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Adaptation Strategies to Climate Change in China- A Case Study of Heilongjiang Province

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Abstract: Climate change is one of the most significant environment issues in the whole world today. And it is one of the most complex challenges of the humanities faced in the 21st century. Climate Change is impacted on our global; nobody can avoid the influence of climate change. The local adaptation strategies on climate change are very important to contribute the mitigation and poverty stricken situation, both in China and in the world. We chose a typical China's province as a case to analyze the impact of climate change on the region (such as agricultural, natural ecosystems, water resources, as well as local people healthy condition), and how the local government and local residences face the impact of the climate change influence, and summarized several strategies on climate change of the area in a sustainable development way.

Key words: climate change, adaptation, strategy

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Introduction

Climate change is one of the most significant environment issues in the whole world today. Meanwhile it is one of most complex challenges of the humanities faced in the 21st century. In China during 2012, climate change impacted the country in many ways, such as storm, flood, heat and drought, which impacted not only the natural environmental, but also the human society and people. While in Heilongjiang Province, it experienced the worst drought since records began in 1891, and in central and southeastern provinces they suffered the flood and typhoon. These events are seen as a prelude to weather patterns likely to become more common due to global change. And we will agree that Malcolm Turnbull's statement, which is that climate change is one of the greatest economic and environmental challenges of our times (AGO, 2007). To concern the climate change, we should consider the mitigation and adaptation measures for the global sustainable development and for the local people and local economy development in a sustainable way.

Adaptation is defined as adjustment in natural or human systems to a new or changing environment (MAB, 2005). And some experts also think that adaptation to climate changes refers to adjustment in ecological, social, or economic systems in response to actual or expected climate stimuli and their effects or impacts, addressed to the solution of relative problems, as well as to the benefits from the undertaken measures (Chen, 2005; Jiang and Zhang, 2006). In my opinion, adaptation is the adjustment in natural or human systems in response to actual or expected

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climate effects and try to moderate harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation (MAB, 2005).

Heilongjiang Province has special characteristic natural resources for the local people to enjoy and share with outside people. And the local people are trying to take some adaptation measures to keep the beautiful landscapes, forests and grasslands, wetlands and rivers and lakes provide rich resources for developing local economy in a sustainable way. Table 1 shows the key statistics of Heilongjiang Province and China. Through the data we found Heilongjiang Province is one of the most important provinces in China.

Table 1 Key statistics for China and Heilongjiang Province

Item	Heilongjiang Province	China
Provincial capital	Harbin	Beijing
Total land area	454 000 km^2	9 600 000 km^2
Population	38.20 millions	1 307.56 millions
Annual GDP growth	9.70%	9.20%
Area of cultivated land	990.5 (10 000 hm^2)	17 491 (10 000 hm^2)
Total standing stock volume	15 (100 million cu.m)	136.18 (100 million cu.m)
Forest area	2 007 (10 000 hm^2)	17 491 (10 000 hm^2)
Stock volume of the forest	14.3 (100 million cu.m)	124.56 (100 million cu.m)
Forest-coverage rate	43.6 (%)	18.21 (%)
Total water volume	755.5	28 053.1
Arable land area	11 773.0 (1 000 hm^2)	130 039.2 (1 000 hm^2)
Agricultural gross output value	1 294.4 (100 million Yuan)	39 450.9 (100 million Yuan)
Volume of waste gas emission	5 261 (100 million cu.m)	268 988 (100 million cu.m)

Data comes from the Heilongjiang Statistical Yearbook 2012(HPSB,2012) and China's Statistical Yearbook 2012 (CNSB, 2012).

Key Areas for Adaptation to Climate Change in Heilongjiang Province

Agriculture

Heilongjiang Province is one of the important agricultural provinces in China, and it has experienced a warming trend after the 1980s, where the warming trend is the most obvious since 1951 (Fang, 2000). Climate change is influencing the local agricultural development, and will result in crop production and food safety in future. Studies showed that the rapid increase in paddy planting area and the northward expansion of the paddy fields since the mid 1980s are response to the distinct rising trend of temperature since the 1980s (Fang and Shen, 2000).

For adaptation to climate change, it is necessary to improve agricultural infrastructures. Accelerate the construction of supporting facilities of large-scale, water-saving irrigation areas; promote field engineering quality; upgrade aging electromechanical equipment; and improve irrigation and drainage systems to adapt the local climate change influence. And in Heilongjiang Province, it is a good initiative for adaptation to climate change, which is to expand demonstration on water-saving irrigation and build pilot projects in the main crop production area. And to conduct small-scale hydraulic engineering focused on field irrigation and drainage projects, small-scale irrigation areas and watershed projects in the non-irrigation area for fighting drought. Strengthen the control and restoration of middle-and-low yield fields