

An Invisible Killer

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Climate change comes invisibly and slowly, so many people underestimate its damage to our life and ecosystems. It happens on a global scale that is far beyond our normal sight, thus leaving it unnoticed by the common people. Climate change is a hidden killer that destroys crops and animals, sucks water resources, causes more natural disasters such as floods and droughts, spreads infectious diseases and invasive species, melts glaciers and permafrost, submerges coastal cities and wetlands, and reduces biodiversity and other ecosystem functions and services. Rapid climate change has been with us for decades, and numerous events over the world have provided evidence of the guilt of its killers. The experience of a typical farmer from southern China offers an eloquent example:

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Fulin Wang, a forty-five-year-old farmer in southern China, is one of the victims of climate change. Fulin and his family live in a small village in Hunan province where their ancestors had farmed for hundreds of years. They traditionally grow rice in the lowland valleys and fruit trees on mountain slopes. With an increasingly warming and drying climate in the past decades, the rice production has declined substantially due to the enhanced plant respiration consumption and the damage from more severe pest and insect diseases and more frequent summer heat stresses. Meanwhile, the farming cost, such as fertilizers, fuels, pesticides, and herbicides, has more than doubled in the past ten years, making rice farming less and less profitable and even losing money in some years.

Given these difficulties, Fulin had hoped to make a living on his mountainside orchards, where he used to grow oranges, cherries, and tea. In 1997 he rented about ten acres of “barren lands” from the village and planted cherry trees on the hillsides. With the cherry trees growing bigger and bigger through his hard work year after year, Fulin hid the happiness in his mind. He even discussed with his wife on how to spend the money made on cherry sales: renovating his old houses, buying himself a new motorcycle, and leaving a major portion as the betrothal “gift” for his twenty-year-old son.

He never thought the invisible killer was around him and his cherry trees. Eight years after he planted the cherry trees, he hardly harvested any fruits, though the cherry trees grew very well and bloomed in some years. He thought the trees were not big enough to bear fruits. But he was very surprised one day, when he was watching TV, to learn that the farmers had a very good harvest of cherries in his neighboring provinces, while he harvested only about two hundred pounds of cherries out of thousands of trees. He started consulting horticulture experts and found that the cherry trees require a certain period of chilling during the winter to overcome bud dormancy. Otherwise, the trees may produce erratic and prolonged flowering, but bear few fruits. The annual mean air temperature in the area where Fulin lives has increased 1.6 degrees C, with winter temperature increased more than 2 degrees C in the past three decades, which cannot meet the chilling requirements for cherry trees to bear fruits.

Learning that this human-induced global warming might continue

for the coming decades due to the persistence of the greenhouse gases in the atmosphere, Fulin cut all the cherry trees four years ago and replanted with eucalyptus trees, a pulp tree species introduced from Australia, to take the advantage of global warming. Driven by the fast-growing paper industry, eucalyptus plantations expanded rapidly in southern China and moved northward to marginal lands, including Hunan province, where the eucalyptus trees cannot survive cold winters. Having experienced the warmer and warmer winters in the past years, and learning of global warming from various sources, Fulin and the villagers believed that the freezing risk was gone. They converted almost all the woodlands including orchards in the village into eucalyptus plantations in a couple of years. They did not know that the killer was still with them all the time. And this time it used the other side of the sword: a record-cold ice- and snowstorm that hit southern China from mid-January to early February in 2008. All the eucalyptus trees in the village died as a result of the storm, and afterward Fulin cried hopelessly under the dead trees. He was confused by climate change and he did not know what he should grow. He was worrying more about his family, particularly the future of his son.

Climate change is beyond global warming. It comes with many weapons, such as heat waves, cold fronts, flooding, droughts, hurricanes, storms, and rising sea levels. Climate change is a challenge that tests the capacity of human knowledge, technology, and cooperative spirit. Climate change involves so many ecological and socioeconomic processes and their interactions at different scales. So the prediction of climate change and its impact will always come with uncertainties because of all kinds of limitations. However, these uncertainties should not be the excuse for taking no action. We cannot wait for fifty years to get an adequate understanding and meanwhile miss the opportunity to fix the problem. Uncertainties also mean opportunities for us to improve our actions and measures on climate change in the future. The most difficult challenge is nothing but the greedy and selfish nature of human beings.

Climate change is solvable only if we humans work together across nations, cultures, religions, and socioeconomic status. Solutions to climate change call for cooperation among governments and inter-

national organizations. Solving climate problems can also start with us as individuals, families, and communities by reducing our carbon footprints every day. Climate change is the most important threat we face, and there is a threshold beyond which the climate system will be irreversible, its damage becoming permanent and the cost of fixing it too expensive to afford. Therefore, we should start fixing the problem right now rather than leaving more threats to our future generations and putting their lives at a much higher risk. The gambling attitude is very dangerous, and we cannot afford any mistakes because we have only one Earth and there is no second chance if we fail. Therefore, acting *now* is our moral obligation to the future of our planet's unique life-sustaining climate system and to the future of human beings and other life-forms on Earth.