VEGETATION INDEX INCREASES THE QUALITY OF DATA PROCESSING RESULTS IN THE FIELD OF FOREST MONITORING AND MANAGEMENT.

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KEY WORDS :

ABSTRACT

In the field of the forest monitoring and management remote Sensing technique is one of the most effective tool for data update and supply input-information likes forest fire, forest cutting, ... But as the spectral response of vegetated areas presents a compllex mixture of vegetation, soil brightness, environmental effects, shadow, soil color and moisture we have chose the method in order to enhance vegetation response and minimize the effects of the influenced factors. One of the methods described above is using rational vegetation index for remote sensing data interpretation. Each environment has its own characteristics and each index is an indicator of green vegetation in its own right so the choice of vegetation index is quite necessary to mak. For that purpose the experiment to carry out for pine forest in Lam Dong province and mangrove in Ca Mau region.

1 INTRODUCTION

Integration of Remote Sensing and GIS is one of the most effective tool in the field of forest monitoring and management. Remotely sensed data has many advantages like: large view, multitemporal... . The big problem of remote sensing application is quality of ground object's recognition. One of the methods to solve this problem is use of rational vegetation index. Chose the using vegetation index is very important for that purpose.

2 METHODS

2.1 Choice of study areas:

Vietnam is a tropical country so its forest is often very complicated by multi-stage and dence background vegetation cover. For experiment, there are two demands : study area must be certain large and it has unification of species. Two types of forest had been choose for study. One of them is a pine forest and another is the mangrove.

a/ The first study area :

Pine forest in Vietnam coved an area more than 155 100 ha. , more than 82% of it distributs in Lam Dong province. The Lam Dong province is chosen for study with geographical coordinates : 11^o 13'-12^o 25' N and 107^o 17'-108^o 41' E (source FIPI 1995). It's mountain and plateaux of Central Plateaux in Southern part of Vietnam. The study area was approximately 127 400 ha. There are mainly two types of pine species : *Pinus Merkusii* distributes at altitude under 900 m and *Pinus Khasya* - from 900 m and higher. Generally pine forests have not unification of their density and age.

b/ The second study area :

In the Ca Mau peninsula mangrove forest covered about 150,000 ha (~ 6o% total area of mangrove). It situated in the southern part of Vietnam. The geographical coordinates are : from 104^0 30' to 105^0 10' East, from 8^0 30' to 8^0 50' North . Along the coastline, on newly accreted land with a substrate of deep, soft mud and affected by low tied, pure stands of *Avicennia alba* are found. Scattered stands of *A. officinalis* and *Bruguiera sexangula* also occur. Mixed communities of *Rhizophora apiculata- Bruguiera parviflora or Avicennia alba- R. apiculata* occupy areas flooded by mean tide. On higher land, only flooded by spring tide and with a loamy substrate, a community *of Lumnitzera racemosa- Ceriops taga l* is found. On high land near the sea, a pure community of *Excoecaria*

agallocha is met and on firm mud, only affected by spring tides, a secondary forest of the palm *Phoenix paludosa* can be found. The r*hizomatous palm Nypa fructicans* is characteristic of areas, which become only slightly brackish, but which are still subject to regular flooding as a result of tides. In places of the mangrove forest, rarely flooded by tides, where trees have been cut, the giant fern *Acrostichum aureum* can be met. On the severely eroded sandy flats of the east coast of Ca Mau peninsula, from Bo De to Dat Mui, an almost pure stand of *Avicennia marina* is found. In rapidly accreting areas, *Avicenia alba* is not replaced by *Rhizophora apiculata*, but instead develops in a mixed community of A. alba- A. officinalis.

2.2 CALCULATION OF VEGETATION INDEX :

Mainly four pine forest successional stages were identified on the images based on calculation the complex division (C3/C1*C2*C4*C5) with correlation coefficient r=0.69 (tab. 1).

2.3 DATA PROCESS AND OUTPUT MAPS:

For the first study area 11 scenes of NOAA AVHRR image were acquired :
- 16 July 1998
- 9 September 1998
- 24 October 1998
- 16 November 1998
- 23 December 1998
- 16 January 1999
- 25 February 1999
- 16 March 1999
- 20 April 1999
- 30 May 1999
- 13 August 1999

Output maps printout based on the value of complex division PVI=(C3/C1*C2*C4*C5) and normalized difference PVI =((C2-C1)/(C2+C1)) see(tab.1and 2 & maps 1 and 2)

For the second study area 3 scenes of Landsat and SPOT imageries are used :
- 28 January 1973
- 4 March 1986
- March 1995

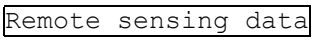
Output maps printout based on the value of normalized difference greenness index NDGI = (G-R)/(G+R) see (tab.2 and maps 3 and map 4)

3.0 RESULT & DISCUSSION

Main four different pine forest classes were extracted (with average correlation coefficient r=0.69):
- new planted open-canopy / shrub canopy cover : 0.17
- young closed-canopy cover : 0.23
- mature : 0.29
- mixed of difference ages

We suggest a technological schedule (schema 1) and based on it we calculate the time and the money for purchase the data we have to economize (tab.3).

Schema 1: Technological schedule



Discussion : Use that method we saved 20-30% of total amount by reducing time and data purchaging

4.0 CONCLUSION :

For two forest type : pinef orest and mangrove forest we can use above mentioned vegetation index and technological schedule. By that way we can improve the quality of data processing.

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