in China project, based on the transcripts of on-the-ground interviews, undertaken for the ACCC documentary. Other sources used to develop this Resource File include:

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ACCC Project Completion Report (Internal Document), 2013, Adapting to Climate Change in China