

The parametric estimation of the amount of CO₂ to be stored as HWP of the wooden house, based on the each of tree specie

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In the term of the handling of wood in Kyoto Protocol, it has been considered to release carbon accumulated in growing stage immediately into atmosphere at the time of cutting down from forest in the first commitment period. In the second commitment period, it has been considered to fix carbon while it is used as harvest wood products (HWP), and to release carbon into atmosphere at discarded stage. The main utilization of domestic wood is to build wooden house domestically, and it has an important role as a carbon pool of HWP. However, the rate of utilization of domestic wood has been continued to decrease. In order to take concrete strategy to measure rate of increase in utilization of domestic wood in the future, it is important to estimate present amount of utilization by each of tree species and the amount of prospect for increased use in the future.

Future estimation of carbon pool by HWP for all over the country was studied in the past research. In the estimation for all over the country, national total gross floor space, the number of new constructions per year, the number of households, the amount of average for wood utilization are used as basic date, it has not been estimated by each of tree species. Therefore, in order to estimate target amount of increased utilization for each of tree species, it is urgent issue to make calculation flow based on area characteristic by using the amount of tree species used in each material by region, and the amount of carbon stock (hereinafter called carbon balance) for each of tree species by region.

In this study, it was investigated that estimation method of the amount of utilization by each of tree species and the amount of carbon stock which is applicable to wood statistics and all prefectures. Estimation, which is for Nagano, of the amount of utilization for each of tree species and the amount of carbon stock was conducted by using carbon balance for each of tree species in Nagano which was revealed by Yamagata et al. in the past research, and the rate of utilization for each of tree species which was surveyed by Nagano Prefecture.

As a result of estimation, it revealed that the amount of carbon stock would decrease with a peak of 380,000 [t-C] in 2021 (Heisei 33). From the increase in the total gross floor space in the whole area of Nagano by the increase in the average of gross floor space per house, the amount of carbon stock indicated an upward trend until 2021. However, the amount of carbon stock declined by the decrease in the number of new constructions per year and increase in the number of losses of existing houses in 2022 and later. In this research, we conducted the estimation of the case in which 60% of domestic wood utilization that Forestry Agency advocated as a measure against decrease in the amount of carbon stock was achieved. As a result of having changed the domestic wood utilization up to 60% in 2011 and later, the decrease in the amount of carbon stock was not seen until 2038 (Heisei 50).

The estimation revealed necessity to increase supply of domestic wood approximately 50,000m³ per year to achieve 60% of utilization rate for domestic wood. There is sufficient amount of accumulated forest resources in Nagano, however, it is necessary to secure supply capacity. Ido et al. pointed out that it is difficult to adjust the cut of timber from forest since it is difficult to show demand prospect. For this issue, the estimation of this study is very useful and contributes to increase distribution of domestic wood by feeding back the estimation result to supply side. Since there is a distribution of domestic wood between prefectures, it is necessary to estimate by the method of this study in other prefectures. It is important to create road map which raises rate of utilization of domestic wood by planning and grasping the wood distribution of the whole country by obtaining each demand prospect in the future.

Keywords: Kyoto Protocol, HWP, wooden house, carbon stock, domestic wood