

# Study on the Identification of Rice Varieties with Remote Sensing Data



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## 1. Introduction

Heilongjiang Agricultural Reclamation has abundant land resources, concentrated arable land and high degree of agricultural mechanization, which has unique advantages in the development of precision agriculture. In recent years, with the emergence of various kinds of high spatial and temporal resolution satellites, agricultural remote sensing, global navigation technology and Internet of things technology can be effectively combined, and play an important role in the fields of crop classification, accurate management, yield estimation and pest control. The Random Forest, one of the most powerful classifiers, is widely applied in the field of the land classification.

## 2. Study Area and Data

The Chuangye Farm is located in Heilongjiang Province in Northeast China, within the range of 132-133 longitude and 47 latitude. It is an important single-season rice producing area in China. The small red rectangle on the left in Figure 1 represents the location of the chuangye farm.

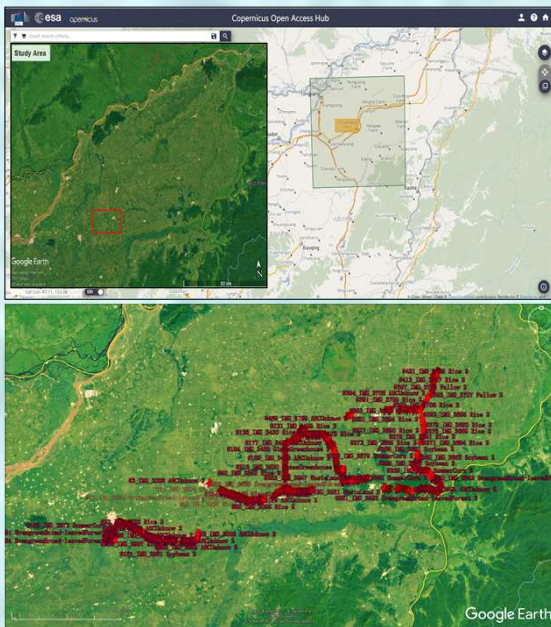


Fig.1 Study Area

Landsat 8 was launched in February 2013 and has 9 bands with a spatial resolution of 30 m, which also includes a panchromatic band with a spatial resolution of 15 m. The Landsat-8 data used in this study was downloaded from the USGS website and mainly used the image data on July 3, 2020.

Data collection started at the end of August 2020, as shown in Figure 1 covering an area of about 10,000 square kilometers, including Qixing, Chuangye, Hongwei, Qianfeng, Erdaohe and other farms.

## 3. Classification Approach

Figure 2 shows the logical flow of this research. Rice varieties are divided into four types: Longjing, Suijing, Sanjiang and Xinnian. In addition to the collected field samples, more samples were further trained with the support of Google Earth image. Thereafter all sample points were randomly divided into 75% training samples and 25% validation samples and then used to the classification and the validation, respectively. Random Forest was used as the key classifier. The classification accuracy was evaluated by the error confusion matrix.

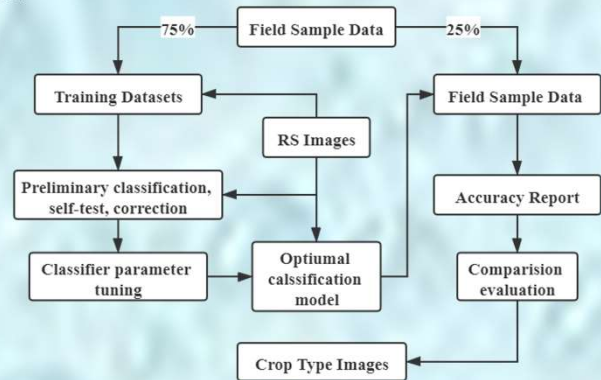


Fig.2 Flow Chart of the Classification

## 4. Results

Fig.3 presents the merged and classified rice area in the northeast of China. The accuracies listed in the table 1.

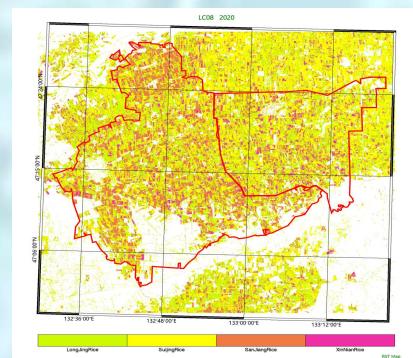


Fig.3 The classified map results from Landsat 8 in 2020

Table 1 accuracies list for classified mapping

Accuracy Matrix	Error unit %
Overall Accuracy	68.40
Kappa	56.00
F1 Score	66.40

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**DRAGON 2021 SYMPOSIUM**  
**Dragon 4 Final Results Poster Session**  
**19 July 2021**

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