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Natural Disasters and Food Shortages in North Korea: Disaster Justice

Jin Yong Choi

Seoul National University College of Agriculture and Life Sciences
Landscape·Rural Systems Engineering

Introduction

North Korea spent a period of famine, known as the "Arduous March", in the late 1990s. The appearance of homeless, migrant children known as Kotjebi on TV broke the hearts of many viewers at the time. In 2021, after over 20 years have passed, North Korea called for another "arduous march". Food production is known to have decreased due to storm and flood damage in Hwanghae-do in 2020, and self-imposed border lockdown to prevent the COVID-19 outbreak has exacerbated food shortages in North Korea, who partially relies on foreign aid to feed its people. In July 2021, in an article titled "Will the 'Arduous March' of the Triple-handicapped North Korea in the 90s Repeat?"[1], JoongAng Ilbo wrote, "North Korea, who suffered from food shortages due to typhoons and floods in 2020, is on guard of heat wave damage," suggesting North Korea's exacerbating living condition due to natural disasters.

Droughts and floods in North Korea often appear in our broadcasts, and what is also mentioned at times of such disasters is North Korea's food shortage. Natural disasters cause damage to facilities and lives, but in countries with weak response capabilities like North Korea, it is typical that natural disaster damages lead to food shortages. South Korea, with a food self-sufficiency rate of around 47%, lacks food but supplies the demand through imports. On the other hand, in North Korea where internal and external conditions are difficult, coping capabilities with food shortages are presumed to be weaker than in South Korea.

1) JoongAng Ilbo (July 16, 2021), "Will the 'Arduous March' of the Triple-handicapped North Korea in the 90s Repeat?"

Several studies have raised the issue of North Korea's vulnerability to natural disasters and the resulting food problems, and have proposed various solutions, including international and inter-Korean cooperation. However, there were insufficient cases that considered disaster justice in the approach to carrying out cooperative projects for humanitarian recovery and response to natural disasters in North Korea. In particular, if North Korean residents who are exposed to natural disasters due to poor living conditions were alienated from the opportunity to secure food owing to inequality in food production and distribution and were thrown on the verge of starvation, this should be examined as a matter of disaster justice.[2)]

The Occurrence of Natural Disasters in North Korea

Table 1 shows the current status of natural disasters in North Korea over the past decade. Most were water damage, such as typhoons, floods, and droughts. typhoons and floods involve casualties and farmland damage, and droughts result in a decrease in agricultural production and eventually lead to food shortages. The issues of cultivating water resource reserves, reclaiming forests which serve as green dams, and damaging fuel reactor have been addressed in several studies[3)4)], so these will not be discussed in detail here. However, it should be noted that agricultural production infrastructures such as dams, reservoirs, and pumping stations, which contribute to the improvement of agricultural productivity while coping with floods and droughts, are in poor conditions. Moreover, the occurrence of food shortages in the event of a natural disaster in North Korea is related to poor maintenance of agricultural production infrastructure, deterioration of irrigation facilities which are based on pumping stations, and difficulties in operation due to power shortages.[5)]

2) A coined term used by Robert Verchick in "Disaster Justice: The Geography of Human Capability" (2012), meaning "treating everyone fairly in disaster response policies" (Source: Anna Lukasiewicz and Claudia Baldwin, 2020, Natural Hazards and Disaster Justice: Challenges for Australia and Its Neighbours, Springer Nature Singapore Pte Ltd.)

3) Park Kyung-seok, 2013, North Korea's Forest Present Condition and Forest Policy, KREI North Korean Agricultural Trends, Vol. 15, No. 3, 1-21.

4) Moon Kyung-yeon, Kang Hwan-woo, Baek In-rip, Lee Soo-chul, Jung So-min, Yoon Seol-hwa, 2015, Analysis of the Causes of Famine in North Korea: A Critical Study of the FAD and FED approaches, Journal of Asia-Pacific Studies, Vol. 22, No. 1, 77-109

5) Kwon Soon-guk, 2006, Measures for Mitigation of Natural Disasters Through Improvement of the Hydrulics System, Power and Resources, 1-9

Table 1 Reported Natural Disasters in North Korea (2012~2019)

Year	Period	Natural Disaster Type	Affected Area	Damage
2012	8.28.~ 8.30.	Flood caused by Typhoon Bolaven, Landslide	Pyeongannam-do, Hwanghaenam-do, Hwanghaebuk-do, Gangwon-do	Life Damage: 53 Deaths, 45 Missing Farmland Damage: 101,000ha
2013	7.12.~ 7.23.	Flood	Jagang-do, Pyeongannam-do, Pyeonganbuk-do, Gangwon-do, Hwanghaebuk-do, Hamgyeongnam-do	Life Damage: 28 Deaths, 18 Missing Farmland Damage: 13,340ha
2014	2014.3.~ 2015.8.	Long-term Drought (18 months)	Hwanghaenam-do, Hwanghaebuk-do	Farmland Damage: 80% of Hwanghaenam-do farmlands, 58% of Hwanhaebuk-do farmlands
2015	8.1.~9.6.	Flood caused by Typhoon Goni	Pyeongannam-do, Hwanghaebuk-do, Hwanghaenam-do, Hamgyeongbuk-do, Jagang-do	Life Damage: 40 Deaths and Missing, About 5,240 Houses Damaged
2016	8.29.~ 8.31.	Flood	Hamgyeongbuk-do	Life Damage: 138 Deaths, 400 Missing Farmland Damage: 27,000ha
2017	January ~ June	Drought	Pyeongannam-do, Pyeonganbuk-do, Hwanghaenam-do, Hwanghaebuk-do	Farmland Damage: 50,000ha
2018	July ~ August	Drought	Gangwon-do, Hwanghaebuk-do, Hwanghaenam-do	Farmland Damage: 9,900ha
2018	8.23.~ 8.25.	Flood caused by Typhoon Soulik	Hwanghaenam-do, Hwanghaebuk-do, Gangwon-do, Hamgyeongnam-do	Life Damage: Over 10,000 Displaced
2019	9.6.~9.8.	Flood caused by Typhoon Lingling	Pyeongannam-do, Pyeonganbuk-do, Hwanghaenam-do, Hwanghaebuk-do	Life Damage: 5 Deaths Farmland Damage: 46,200ha

* Choi Yong-ho, 2020, COVID-19 and North Korea's Food Supply and Demands Trends and Prospects, KREI Agricultural Administration Focus

A Look at the Food Problem Through Statistics

North Korea has higher food self-sufficiency rate than South Korea. As of 2019, South Korea's food self-sufficiency rate is only 45.8% and self-sufficiency rate of grain is 21.0%.[6] Meanwhile, South Korean agricultural administration predicted North Korea's self-sufficiency rate to be more than 90%.[7]

According to Statistics Korea's major indexes of North Korean statistics[8], the total output of rice, corn, root and tuber crops exceeds 4 million tons in 2020, this being the lowest output since 2012. On the other hand, South Korea produced more than 3.5 million tons of rice in the same year, this being 1.75 times higher than North Korea, whereas corns and tuber crops productions were much less - about 90,000 tons and 200,000 tons, respectively. Considering that the 2019 population of South Korea is 51.84 million and North Korea has a population of 25.37 million[9], the food situation in North Korea may not be so bad. Of course, this is on the premise that North Korea's statistics are reliable. Then, what does the fact that they are suffering from food shortages every year mean? For one thing, it is variability. There are times when agricultural production in North Korea significantly decreases due to droughts or floods, and if the ability to cope with these natural disasters is weaker than that of South Korea, fluctuations in agricultural production may increase. The other is an inequality problem in security or accessibility to food essential for human survival. When the state fails to supply sufficient food through imports, the vulnerable class in securing accessibility may suffer from food shortages. In the event of a disaster, those whose accessibility is not secured can fall into a state of starvation since they do not receive equal distribution. This is the case when disaster justice is not served within the state.

In the end, the food shortage is fundamentally due to the lack of agricultural production due to natural disasters, but is intensified by the imbalance in accessibility to food. Therefore, there is a limit to grasping North Korea's food shortage problem simply

6) National Assembly Research Service, 2020. 10. Food Self-Sufficiency Status and Tasks
7) http://www.ikpnews.net/news/articleView.html?idxno=33955, "North Korea's food self-sufficiency rate is expected to be over 90%"
8) Major Index of North Korean Statistics, Statistics Korea
9) 2021 Major Index of North Korean Statistics, Statistics Korea

by attributing to the influence of natural disasters. Although North Korea's unfavorable natural conditions and natural disasters worsen agricultural production and food shortages, inequality in access to food in the process of supplying and distributing food causes starvation, and this has intensified North Korea's wrong socioeconomic and policy system. In this regard, it brings us to consider disaster justice as a window to examine food problems along with North Korea's natural disasters.

Changes in Food Consumption in South and North Korea

Here, I examine the changes in South and North Korea's food consumption structure. "What the World Eats" of "National Geographic" presents daily calories of average food consumption in major countries from 1961 to 2011. According to this data, South Koreans consumed 2,140 calories per day as of 1961, which is similar to the world average of 2,194. However, in 2011, South Koreans consumed 3,329 calories, which is 450 calories higher than the world average of 2,870 calories. North Koreans, on the other hand, consumed 1,878 calories per day in 1961, slightly lower than the world average, but their daily consumption in 2011 was 2,103 calories. This is not only 770 calories lower than the world average, but also the lowest among 22 countries presented by National Geographic excluding Somalia. In regards to meat consumption, North Korea's food and nutritional vulnerability is more pronounced. Whereas South Korea's meat consumption increased by 831% compared to 1961, North Korea's meat consumption decreased by 12%. Such changes in food consumption show that the food problem in North Korea has affected the nutritional problem of North Koreans over a long period of time. What is noted here again is the food self-sufficiency rate, population, and calorie consumption. South Korea's population is about twice that of North Korea and food consumption exceeds 1.5 times, but grain productions of two countries are similar. South Korea has to supply three times as much food as North Korea, but their grain productions are about the same. South Korea supplies the excess demand for food with imported agricultural products. South Korea not only imports meats directly, but also raise livestocks with imported corns and beans from abroad. In other words, whereas South Korea overcomes the food shortage with imported agricultural products, it is not the same case for North Korea who lacks foreign currency.

This suggests that internal and external conditions and economic power to be able to import agricultural products greatly affect food supply and demand.

A Look at the Risk of Humanitarian Disasters in North Korea through Inform Report[10)]

In order to compare North Korea's humanitarian disaster risk with other countries, it is meaningful to look at Inform Report released by the Joint Research Center of European Commission. Inform Report is an annual report in which the Joint Research Center of European Commission creates an evaluation index named Inform Risk and quantitatively evaluates indicators related to humanitarian risks and disasters in countries around the world. The Inform Global Risk Index is calculated based on three dimensions of risk: Hazard & Exposure, Vulnerability, and Lack of Coping Capability.

North Korea ranked 29th with 5.4 points in the evaluation of information risk indicators, and South Korea ranked 150th with 2.1 points (the bigger the points, the more vulnerable the state is). If we take a look at the values of Inform Risk index by each evaluation factor, North Korea scored 4.5 points and South Korea 3.7 points for Hazard & Exposure, of which the values for natural disasters is 5.2 points for North Korea and 5.9 points for South Korea. However, the vulnerability values differ greatly with 5.7 points for North Korea and 1.4 points for South Korea. There is also a significant difference in values for lack of coping capability with 6.3 points for North Korea and 1.7 points for South Korea. That is, the degree of exposure to disasters in accordance with the natural environment does not show much difference between South Korea and North Korea, but there is a big difference in their abilities to respond to those disasters. North Korea's comparatively lower ability to respond to natural disasters is evident from the difference in Inform Risk index values, and North Korea ranks the same as Mauritania located in the Sahara Desert. In other words, the risk of North Korea in terms of natural disasters is about the same as that of South Korea, but North Korea's ability to to respond to those disasters is significantly lower.

10) Thow, A., Vernaccini, L., Nika, A., Poljansek, K., Galimberti, L. and Dalla Valle, D., INFORM REPORT 2021; Shared evidence for managing crises and disasters, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-39355-9 (online), JRC125620.

I further examined the relationship of Inform Risk index, hazard & exposure, vulerability, and lack of coping capability of 191 countries with GDP per capita provided by World Bank in 2020. While the Determination coefficient (R^2) of GDP per capita and the natural disaster values of hazard & exposure index was about 0.19, the R^2 of GDP and Inform Risk index was 0.70, vulnerability 0.58, and lack of coping capability 0.80. These results suggest that exposure to natural disasters in each country does not have much correlation with its economic power, but the lack of coping capability, vulnerability and Inform risk index show high correlation, indicating that a country's economic power is a crucial factor in national risk management. In this context, North Korea is vulnerable to natural disasters due to economic conditions, resulting in low resilience which leads to food problems. With disaster justice yet to be established and served, the vulnerable class in North Korea is likely to suffer from starvation in the face of natural disasters.

North Korea's Food Problem and Disaster Justice

North Korea's food problem involves vulnerability to disaster exposure and response and inequality in the process of food distribution. In "Analysis of the Causes of Famine in North Korea: A Critical Study of the FAD and FED approaches"[11], Moon et al.(2015) classified North Korea's hunger problems into natural disaster problems and problems of food accessibility, and analyzed the causal relationship of natural disasters and food shortages. They also analyzed how these causes are related to increase the North Korean famine. This is similar to the issue of the process of serving disaster justice in relation to inequality in food acquisition beyond the causal relationship between damage caused by physical disasters and food shortages. Whereas several other studies directly correlate natural disasters with food shortages, Moon et al. distinguished food shortage problems using Food Entitlement Decline(FED) approach and Food Availability Decline(FAD) approach. Based on these approaches, they explained that although famine results from food shortages caused by natural disasters, hunger occurs depending on the ability to obtain sufficient food and thus, famine occurs among those who lack power to acquire

11) Moon Kyung-yeon, Kang Hwan-woo, Baek In-rip, Lee Soo-chul, Jung So-min, Yoon Seol-hwa, 2015, Analysis of the Causes of Famine in North Korea: A Critical Study of the FAD and FED approaches, Journal of Asia-Pacific Studies, Vol. 22, No. 1, 77-109

food. This raises the issue of inequality in food acquisition.

Robert R. M. Verchick (2012)[12], in his paper "Disaster Justice: The Geography of Human Capability", took note of the fact that the elderly and women were especially hit hard in the event of a disaster. He observed that more than 60% of the fatalities from Hurricane Katrina in Louisiana were the elderly, and 65% of tsunami victims in Japan in 2011 were the elderly aged above 60. He noted that most victims of disasters were the elderly, women and children, and 57% of the unemployed in Louisiana after Hurricane Katrina were women. This shows that the socially disadvantaged were not only alienated from efforts for damage recovery from natural disasters, but also already vulnerable to natural disasters before the occurrence. In light of this fact, it can be suggested that the class suffering from food shortages in North Korea had high degree of disaster exposure and vulnerability before the natural disaster, and thus they were bound to suffer a lot of damage in the first place.

Natural disasters are unavoidable due to external factors, but recovery efforts are largely related to national policies, budgets, and community efforts and cooperation. This can be examined through the resilience of a society, which is reflected in vulnerability and lack of coping capability indexes in Inform Report discussed earlier. If a society has great resilience, it can reduce damage to natural disasters, reduce additional damage through rapid recovery, and prepare for the next disaster. However, just because a society has great resilience does not mean that disaster justice is always served. There should be no inequality based on subject, age, class, gender and such in the process of recovery efforts. Famine in North Korea tends to intensify as citizens' ability to acquire food decreases unequally after natural disasters incur food shortages. In other words, the vulnerable including the elderly and women are more vulnerable to securing food and exposed to hunger. Accordingly, in North Korean regime, in which disaster justice is difficult to be served, it is important to keep in mind that the lack of food caused by natural disaster entails the elderly, women, the poor, and others not included in the vested interests on the verge of starvation.

12) Robert R. M. Verchick, 2012, Disaster Justice: The Geography of Human Capability, Duke Environmental Law and Policy Forum 23, 23–70

Conclusion

North Korea's food supply and demand can aggravate in the future due to COVID-19 and climate change. Therefore, in promoting cooperative projects such as food support and natural disaster recovery support in North Korea, it is necessary to contemplate on serving disaster justice in which the vulnerable class to natural disasters is not alienated from the recovery process. As seen in Inform Report, North Korea is a country with a high risk in terms of natural disaster management. Constant interest and support are needed, but discussions on disaster justice must also continue as part of the process.

Author Introduction

Jin-Yong Choi

Seoul National University Department of Rural Systems Engineering, College of Agriculture and Life Sciences

Jin-Yong Choi is a professor of the Rural Systems Engineering Department, College of Agriculture and Life Sciences, and an affiliated professor of IPUS in Seoul National University. He was the president of the Korean Society of Agricultural Engineering and Co-chair of the Rural Water Forum. He is a board member of the Korea Water Forum and National Assembly Water Forum. He is working as a Vice President of the International Commission on Irrigation and Drainage(ICID) and an advisory committee member of KOICA for the agricultural sector. His research area covers rural water resources and ICT convergence, climate change response for agricultural water, and water-food-energy nexus.