Abstract

The impact study of climate variability on fruit growing in the highlands had collected meteorological data to create a database, it showed that variation patterns, the average temperature of each month varied according to the season of the region. On the highland areas had similar weather changes during the year, but there was a difference in the quantity measured in temperature and rainfall according to the variable physiographic features and the height of the area. The period gained highly the climate variability, there was a different daily temperature from January to April. The climate model was determined the distinct relationship between Southern oscillation index (SOI) with maximum temperature, the minimum temperature, and precipitation during the year. Climate model testing for the highland should be accuracy under the moderate and severe phenomenon of El Niño and La Niña regimes on the fruit yield estimate. By the climate scenarios of the long period (2531-2564 BE.) under the regional level of ECHAM4-PRECIS revealed that maximum temperature and minimum temperature of the highlands tend to increase but precipitation was uncertainly and highly variability in a year. In the study on climate change in the short term of a year and a long term may be changed to no more than 2 $^{\circ}$C in the next 50 years.

Validation of climate model for the short term by Southern oscillation index (SOI) found the distinct relationship in some month with maximum temperature, the minimum temperature, and precipitation. The variation of the ENSO phenomenon was quite high, up to 75%, the phenomenon of El Niño more than La Niña. A tendency of the strong La Niña phenomenon decreased the yield of persimmon and mango 'Chiin Hwang', while the strong El Niño phenomenon decreased more than 50% yield of the avocado. But there was not affected an evidence relation with plum 'Dang Ban Luang'. The study of geographical features, soil characteristics and the water utilization in the soil for fruit crops differed in each area. Plants could absorb enough moisture in the soil at the root level during the dry season. But it had a high risk of drought according to soil characteristics Study of reference evaporation with calculating the evaporation rate in the cultivation areas of mango showed a high evaporation value, therefore there was a risk of water shortages more than the cultivation areas of persimmon and

avocado compared in that weather. Applying knowledge about watering on the plant can be used to educate officials for advising growers in the fruit growing area.

The developing and testing of plant models were analyzed on the weather data and yield of persimmon, mango 'Chiin Hwang', avocado 'Buccania', and plum 'Dang Ban Luang' by the weather factors before harvesting. The result showed that the relationship was statistically significant linear regression which in each plant model could forecast the accuracy in some specific area before harvesting period. They were a high level of the determination coefficient (R^2) for using predict the yield before harvesting at the different period in each plant model The validated results were reliably deviated by the other factors influencing it. The plant model could not be used to predict the accuracy yield, therefore was a limitation of the efficiency in forecasting in advance. Besides, the impact of climate on the critical productivity of these fruit crops revealed that the daily temperature influenced the floral sex expression and fruit drop at the young fruit. The relationship showed statistically significant linear regression for fruit drop at the young fruit more than the fruit growth stages. It was a critical period of fruit development when the climate variability impacted on fruit productivity. This study proposed the guidelines for reducing the impacts on fruit drop during the critical period of productions by using plant growth regulators to spray in full bloom period. The result showed that the number of fruits remaining on the tree was found and decreased the fruit drop which reduced the yield damage in some areas.

Using the climate model and plant model in the area was an alternative way to prepare for the impacts of climate change. Utilization of the climate model and plant model should be designed to facilitate easy access to information and timely situational awareness on the climate and fruit yield. Preparation of the meteorological monitoring and instrument setting to meet the standards by the directly responsible personnel are necessary for the development of efficiency. In the opinion of fruit growers on highland areas fruit growers are affected by climate variability on their gainful yield. Then, it should have the policy and plan to inform information for farmers will be gotten promptly in time to remedy the situation.