Abstract

The phenomenon of El Niño or La Niña was relatively high at 75 percent, which is the state of the El Niño phenomenon more than La Niña at 40.7 percent and 34.4 percent, respectively. The weak level of La Niña affected the weather cooler than normal weather and had a higher rainfall in some months which had some impact on the fruit yield. It was found that the weak, medium and strong levels of El Niño phenomenon affected slightly the persimmon yield decreasing (less than 20%). For plum cv. Dang Ban Luang, they were found no correlation with yield variability. However, a tendency for yields may be increased under high temperature and arid conditions in the early period of a year. The correlation of ENSO phenomena type SOI between the 3-month mean was not significantly correlated. It was not suitable for the relationship with the fruit yield in the study areas.

A study on the relationship of climate on the critical period of persimmon cv. P2 and plum cv. Dang Ban Luang was studied the modeling that used to forecast the impact of weather factors on the fruit developmental stage before harvesting period. The results showed that the young fruits of persimmon cv. P2 at 1.5-2.2 centimeters of fruit diameter in the middle of April to early May, correlated to the maximum daily temperature of 4-5 days before fall. The linear correlations showed the percentage of fruit drop in the Ang Khang Royal Agricultural Station and the Mae Hae Project Development Center were Y_{PDA} = 368.981 – 13.020(4dTmax) and Y_{PDM} = −104.507+3.694(5dTmax), respectively. While fruit drop of plum cv. Dang Ban Luang related to the maximum daily temperature of 5-9 days before fall at the young stage at 1.0-2.0 centimeters of fruit diameter before pit hardening in middle February to March. The linear correlations showed also statistical significance of the fruit drop percentage in the Ang Khang Royal Agricultural Station and the Mae Poon Luang Project Development Center were Y_{BDA} = 280.285 – 9.421(9dTmax) and Y_{BDP} = − 616.591 + 24.670(5dTmax), respectively. The correlation coefficient (R) and the determination coefficient (R^2) values were satisfactory levels. It is used as a guideline to study the impact of climate change on fruit yield forecasting in the Royal Project Foundation areas.

The study of the impact of climate change on the yield of plum cv. Dang Ban Luang in the Huai Nam Khun Royal Project Development Center and the Mae Poon Luang Project Development Center had incomplete and insufficient data, then no results for suitable modeling. For the Ang Khang Royal Agricultural Station, linear regression analysis was performed from the data for the 3 years period during the years 2558-2560, which the minimum temperature in January related to yield as followed the equation of $YB = -3965.129d1 + 33808.294$ with the correlation coefficient (R) of 0.982, the determination coefficient (R^2) of 0.965 and the P-value of 0.035 was statistically significant. This plant model could be used to predict yield in the 4 months before harvest. It is used to prepare for the impact of weather conditions on the yield of plums.

The validation results of the plant model of persimmon in Ang Khang Royal Agricultural Station (YPA_{59}) that related to the number of rainy days on March to June and predicted for 2-6 months before harvest, were compared to the other plant models. Their deviations did not so much. The estimated yields of plant model were close to the actual yields. According to the plant model, estimated yields were between 2,182-2,560 kilograms when compared with the actual yield was 2,800 kilograms in the year 2561. For the validation of the plant model in the Mae Hae Development Center (YPM_{59}) that related to the number of rainy days or the frequency of precipitation in January and predicted for 6 months before harvest, showed the deviation no more than 20% in the year 2561. Whereas the plant model of the Huai Nam Khun Royal Project Development Center (YPH_{59}) provided significant deviations, so if there were the other factors influencing it, then the plant model could not be used to predict the yield.

Approach to farmer in the highlands preparedness for the impacts of climate variability should be provided the information, agricultural occupation, appropriated planting area and adjustment of the proper environment in their community, using the appropriate technology for crop production to prepare under climate change impacts, and finding ways of strategies for farmers' adaptation to the effects of climate change in the future.

Keywords: Climate change, fruit drop, correlation, persimmon, plum, model