Rice is the main food of the inhabitants of Sri Lanka. Hence, monitoring at every growth phase of a rice plant is an important information fact for an estimate of the yield prediction before harvest. It helps many aspects like strategic planning and decision making regarding the food security and facilitation of safe harvest storages. In Sri Lanka, a traditional “crop cutting survey” fails to forecast rice yield before harvest as this experiment is conducted during the harvest. However, previous research studies have concluded that satellite RS (Remote Sensing) as a potential tool for identifying the paddy stages and estimating and forecasting crop yields. In this study, I used Sentinel-2A free RS data from 2015 to 2019 over Gampaha, Kiridiwita selected paddy area, for classifying the paddy stages (Germination, Vegetative phase, Reproductive phase and Ripening phase) and also build the model for selected area harvest predicting. For classifying the paddy stages, used image classification using Support Vector Machine(SVM) and Convolutional Neural Network(CNN) approach. Since Sentinel-2A carries the Multispectral Imager (MSI) then (B04, B03, B02), (B11, B08, B04), (B11, B08, B02) bands combinations are selected to build the image classification model for identifying the paddy crop stages. Among them (B11, B08, B02) bands combination shows a more accurate model with an average overall accuracy of 92% in the SVM classification model and also CNN shows the same accuracy with data augmentation. For forecasting the paddy yield of the selected area, analysis the linear gradient and polynomial coefficients in order two of NDVI(Normalized Difference Vegetation Index) values of every Yala, Maha season in each year and map with the past harvest data and build the model. The gradient of the linear in temporal NDVI paddy seasonal data(Yala & Maha) vs past harvest data shows more correlation with other than Polynomial coefficients. So paddy yield forecasting selected model was in AOI. Once the paddy crop is identified as in the Ripening phase, it shows the paddy yield forecasting result per acre. Therefore, this experiment has demonstrated that the seasonal rice yield can successfully be forecasted one month prior to harvest with considerably higher accuracy.

Keywords — paddy yield forecasting, paddy stage identification, Sentinel-2 images, NDVI, SVM