ADITYA SANI SASMITA The Biomass Estimation on Teak Stand Using ALOS PALSAR Image Resolution of 50 M and 12.5 M With Backscatter, Age, and Height of Trees Variable Study at K.P.H. Kebonharjo PERUM PERHUTANI UNIT I in Central Java. Supervised by M. BUCE SALEH.

Global warming is one of the environmental issues that are important at the moment. The cause of global warming is the effect of greenhouse gases. Carbon dioxide (CO₂) is one of the greenhouse gases which trap heat in the atmosphere. The carbon dioxide absorbed by forests and is stored in the form of biomass. Information about biomass can be obtained using the technology of remote sensing. Such as by satellite ALOS PALSAR image. Of course the field variable also has close relation with biomass. Therefore, to maximize the results of the biomass estimation beside backscatter we used the field variable such as aged and height of trees.

The purpose of this research is : (1) To improve and gained accuracy of biomass estimation based on backscatter by adding the variable age, and height of tree; ( 2 ) To improve and increase biomass mapping based on backscatter by adding the variable age of trees. Calculation of biomass done by using Hendri alometric and BEF (Biomass Expansion Factor) coefficient. The formula of the biomass model conducted using two variables, three variables, and four variable. The best model are selected based on the highest value of the coefficient determination (R²), corrected coefficient determination (R² adj), and the Root Mean Square Error (RMSE) which have the lowest value. The mapping is done by the areal base, pixel base, and pixel base using filltering. The best map selected due to Overall Accuracy (OA) and Kappa Accuracy (KA) which have the highest value.

From the regresion analysis result, the best model are quadratic model using backscatter (X₁), Age (X₂), and Height of Trees (X₃). The equation is Y = 123 – 0.488X₁² + 0.00745X₂² + 0.127X₃² for ALOS PALSAR image 50 m resolution with R² adj value 88% and Y = 105 – 0.231X₁² + 0.00802X₂² + 0.126X₃² for ALOS PALSAR image 12.5 m resolution with R² adj value 87.3%. From the accuracy test result of mapping, the best biomass map are using the pixel base with 3x3 filtering for 50 m resolution and 7x7 filtering for 12.5 m resolution. They have the highest Kappa Accuracy value which is 55.05% for 50 m resolution and 49.89% for 12.5 m resolution. The biomass map using areal based method tend to overestimates. From this research, adding the age and height of tree variable proven to incraese the accuracy of biomass model estimates and adding the variable age proven to increase the accuracy of biomass mapping.

Keywords : Biomass, ALOS PALSAR, Backscatter, Teak, age and height of tree