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Identification and Analysis of Vulnerable Population for Malaria Based on K-prototypes Clustering

chenlu Li and Xiaoxu Wu

State Key Laboratory of Remote Sensing Science, College of Global Change and Earth System Science, Beijing Normal University, Beijing 100875, China

Malaria is a serious public health threat in Yunnan province of China and has been frequently reported in some pandemic regions such as Tengchong County with high morbidity. It is essential to analyze the characteristics of malaria cases and identify vulnerable population for its control. Previous studies about vulnerable population mostly used statistical grouping method to count frequency from a single aspect rather than defined clustered groups. Based on a descriptive analysis on temporal variation and demographic structure of malaria population, this study used a k-prototypes clustering algorithm to cluster vulnerable population in Tengchong County from three dimensions, including gender, age, and occupation. The results indicated that a high incidence of malaria occurred mainly in young male farmers and young or middle-aged male migrant workers. Exotic virus carriers, low education level, poor work environment and housing conditions, and unhealthy lifestyles contributed to the high incidence in these groups. Double verification ensured the reliability of the method and the reasonability of results. In addition, we highlighted the importance of targeted prevention and control of malaria for vulnerable groups. We provided some policies and measures implemented by regional government, and at household and individual levels for farmers and migrant workers respectively. This research using k-prototypes clustering algorithm efficiently identified the vulnerable population of malaria, the results may serve as scientific guidance regarding targeted malaria prevention and control in Yunnan Province.