Forest planning decision model to restore forest denudation of N. Korea

- Choosing the optimal tree species considering socioeconomic factors -

Abstract

Recently, efforts to restore the forest denudation are carried out in the field of private, public, industrial and academic sectors. North Korea indiscriminately has been converting its mountainous areas into farmland to solve the food shortage problems. However, the assarts without proper investigation and management only make landslides, steep farmland and forest denudation at the end. The government's policies, numerous studies by industry and academia and hot discussions in the private sector (the Green Association, etc.) suggest that the deforestation in North Korea has reached a serious level and no more time before it fall into a hopeless status.

Of course, North Korea is also aware of the seriousness of the forest denudation and tried to stop the forest denudation but its own solutions are difficult due to conflicting legal systems and an absolute lack of institutional bases.

The forest denudation is going against the global trend of reducing greenhouse gas emissions, threatening the lives of North Koreans by adding environmental damage and causing economic degradation of forests and natural disasters (floods and landslides).

To solve these problems, satellite images of parts of Gaeseong (one of cities of N. Korea) were analyzed to identify the status of the forest denudation sites and to provide directions for rapid restoration of forests using South Korea's advanced cadastral system and spatial analysis techniques. Through this analysis, the optimal tree species are selected to recover the damaged land based on socioeconomic factors like CO_2 absorption rate, less labor input, food crisis and etc.

To induce voluntary participation and for efficient ongoing post management of recovered forests, the ownership system should be changed to the private system. The study is closely related to the privatization of North Korea's land ownership after unification, but this paper is studied on the premise that the ownership issue could not be resolved in a short period of time and that the current state ownership (management) system would be maintained for the time being as forest restoration is very urgent.

The boundary of the forest denudation is defined according to the direct and indirect of satellite images analysis and adjusted with five elements that affect the boundary determination (based on current boundary).

The optimal land use is defined through the analysis of overlapped individual characteristics of the factors and forest planning decision model is made based on the optimal land use.

- (5 factors) actual purpose of land use, geological and geographical factors, climatic factors, vegetation factors, and socio-economic factors

This paper also analyses the public values of the recovered forests based on the assumption that the forest restoration would carried out from 2020 through 50 years through the decision model (water source ships, soil erosion, forest recreation, biodiversity, and air purification).

Background and purpose of study

One of the current biggest issues domestically and internationally is the change of the political unrest on North Korea.

The Panmunjom declaration (2018.4.27.) through the summit showed the possibility that relations with North Korea could improve dramatically.

Even though the improvement the relations does not lead to a conclusion of reunification, everyone will agree that the South and North should exchange and cooperate together in preparation for future reunification.

If so, it should first understand what the two Koreas can do together in the area of cadastral and national territory information to improve the economic status of N. Korea, namely what tasks North Korea should address most urgently for their county.

In 2018, the National Forest Service announced the international cooperation for improving relations in the forestry sector, including the restoration of the deforestation site in North Korea, and the Ministry of Unification is also pushing for the active exchanges and cooperation through joint efforts to prevent forest denudation of N. Korea. Government organizations are ready and preparing the solution to stop the forest denudation

In addition, there is a growing interest and discussion among private and academic communities in the country and internationally about the forest denudation of the North. According to the Ministry of Unification, 2.83 million ha, or about 32 percent of its total forest, has already been devastated at the world's third-largest pace (2018.5). At this rate, it is assumed that all forests will be devastated in the near future.

North Korea is also aware of the seriousness of the problem and implementing laws for forest restoration, forest protection, and appealing for voluntary participation by residents, but it hardly shows drastic improvements of the problems.

On the other hand, South Korea has experienced various experiences in producing various digital map for forest management from long ago and responding proactively to the management of mountainous areas under related laws.

South Korea has recognized the limitations of one-dimensional methods (excluding Forestation by planting trees and sanction on forest ownership), and has taken into account a combination of factors since this period to respond effectively

Therefore, it is necessary to provide a suitable direction for forest restoration based on the experience of the South that already overcame the problem successfully.

The research is aimed at maximizing the forest restoration through reasonable land use by selecting and comprehensively considering the five factors that are important in determining land use objectives and the targeted boundary rather than simple restoration by planting in devastated mountainous areas.