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Evaluation of Carbon Stocks of Domestic wood products to Improve Carbon Sinks in the Forest sector

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ABSTRACTS

◆ **Harvested wood products (HWP**) are an important carbon pool of the forest sector by storing carbon and reducing carbon emissions via replacing energy-intensive materials(cement, steel, plastics etc.)

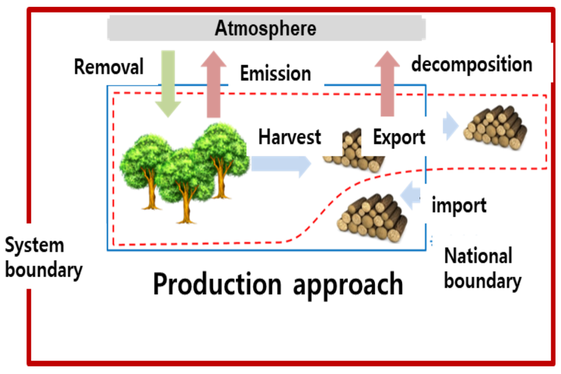
◆ Although the HWP carbon calculation method related to this has been suggested since the IPCC 2006 guidelines, it could not be calculated due to the **lack of HWP statistics data in Korea.**

◆ In this study, to estimate the carbon stock and the annual stock changes for each of the HWP categories with country specific activity data.

◆ As a result of the calculation, it was estimated that about 0.7 million tCO_2 was stored according to the use of domestic wood products in 2019.

MATERIALS & METHODS

Estimation of carbon stock of domestic HWP



The Production Approach is a producing country-based approach, which attributes the carbon stocks and emissions of HWP to harvesting countries by including exported HWP and excluding imported HWP.

$$C_l(i+1) = e^{-k} \times Cl(i) + \left[\frac{(1-e^{-k})}{k}\right] \times Inflowl(i)$$

$$\Delta C_l(i) = C_l(i+1) - C_l(i)$$ (by IPCC(2019))

i = year (yr)

$C_l(i)$ = the carbon stock in the particular HWP commodity class *l* at the beginning of the year *I* (Mt C)

k = decay constant of FOD for each HWP commodity class *l* given in units yr^{-1}

(=ln(2)/HL, where HL is the half-life of the particular HWP commodity in the HWP pool in years)

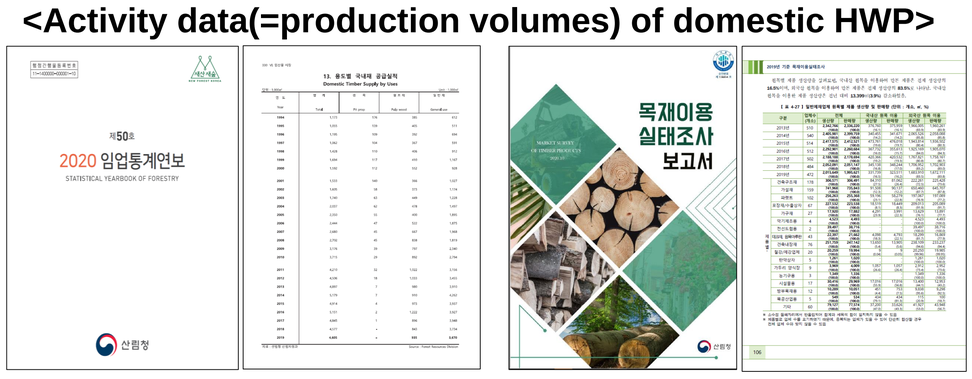
$Inflow_l(i)$ = the carbon inflow to the particular HWP commodity class l during the year i, Mt C yr^{-1}

$\Delta C_l(i)$ = carbon stock change of the HWP commodity class l during the year i (Mt C yr^{-1})

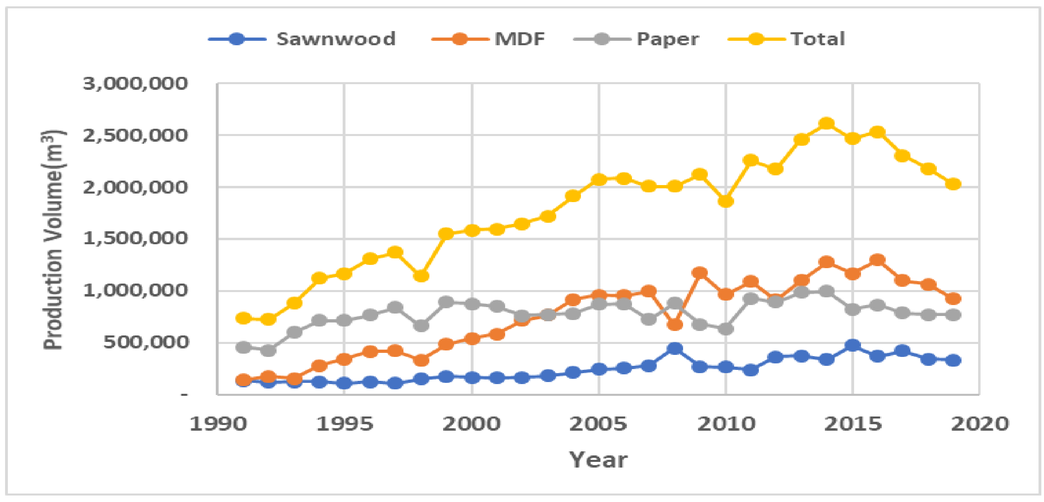
<Default conversion factors of semi-finished HWP>

	Density (oven dry mass over air dry volume) (Mg/㎥)	Carbon Fraction	Half-life (year)
Sawnwood	0.458	0.5	35
MDF	0.691	0.427	25
Paper and paperboard	0.9 (oven dry mass over air dry mass)	0.386 (Conversion factor, Mg C / Mg)	2

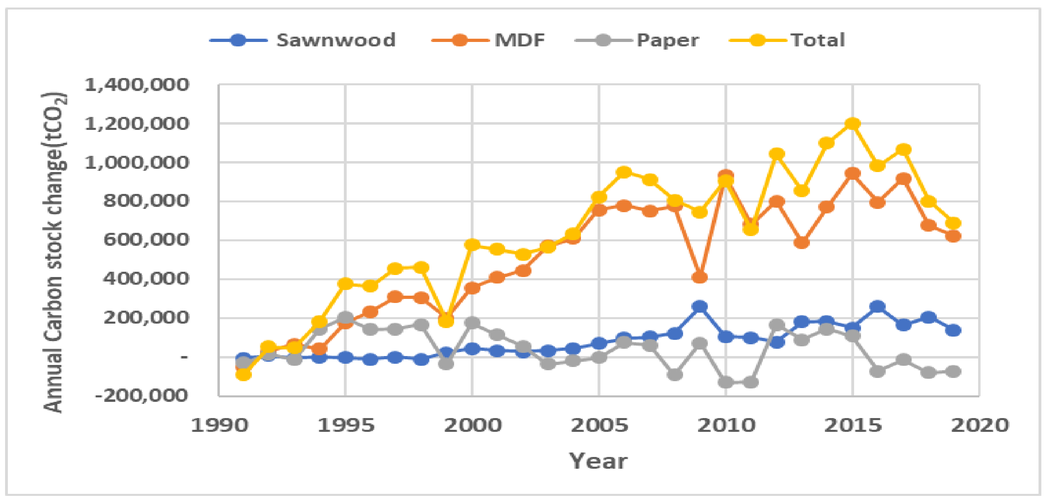
<Activity data(=production volumes) of domestic HWP>



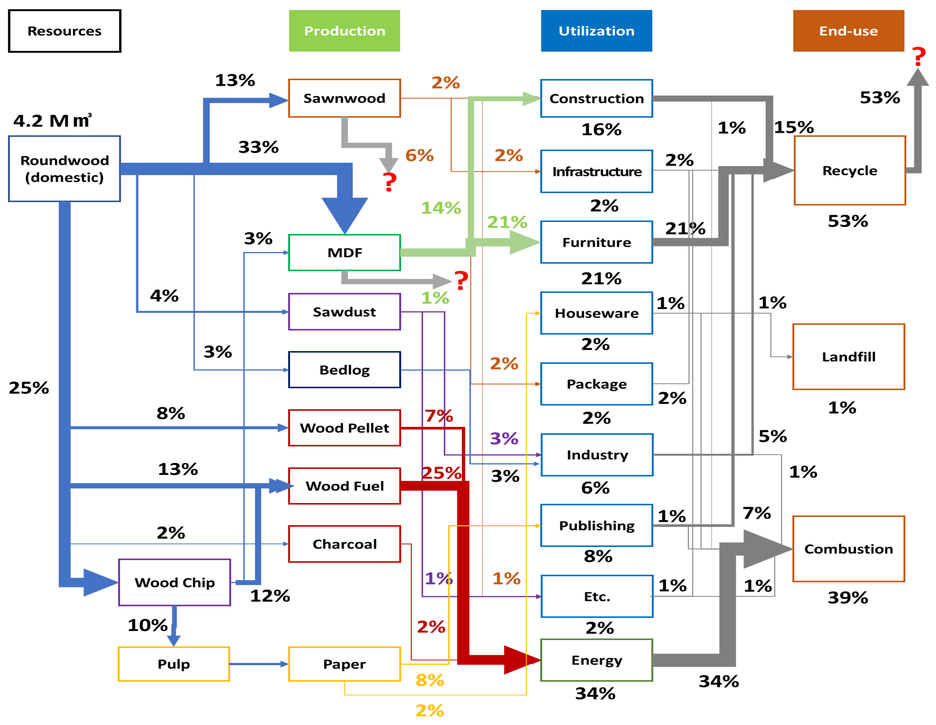
RESULTS & DISCUSSIONS



▪ Domestic HWP production has steadily increased, **but it has been on the decline since 2015. Most of the domestic wood is used as MDF.**



▪ In 2019, **annual carbon stock change of domestic wood products** was estimated about **0.7 million tCO_2**



▪ It is planned to **increase the carbon stock of HWP originated from domestic roundwood** through material flow analysis

CONCLUSIONS

◆ It is necessary to establish and implement policies such as granting incentives to encourage the expansion of wood use and longer-lived applications

◆ More extensive studies that includes the benefits of avoided emissions through carbon storage and product substitution is an important future requirement to fully assess the potential contribution of HWP to climate change mitigation