

## ABSTRACT

In this paper, based on Google Earth Engine (GEE) cloud platform and Sentinel-2 data, three classification methods, random forest classification, classification regression tree, and support vector machine, were used to classify and verify the accuracy of typical crops in the study area by constructing spectral features and index features, and the confusion matrix of kappa coefficient and overall accuracy was derived by analyzing and comparing nine types of vegetation indices combined with weather characteristics, and the best time combination was selected to construct a normalized garlic index based on weather characteristics.

## INTRODUCTION

In recent years, the industrial scale of garlic in China has been expanding, and the price of garlic fluctuates more frequently, which is very unfavorable to the healthy development of the garlic market and makes garlic farmers less motivated to plant garlic. Therefore, it is of great importance to obtain accurate information on garlic planting area, price and production for the government to adjust agricultural policies, regulate garlic prices and stabilize the garlic market.

## OBJECTIVE

The remote sensing method has the advantages of large coverage area, short replay period and complete information of acquired features in extracting garlic planting area, but the disadvantage of remote sensing so far is that garlic is easily confused with other features, which will affect the accuracy of the final acquired area. Therefore, the problem of accuracy in the process of remote sensing extraction of garlic cultivation area becomes the focus of the research process.

## METHODS

The index features and spectral features of different features were used as variables to verify their accuracy by classification. By combining different vegetation indices with weathering features for garlic crop weathering identification, the confusion matrix of kappa coefficients and overall accuracy is mathematically calculated, and the time combination with the best extraction effect is analyzed and preferred. The normalized garlic indices based on the weathering characteristics are constructed.

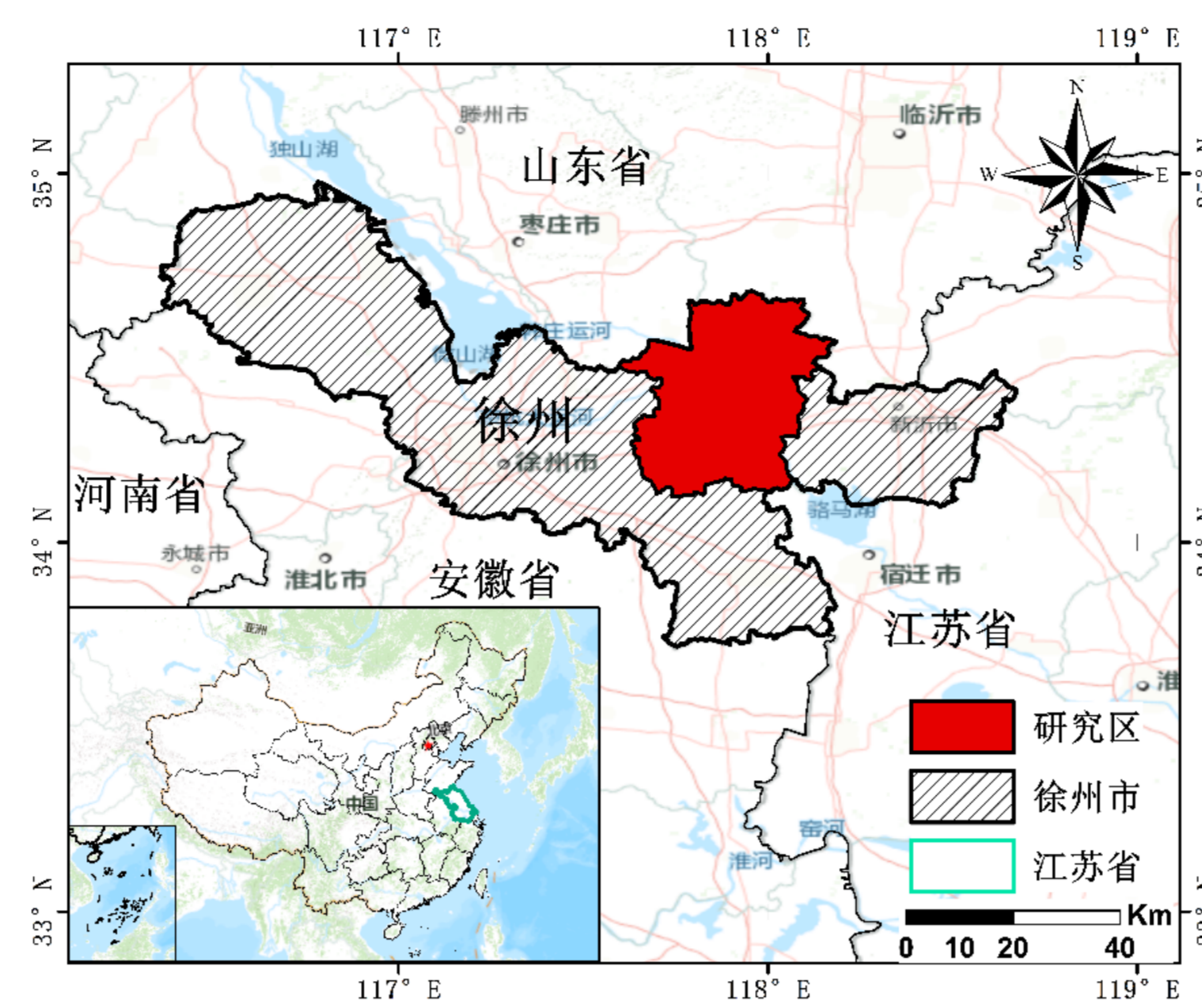


Figure.1 Overview of the study area location

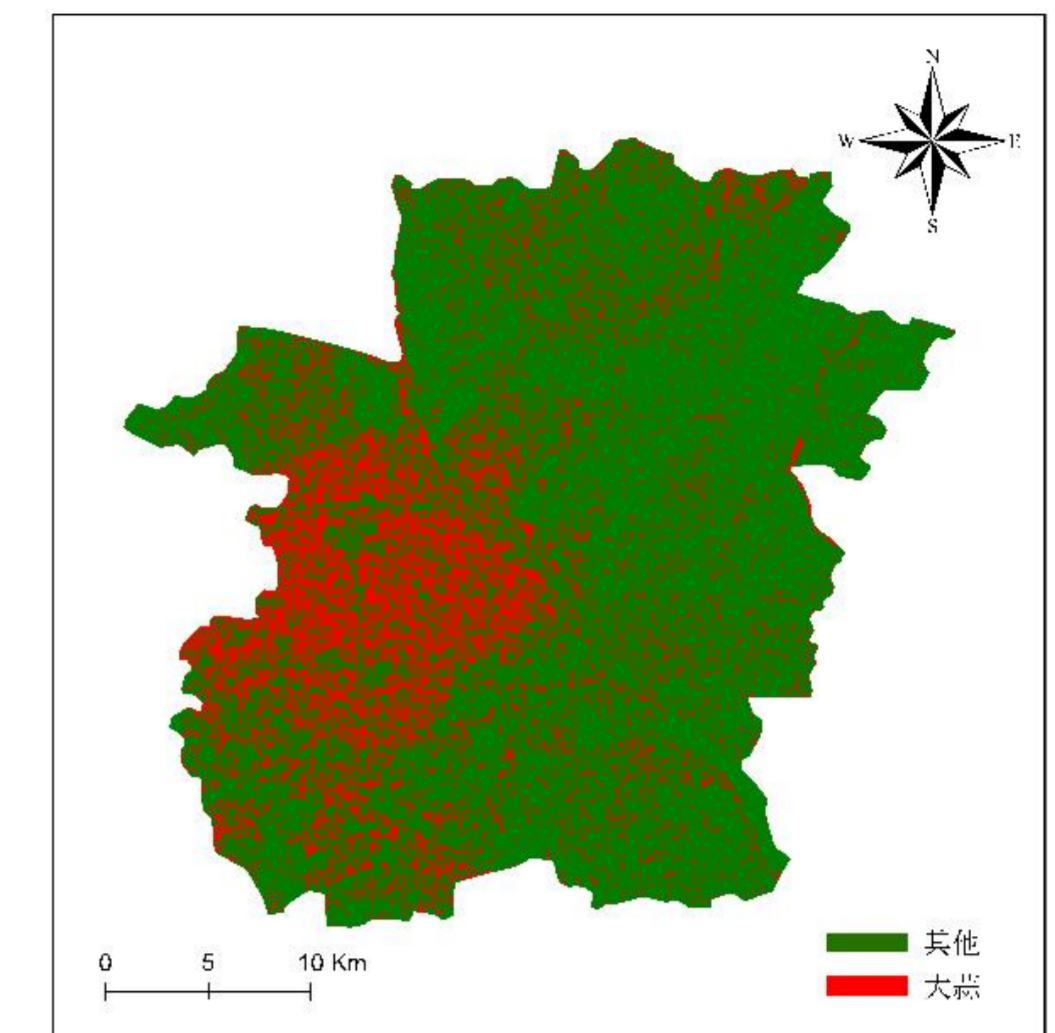


Figure.6 Garlic index extraction effect

## RESULTS

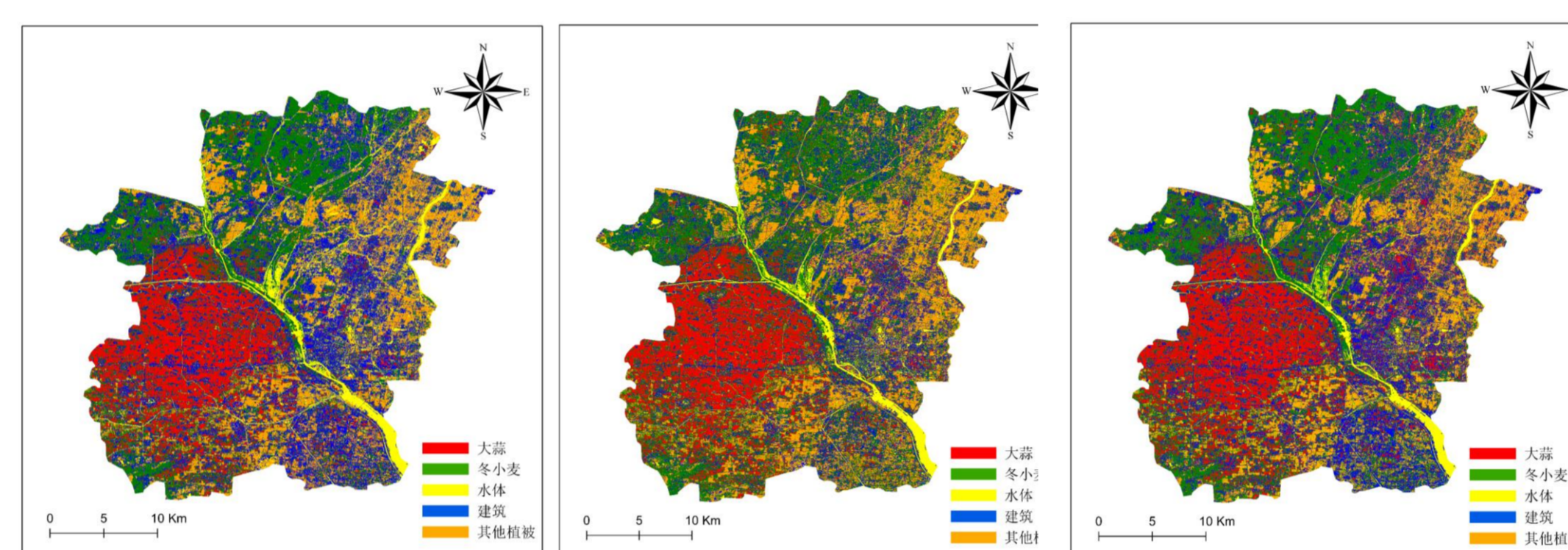


Figure.2 Comparison of classification results based on spectral features: random forest, classification regression tree, support vector machine

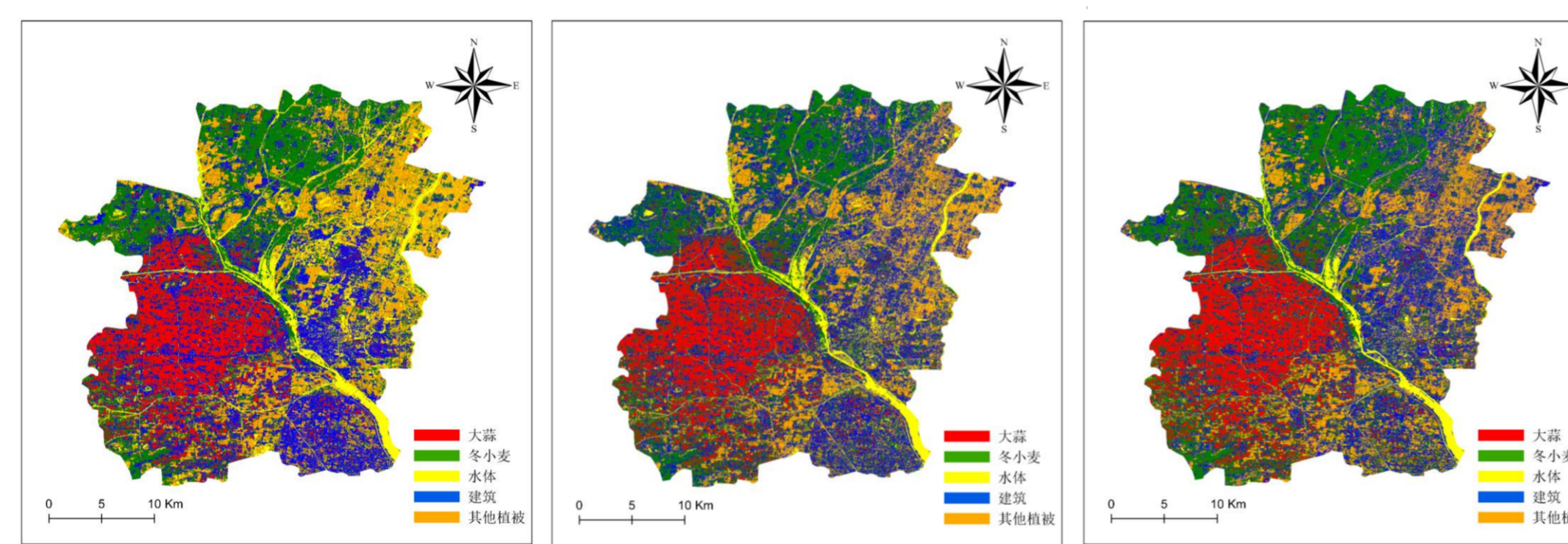


Figure.3 Comparison of classification results based on exponential features: random forest, classification regression tree, support vector machine

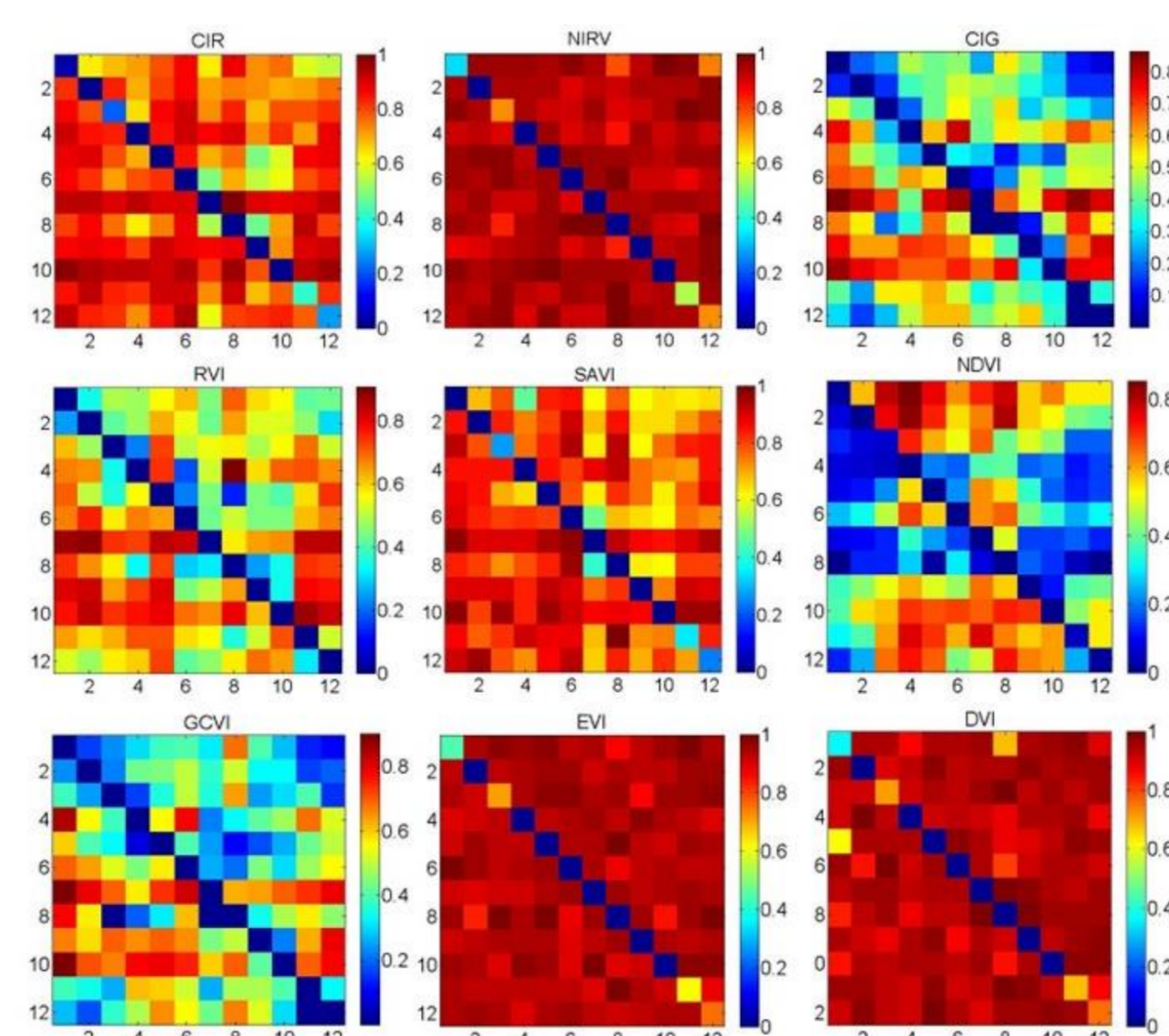


Figure.4 Kappa coefficient confusion matrix

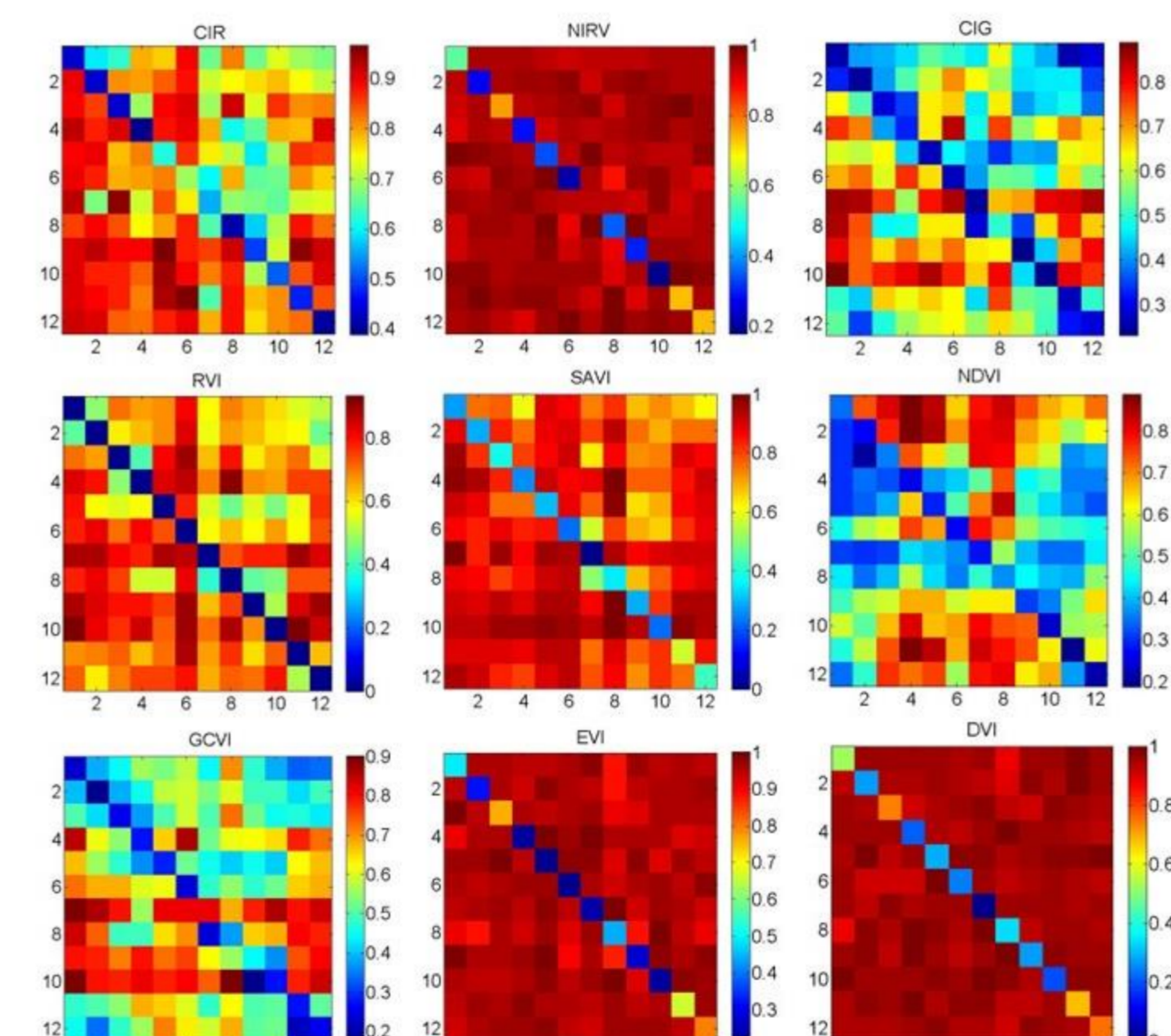


Figure.5 Overall accuracy confusion matrix

The random forest algorithm is significantly more effective than other algorithms in the classification of garlic and other crops by spectral features and index features. The time periods of October and May were selected to construct the normalized garlic index based on the vegetation index.

## CONCLUSION

In summary, five typical crops were extracted as sample points, and three classification methods, random forest, support vector machine and classification regression tree, were used to obtain crop feature information for classification by constructing index features and spectral index features to obtain accuracy. Random forest method was the best method for garlic classification extraction. By deriving kappa coefficients and overall accuracy confusion matrix, May and October were obtained as the two months with the best results for garlic extraction, and garlic indices were constructed through this time period.

## MAJOR REFERENCE

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