USING OF VEGETATION INDICES FROM THAICHOTE SATETLLITE DATA FOR FOREST TYPES CLASSIFICATION IN DOI LUANG NATIONAL PARK, CHIANG RAI PROVINCE

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Abstract: The research aims to study the reflection of light derived from multispectral instrument on board THAICHOTE satellite. The relationship between forest types and vegetation index data in Doi-luang national park, Chiang rai province.Guidelines for application of vegetation index classification forest types, with the second method is to determine the extent of forest to create a range of conditions. And classificationdata monitoring by the supervised classification maximum likelihood model The vegetation indices utilized the equations is normalrized difference vegetation index (NDVI), ratio vegetation index (RVI), difference vegetation index (DVI), infrared percentage vegetation index (IPVI), transformed normalized difference vegetation index (TNDVI) and soil adjusted vegetation index (SAVI), using a satellite image of THAICHOTE between November 6, 2010 and on February 17, 2011.

The scattered plot obtained from the reflectance values clearly distinguished the types of forest. From the data on November 6, 2010, the accuracy assessment of vegetation indices on mixed deciduous forest of NDVI, SAVI, IPVI, DVI, RVI, TNDVI were 65.25, 59.57, 55.32 54.17, 53.19, 46.81 percent, respectively. From the data on February 17, 2011, the accuracy assessment of vegetation indices of NDVI, RVI, DVI, IPVI, SAVI, TNDVI were58.16, 57.45, 44.68, 42.55, 39.72, 37.59, percent respectively. The vegetation indices that can identify the accuracy of the information as of November 6, 2010 were that of NDVI, IPVI, TNDVI, DVI, RVI and SAVI, which were 55.32, 46.10, 45.39, 43.97, 39.01, and 35.46 percent, respectively. the accuracy assessment of vegetation indices as of February 17, 2011 were that of NDVI, DVI, IPVI, SAVI, TNDVI, and RVI, which were 53.90, 53.19, 52.48, 44.68, 41.13 and 40.43 percent, respectively. From both methods, the best vegetation index that gave the most accurate data was NDVI.

INTRODUCTION

Forest resources that are useful to humans both directly and indirectly. Which is an important factor in human life. Current forest has decreased steadily increasing population of the country. Economic growth and the public use of the forest. In addition, the development of public infrastructure such as dams and roads and high voltage wiring is the cause of the extensive forest areas. In particular, the exploration of natural resources survey satellite is widely popular. Since it can cover an area the size of the facility and assist in the analysis area quickly. Save time. Cost and high accuracy.

It also incorporates a number of remote sensing for use in the forest. In particular, data from aerial and satellite images were used to search for information. Mainly used for forest classification. Classification of land use. Monitoring of forest cover change. And mapping of the forest. In the past, the forests in the area. We do this by using a satellite image of the area of expertise of the translator. In the forest each time I would get a different image depending on the skill of the translator. As a result, the application of vegetation indices,which is determined by the wavelength associated with the proportion of plants that do well. In order to identify areas where the vegetation cover. With the non-vegetation. Will be useful in tracking the rise. Or reduction of vegetation in the study area. They can study the changes of vegetation cover them.

This study. Focus on the use of satellite vegetation index in THACHOTE. For classifying forest in Doi luang national park. Have studied the relationship between vegetation index and the national forest. For guidance in classifying forest. The field survey. Analyzed together to achieve results that are more reliable.

METHODS AND EQUATION

1. Preparation of satellite image data.

1.1 Doi luang national Park to establish the extent of the map at a 1:200,000 scale map, according to the ordinance. Make the image coordinates map to map and make use of the tools in the creation of the scope of arcscan because this area. Use this method to help determine the extent of the study area is the more reliable.

1.2 Input satellite image data THAICHOTE in doiluang national park covers an area of. Chiangrai. Recorded on 17 February 2554 and on 6 November 2553 by the cloud-free.

1.3 Adjust the geometric data of visual satellite image to map the position of the image to the coordinate system of the map by using ground control points (GCP) all 17 points from topographic map scales. 1:50,000 map of the military Department.

1.4 Input satellite image data and the revision of the geometric data. Doiluang national park covers an area Chiang rai. To reduce the size of the image data.

2. Data analysis.

2.1 Study of the vegetation index related to plants including normalrized difference vegetation index (NDVI), ratio vegetation index (RVI), difference vegetation index (DVI), infrared percentage vegetation index (IPVI), transformed normalized difference vegetation index (TNDVI.), soil adjusted vegetation index (SAVI), which determine the relationship of satellite data in different frequency ranges. Vegetation index in Table 2 Correlation analysis of satellite data. Selected wavelength range. The correlation analysis of the reflected light from the 2-band satellite data is the red light wave length range between 0.62 to 0.69 microns, and the final wave near-infrared wavelength range are stored. The wave length range from 0.77 to 0.90 for the analysis of vegetation index.

Table 1 Is a comparison of the vegetation index.

Vegetation Indices	equation
ratio vegetation index (RVI)	$RVI = \frac{NIR}{R}$
normalrized difference vegetation index (NDVI)	$NDVI = \frac{NIR - R}{NIR + R}$
difference vegetation index (DVI)	$RVI = NIR - R$
infrared percentage vegetation index (IPVI)	$IPVI = \frac{NIR}{NIR + R}$
transformed normalized difference vegetation index (TNDVI)	$TNDVI = \sqrt{\frac{NIR - R}{NIR + R} + 0.5}$
soil adjusted vegetation index (SAVI)	$SAVI = \frac{1.5 \times (NIR - R)}{NIR + R + 0.5}$

R is red band and NIR is near-infrared band

2.2 Analysis of forest types.

Classification of forest types. Can create an instance of the representation of the wild type. The area of the field. The main cost is statistical minimum, maximum, mean, and standard deviation. Used to analyze wild species. Create a graph to show the relationship of the index to the wild-type plants with the statistical range of forest types that appear. Comparing information from data processing. The data analyzed in the second period is during November. And February to determine the optimal index for the forest.

RESULTS

This study used data from THAICHOTE satellite. Doiluang national park covers an area of study. Chiang rai. Capture the moment and on November 6, 2010, a period that coincided with the period of data collection in the field. And deciduous forest during the season. The second part of the selected satellite imagery recorded on February 17, 2011 as well as the absence of cloud cover, and the season starts deciduous forest.

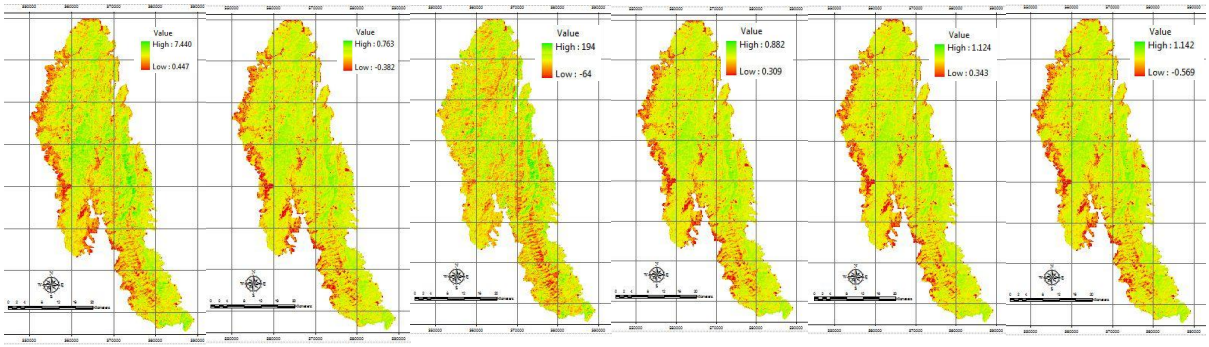
1. Analysis of vegetation index**.**

Vegetation index to study the distinction between forest types by analyzing vegetation six index to the RVI, NDVI, DVI, IPVI, TNDVI and SAVI, which shows.

Table 2 Analysis of vegetation index data of Doi Luang National Park.

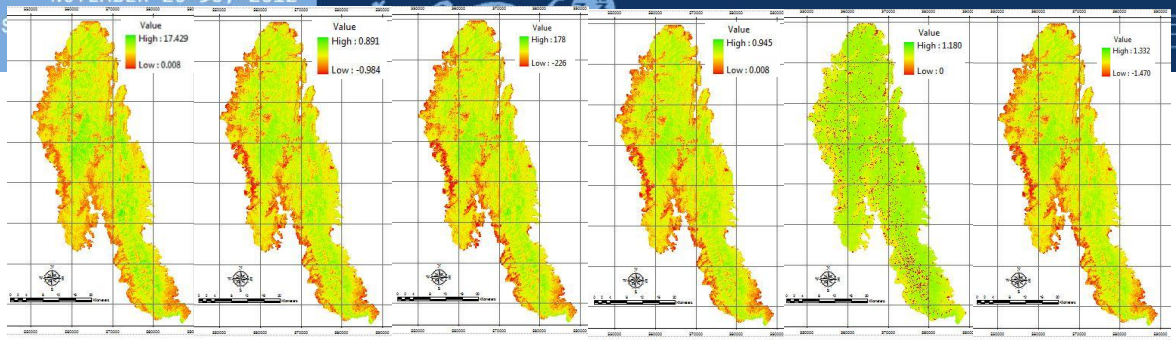
Vegetation Indices	6-Nov-10	17-Feb-11
RVI	0.45 to 7.44	0.01 to 17.43
NDVI	- 0.38 to 0.76	- 0.98 to 0.89
DVI	- 194 to 64	-226 to 178
IPVI	0.31 to 0.88	0.01 to 0.95
TNDVI	0.34 to 1.12	0 to 1.18
SAVI	- 0.57 to 1.14	- 1.47 to 1.33

From Table 2, the vegetation index values reflective of what is covered in the Doiluang national park on November 6, 2010 and on February 17, 2011 the vegetation index RVI indicators showed no vegetation and vegetation. abundant in the area covered. Doiluang national park is the value between 0 and 255, indicating that the abundance ratio of the volume ratio of the area is complete. The vegetation index NDVI is an indicator of vegetation cover in the area. Is between -1 and 1, the closer the index value of -1 indicates that the vegetation in the area is covered with vegetation or the ground or water. Plants, but the index closer to 1 indicates that the area was covered in dense vegetation. DVI vegetation index is an indicator of the quality of the vegetation cover in the area. Is between -255 and 255, the vegetation index values approaching -255 indicates that the quality of the vegetation cover is less. For the vegetation index is an indicator of the quality of education IPVI cover of vegetation in the area. Is between 0 and 1, indicating that the vegetation index approaching 0 indicates that the quality of the vegetation cover is less. Plants, but the index closer to 1 indicates that the area was covered in dense vegetation. Typically, the vegetation index.TNDVI vegetation index is an index that measures the amount of biomass. In the study area, the result is between 0 and 1.22 for vegetation index SAVI, a vegetation index that was developed to prevent the deviation of the measured energy of the reflected wave affecting the reflection of the results of the study showed that is between -1 and 1, Figure 1 and 2.



RVI NDVI DVI IPVI TNDVI SAVI

Figure 1 Index plants in Doiluang national park on November 6, 2010.



RVI NDVI DVI IPVI TNDVI SAVI

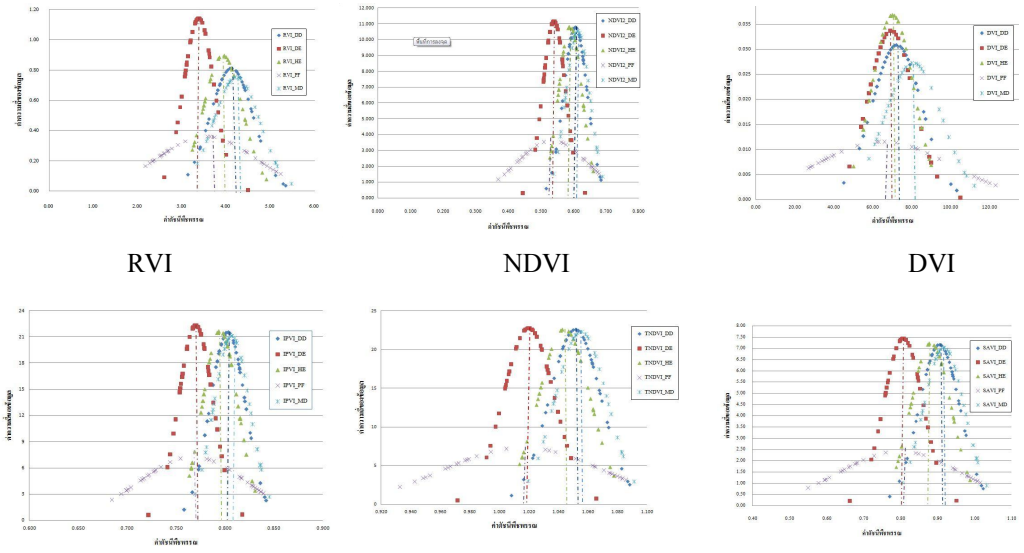
Figure 2 Index plants in Doiluang national park on February 17, 2011.

Of Figure 1 and 2 shows that The reflectivity of doiluang national park area and the second time for a different light by the index image on February 17, 2011 to reflect the higher cost of living due to the deciduous forests. The reflection that is characteristic of the arrangement of the leaves. If you live in the deciduous. Deciduous forests can be easily separated by deciduous and evergreen.

2. image classification

2.1 Classification of data used in the statistical analysis.

Classification of data using statistical analysis. The study area has been made. Create a test area of each forest type. To create the conditions. To study the forest classification. By using the statistical minimum, maximum, mean, standard deviation. Used in the data analysis. And make a graph to show the relationship of the index to the forest vegetation. Comparing information from data processing. The analysis is for the period from November, Figure 3 and Figure 4 to determine the optimal index for the forest.



RVI NDVI DVI

IPVI TNDVI SAVI

Figure 3 graphically shows the reflectivity of the vegetation index of the wild forests of the five types of vegetation index during November 6, 2010.

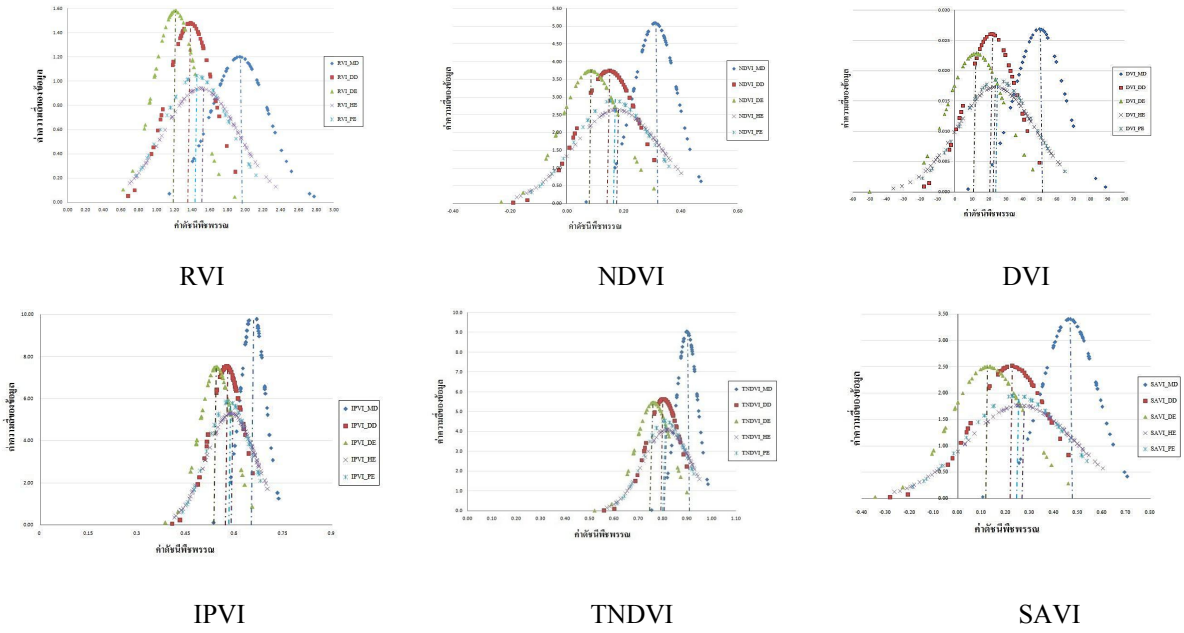


Figure 4 graphically shows the reflectivity of the vegetation index of the wild forests of the five types of vegetation index during the February 17,2011.

The graph shows the reflectivity of the vegetation index of forests of the five types of forest is mixed evergreen forest, dry evergreen forest, dry evergreen and pine forest, he found that the reflectivity of the forest, each index has a different value. different light. However, the index of rainforest and pine forest with a very similar light. Cause of forest graphs and statistics that have led to the use of remote sensing program. For processing into the forest.

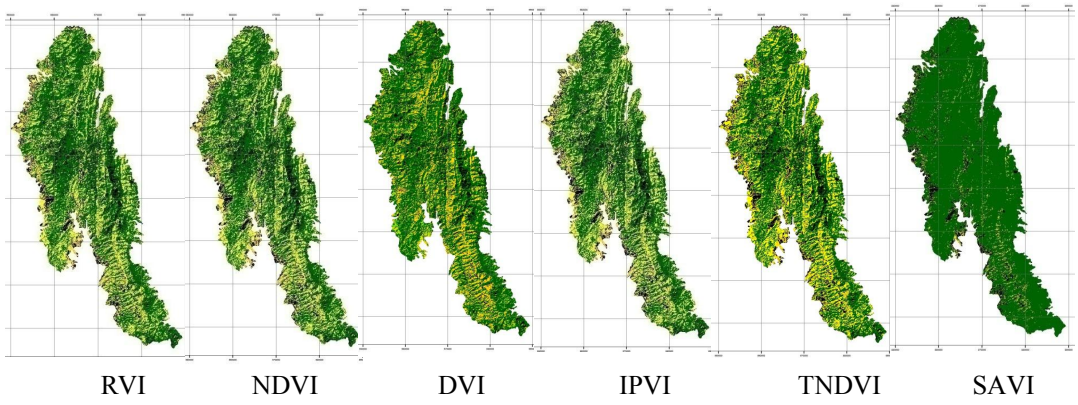


Figure 5 Forest classification using vegetation index and sixth form. on November 6, 2010.

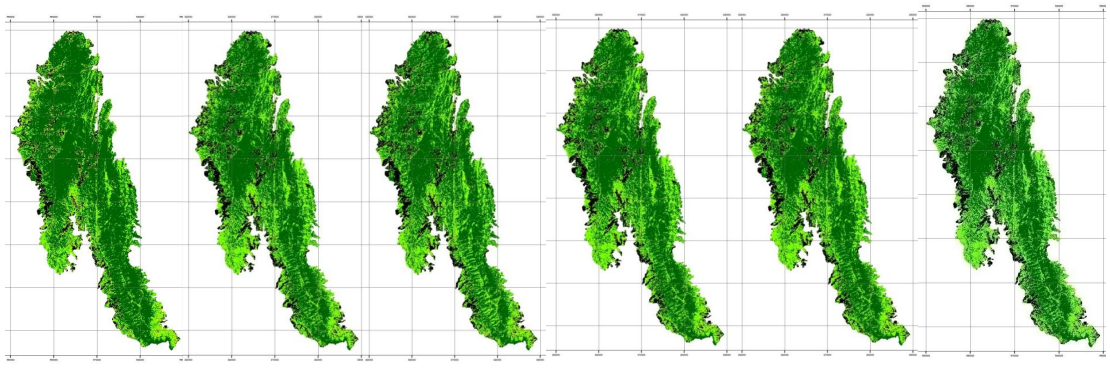


Figure 6 Forest classification using vegetation index and sixth form on February 17, 2011.

The results of the classification of forest types in the period November 6, 2010 and on February 17, 2011. That Identification of the forest can be classified as a mixed deciduous forest. (Dark green), dry evergreen forest (light green) as classification of the forest (yellow) pine forest (purple) is not good and evergreen forest (red) can not be identified. But may be due to a forest of deciduous forest. It is impossible to separate deciduous and evergreen forest for Figure 6 is a comparison of the wild type. Can I have more than Figure 5 to the deciduous forests. And can be identified with the image is black. Shows that in the wild-type classification. Area is an area that has no vegetation cover.

Forest classification using supervised

Another way to classify the test data. Set of sample data (training area) area of each forest type is a representation of the data. Here are divided into five types of forest are mixed deciduous forest, dry dipterocarp forest, dry evergreen forest, hill evergreen forest and pine forest. From data processing. The data analyzed in the second period is during November and February to determine the optimal index for the forest. It can be shown in Figure 7 and 8.

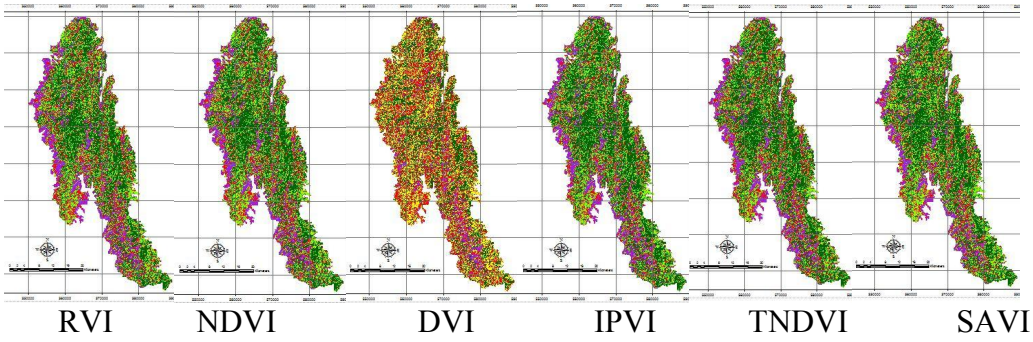


Figure 7 Vegetation index in Doiluang national park on November 6, 2010 (the second test).

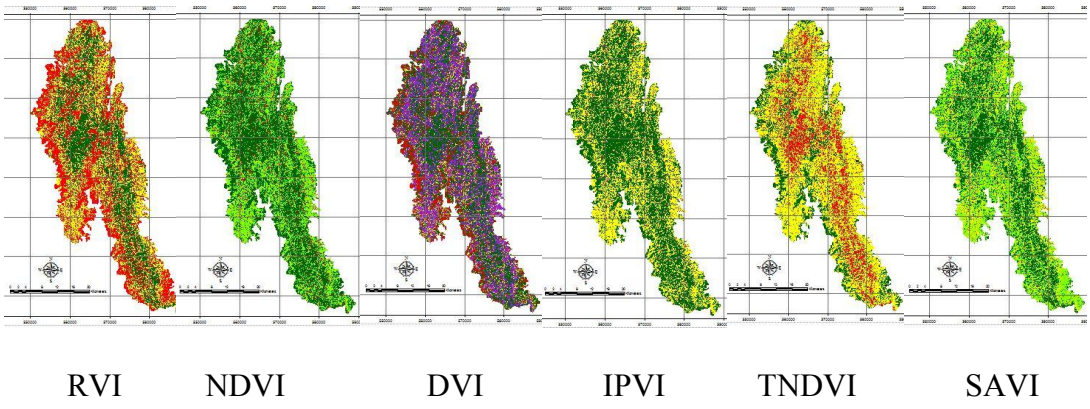


Figure 8 Vegetation index in Doiluang national park on February 17, 2011 (the second test).

Figure 7 and Figure 8 show the results of classifying forest during the November 6, 2010 and on February 17, 2011 by means of supervised classification showed that Identification of 5 types of forests can be classified forests are mixed deciduous forest. (Dark green), dry evergreen forest (light green) classified forest (yellow) pine forest (purple) rain forests (red) are shown by the vegetation index of classification is different. In the analysis of the image data. This can be most clearly identified forest vegetation index NDVI in the period February 17,2011 (Figure 8)

3. To evaluate the accuracy of the classification information.

To evaluate the accuracy of the classification data of land use from THAICHOTE satellite imagery the second time was on November 6, 2010 and on February 17, 2011 to analyze vegetation six index plants by being. Forest types in the first two methods can identify four types of forest are two ways to prepare for the test.

Indistinguishable from wild type, wild-type comparison of five references (reference data) from the ground to determine the correct data to the correct interpretation of the satellite images before detection accuracy. To monitor the use of the check total is 141 points from the field. By the check point for all kinds of wildlife to determine test all vegetation index was found in the way that first the vegetation index NDVI to classify forest out most of the second period to determine the validity of the results. overall classification were 65.25 and 58.16 percent, respectively, for the highest accuracy. Compared with the detection of a vegetation index. The second method is to classify forest vegetation index NDVI out most of the second period to determine the accuracy of the overall classification equal to 55.32 and 53.90 percent, respectively.

CONCLUSION

1.Classification of forest types. The index is used vegetation index six type is RVI, NDVI, DVI, IPVI, TNDVI, SAVI analysis of satellite data in THAICHOTE satellite at November 6, 2010 and on February 17, 2011 for classification of forest in the park. DoiLuang national park. A study of the reflectivity of the satellite THAICHOTE satellite image. In each forest type, forest type, and study the relationship between vegetation index variations. Generated from THAICHOTE satellite. Time on November 6, 2010 is reflective of the vegetation of the imagery in the red spectrum. Show the lowest reflectivity. Compared with the reflection of the waves, the red during the day of February 17, 2011 for the period November 6, 2010 was a season of evergreen trees to absorb the leaves during the adsorption. The waves are good. Even in the season of deciduous trees will be reflective of the vegetation in the red spectrum.

2. The vegetation indices were studied in the wild. Found on the graph to determine the relationship of the reflected light of the forest. Time on November 6, 2010 to find that the graph of the reflectance values of each forest type. There is a similar relationship. When observing the graph over time on 17 February 2011 that showed the relationship to be separated clearly the wild, except the evergreen forest (HE) and pine forest (PF) graph is found that very similar. To separate the two types of forest are rare.

3. Forest classification analysis. The second method is a method of data analysis for the vegetation index values. Create a test area of each forest type. To study the forest classification using statistical principles. Data governance and supervised classification were 41.13 and 40.43 percent respectively. The study of these two methods. Shows. Vegetation index to the accuracy of information that is best for both the NDVI vegetation index.

4. Can distinguish clearly is mixed (MD) and vegetation index that classification accuracy of the information on November 6, 2010 is the NDVI, SAVI, IPVI, DVI, RVI and TNDVI was 65.25, 59.57, 55.32,. 54.17, 53.19 and 46.81 percent respectively. And classification of the vegetation index with classification accuracy of the information on February 17, 2011 is the NDVI, RVI, DVI, IPVI, SAVI and TNDVI was 58.16, 57.45, 44.68, 42.55, 39.72 and 37.59 percent respectively.Method 2 can be classified as a mixed deciduous forest, dry evergreen forest and deciduous forest. Vegetation index data can be classified with the accuracy of the information on November 6, 2553 is the NDVI, IPVI, TNDVI, DVI, RVI and SAVI were 55.32, 46.10, 45.39, 43.97, 39.01 and 35.46 percent respectively. And classification of the vegetation index with classification accuracy of the information on February 17, 2011 is the NDVI, DVI, IPVI, SAVI, TNDVI and RVI is 53.90, 53.19, 52.48, 44.68, 41.13 and 40.43 percent respectively. The study of these two methods. Shows. Vegetation index to the accuracy of information that is best for both the NDVI vegetation index.

RECOMMENDATIONS

1. New satellite images should THACHOTE satellite several years were analyzed for comparison. For the reflected light to be worth a lot more.

2. Other factors should be added to the analysis, such as the height above sea level, the factors related to the classification accuracy.

3. New satellite image of the study THACHOTE satellite. Those who are interested should be careful about the sort-band data. Because each satellite band satellite will have to sort the data differently.

4. The validation should be used to determine the appropriate amount of space to spread across all regions of the state by area.

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