

Impacts of Climate Change on the Agricultural Sector in Korea

JANG Hansol

Kyungpook National University

Introduction

Through extensive research and analysis of global warming, the average temperature of the earth has risen 1.5°C per year, over the past 100 years. Meanwhile the winter seasons have been reduced, and summer seasons have lengthened. Thus advancing the flowering season later in during spring. As a result, the agricultural cultivation area has been extended northward and the damage by blight and harmful insects during the winter has increased. This has caused the decrease in agricultural productivity. Therefore we need to devise a strategy for this environmental situation, such as considering raising a variety of fruits and vegetables. Nowadays, it is possible to cultivate different tropical plants in Korea.

Scientific diagnosis and evaluation of the impacts of climate change on the agricultural sector is very important in establishing future visions of the agricultural industry and the direction of its policies. This provides useful information for establishing adaptive plans such as long-term regional agricultural and farming plans.

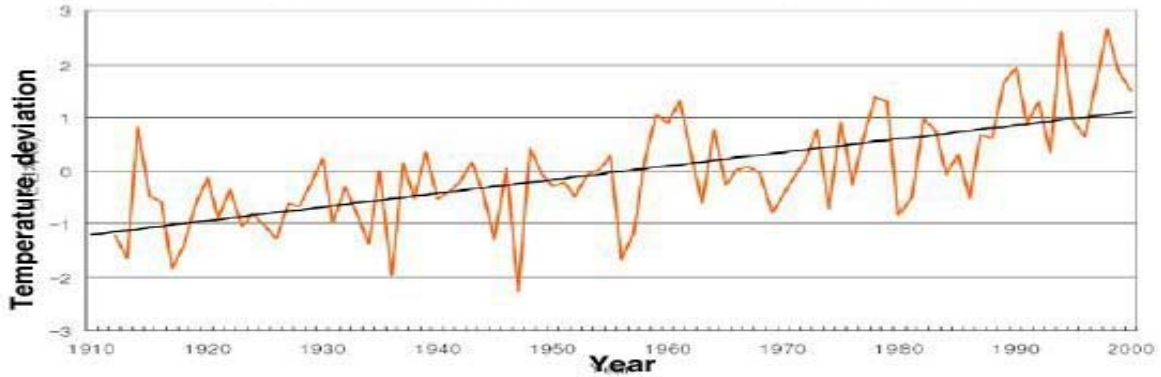
With the different issues concerning our cultivation practices and environmental conservations, a new policy should be in effect. Recently the Korean government announced a new policy, named Low carbon and green development. The purpose of this policy is to reduce environmental pollution and carbon-dioxide in agriculture. The promotion of measure is being made by various circles. This is one of popular topic in Korea now.

Korean agriculture sector is decreasing, and impact of climate change will be a serious problem. It is time to change our act about agriculture and environment.

2. The present state of climate change in Korea

Korea is located at the northern hemisphere of Far East, and belongs to a temperate climatic zone. This results in four distinctive seasons. Since the start of meteorological observation, between the years of 1904 -2002, temperatures have shown an average increase of 1.5°C per year. This is higher than international temperature increase ($0.74\pm 0.18^\circ\text{C}$). The reason is global warming, urbanization and urbanization effect take 20~30%.

Figure 1. Temperature deviation in Korea



Source: National Institute of Meteorological Research (Korea) 2006

There is detection about the change of season which relate to climate changing. In the 1990s winter is shorter than 1920s approximately 19 days, and summer is longer approximately 16 days. According to this research, spring and summer is getting longer and autumn and winter is becoming shorter.

Table 1. The change of the summer and winter period

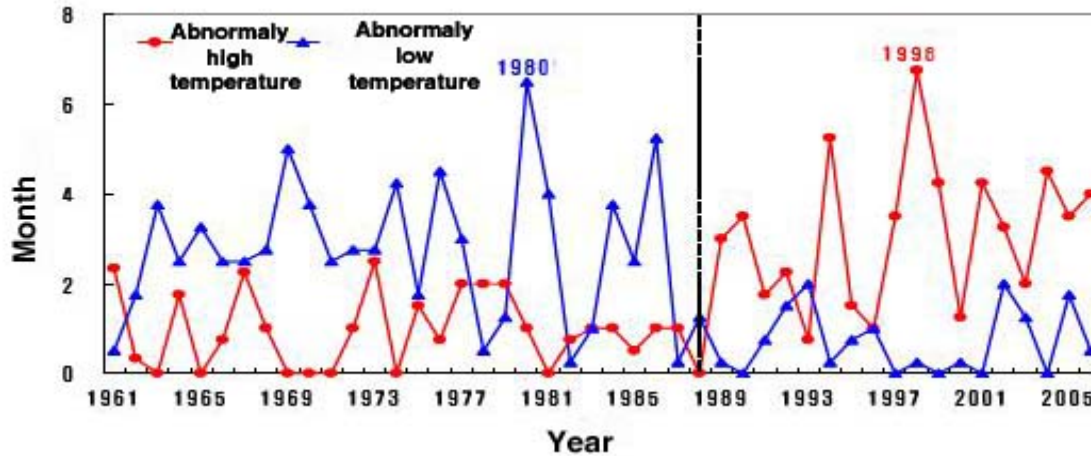
		Period	Compare 1920s with 1990s Increase or decrease
Summer	1920s	6.3~9.12	16days increase
	1990s	5.24~9.27	
Winter	1920s	11.21~3.18	19days decrease
	1990s	11.29~3.18	

Source: National Institute of Meteorological Research (Korea),2006

The status of occurring abnormal weather

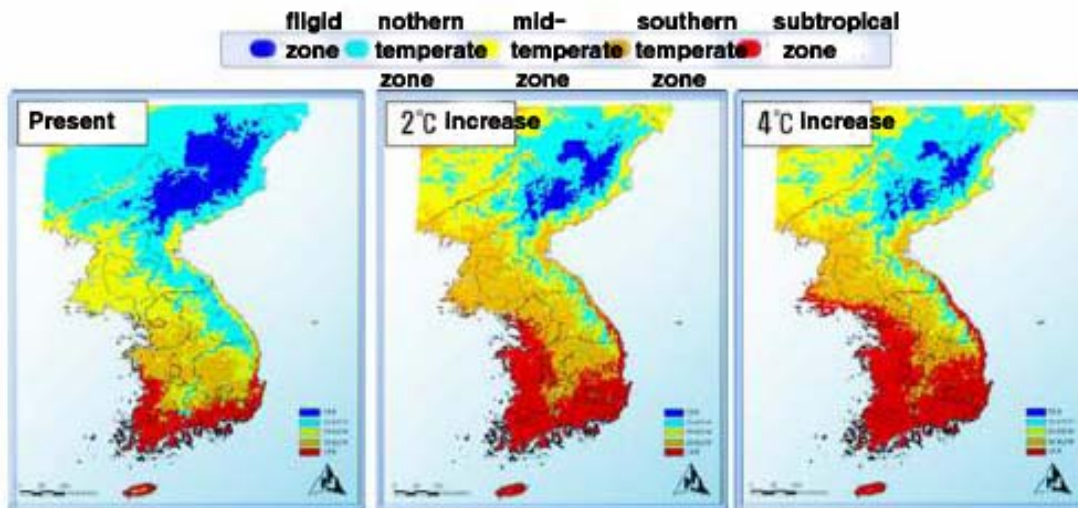
World Meteorological Organization defines abnormal weather as an unusual weather pattern which occurs once in 25years. Abnormal weather occurrence indicates there is definite change after 1988. During the years of 1961~2006 according to Korean National Institute of Meteorological Research temperatures increased along with rainfall levels. With increased temperatures, this will alter the climatic zone in each region. The scale of temperature change in Korea is bigger compared to the world. This is contributed by increased carbon dioxide density, a growing population in China and the other Asian regions and increased greenhouse gases. (Yumi Cha 2007)

Figure2. The change of Abnormal temperature occurred month (1961~2006)



Source: Sim, moon gyo (2008)

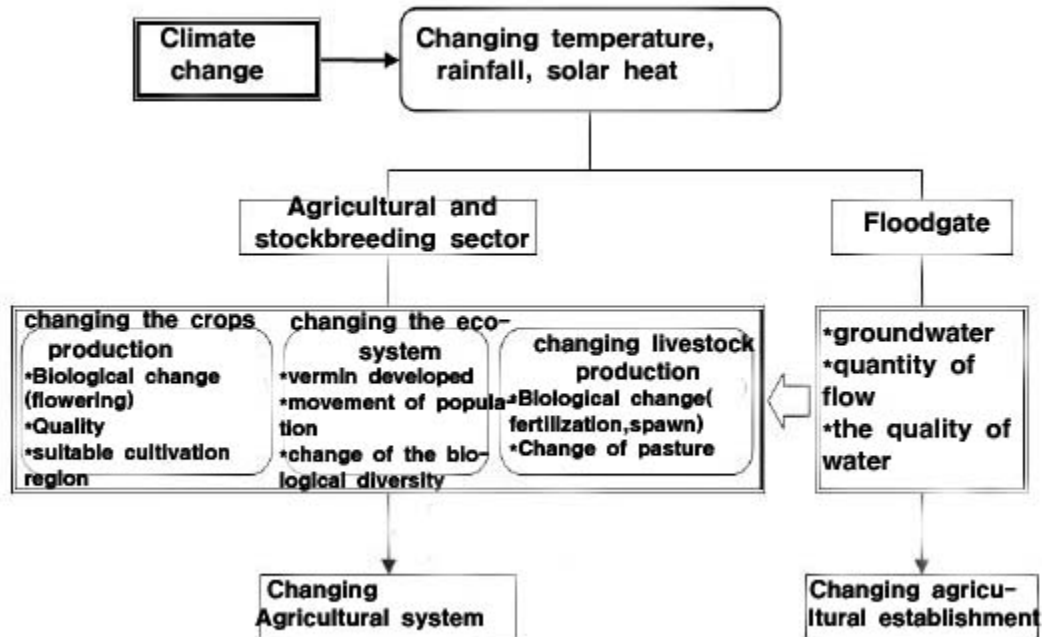
Figure3. A regional distribution chart of global warming in the Korean Peninsula



3. The influence of climate change on the agricultural sector.

Climate changes may confuse the agro ecosystem what was once stable before. Changes in temperatures, rainfall and solar heat have influenced agriculture, stock breeding and water resources.

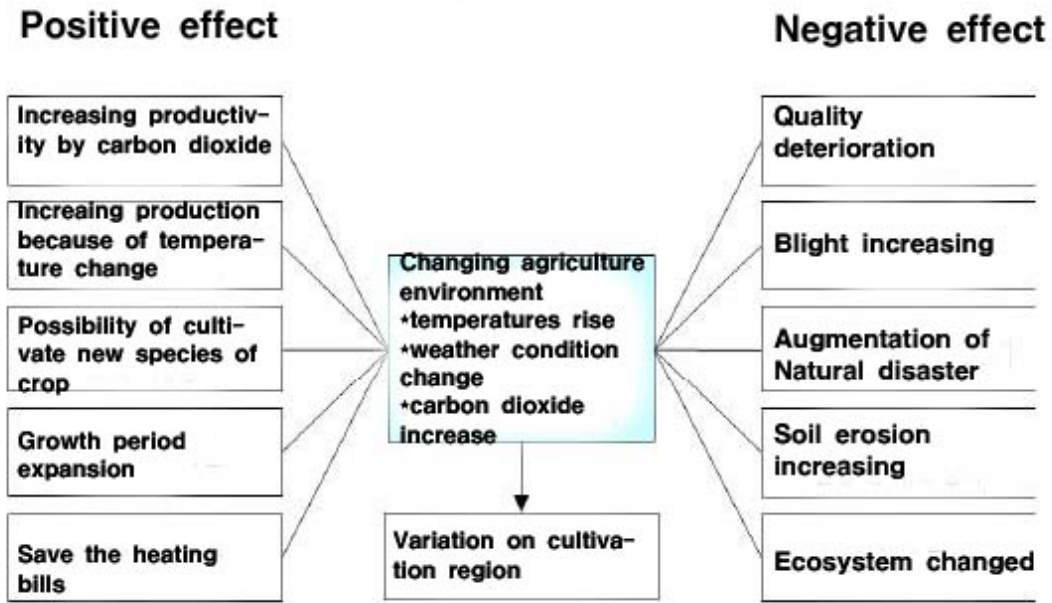
Figure4. The system of climate influenced on agriculture



Climate variation brings on biological change, quality and suitable cultivation. It has also influenced an agroecosystem which resulted in vermin growth, movement of population and change of the biological diversity. Moreover, it brings biological changes such as fertilization and spawn to the stockbreeding sector. This climate change has created a huge effect in crop production, and farming benefits in addition to changing the agriculture system.

However there is a positive effect in global warming such as increased productivity because of increased carbon dioxide density, expanded new High temperature fruit raise region and cost saving heating bills plus much more.

Figure5. Potential effect of global warming on agriculture



Increasing of blight

Temperature rise has brought us global warming along with new noxious insects, which causes serious crop damage. Rice crops have the highest self sufficiency in Korea. The affected district is northing by blight as a viral disease and the damaged area is almost 14,137ha.

Figure 6. Diffusion of rice blight insect

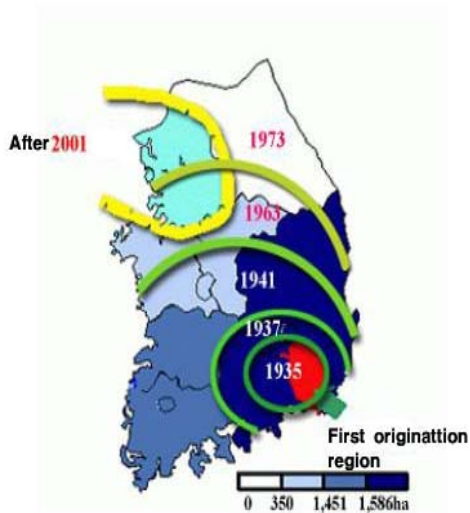


Figure 7. Case of grape damage by

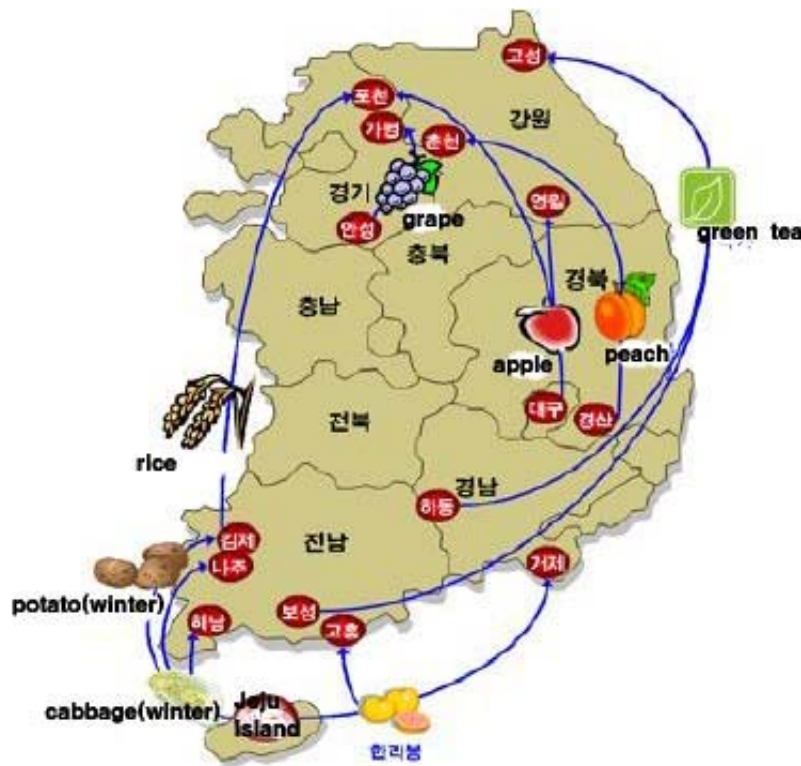


Source: Korean Rural Development Administration (2008)

Fruit crops have been damaged by *Lycorma delicatula*. These organisms have colonized all over Asia. The fruit crop damage have not occurred since 1979, but resurfaced in years 2007 and 2008.

Northing the main producing district

Figure 8. The map of main producing district moving



The main producing district is going north as apple, peach etc. Moreover garden products which can grow in only Jeju island are grown in the south coast region.

4. Appropriate measures

Develop alternate crops

Korean degree of food support is low. A new policy to cope with climate change is needed to improve the agriculture system and weather forecasting. First and foremost a policy for fruit and vegetable crops and tropical plants must be in place because of the expanded cultivation of tropical fruits now such as mango, papaya, kiwi, artichoke, okra, etc. (The present state of cultivation of tropical fruit in Korea; 44.1ha, 695ton).

Public relations are needed because many Koreans do not consume tropical fruits. If Korean farmers produce tropical fruit, export will be unsuccessful. Many Southeast Asians have competitive power of tropical crops compared to Korea. There must be a domestic demand before any exports are considered.

In spite of development of alternate crops we still need crops what was consumed by most of Korean people. In other word the existing crops in Korea need to endure high temperature, but lack in studies about that. And also need a technical development for crops what was cultured in southern region. Because each country got a special product for example Kyung Pook is famous for apple, but cultivation region of apple is northing so solution is needed for many Kyung Pook farmers and that is plant breeding namely make them strong at new weather condition.

Environpolicies

Facing the new weather condition as well as the protection of environment are needed in other word we must not make it worse. Recently Korean government announced new policy about protection of environment named 'Low carbon and Green growth policy'. Korean new government is interesting about environment with international trend. The purpose of policy is environmentally sustainable economic growth. The policy is focus on not only cope with the weather situation but try to reduce the environmental pollution in agriculture sector

Conclusion

We can not avoid the situation from global warming. Korean agriculture is face with a crisis and it should change to chance. Climate change can threat agriculture, but it can be opportunity for raising competitive power and realizing the necessity of protects the environment.

Environment is huge international issue include Korea. Because global warming will be bring a lot of problem and some of that already appeared. Agriculture is immense influenced by weather that is why we take this problem seriously.

We need to concern about the environment and practice the protecting environment but I think we must focus on how to deal with this situation in other word we should get more research about a subtropical and tropical climate. Besides let people know about tropical fruit and consume it what was cultivated in Korea.

Reference

- Kim chang gil. *Analysis of Climate Change In Agriculture*: Korean Rural Economic Institution. 2008.
- Kim chang gil and Jung hak gyu. *Green Growth Symposium*(agriculture sector). 2008.
- Kim chang gil and Kim bae sung. *Strategies to Comply with the Kyoto Protocol in Korean Agricultural sector*. 2008

Korea National Institute of Meteorological Research <http://www.kma.go.kr/>
Korean Rural Development Administration <http://www.ekr.or.kr/>
Presidential Committee on Green Growth. <http://www.greengrowth.go.kr/>