

APPLICATION OF INFORMATION TECHNOLOGY FOR ENVIRONMENTAL EVALUATION OF THE CAU RIVER BASIN BASED ON ARIAL PHOTO INTERPRETATION

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ABSTRACT

The Cau river flows across the territory of Bac Kan province over a length of 103km with a basin area of 510km². For many years the floods in this river have caused serious landslides and erosion along its banks. Therefore, environmental investigation of this river basin is very urgent.

With the use of arial photo data, together with data on geomorphology, geology, structure, vegetation, petrography, etc. and with existing special use software programs and software modules developed by themselves, the authors have compiled a potential landslide zonation map and has in an initial step proposed preventive measures for mitigating damages caused by the environmental changes.

1. INTRODUCTION

BacKan is a mountainous province, in the centre of the mountain in the northeast of our country. The Cau river begins from Tam Dao plateau of BacKan province. The top of the mountain is more than 1328m high at the upstream (in the north of BacKan town) which runs in the east-west, then it continuously runs in the south-north (along side with arched west of Ngan Son) and which runs Thai Nguyen province again, belongs to the territory of BacKan province. The river is 103 km long, has basin area of 510km².

In general, Most of river-ships is the same with rear of tectonic faults, Many river banks have used for highway, in recent these years, landslides and erosion and at two river banks changing the flow which regular occurs and be very serious such as drifting float-bridge to cross the river, the highway is being landslides that is the main reasons to bring about traffic jams, reducing cultivated land and certain effecting on ecological environment. Therefore, the environmental evaluation of the Cau river basin and to offer overcome solutions to central governments and provincial committees are always concerned.

In this paper, we refer mainly to research on application of the Cau river basin based on Aerial photo interpretation of BacKan province.

2. BASIC DATA AND INVESTIGATION METHODS

2.1 Research on using of document as follow:

- Topographic maps are 1:25 000 and 1: 50 000
- Aerial photo is 1: 33 000 that is take at various terms

2.2 Investigation methods

Conveniently, we have applied for various works, in the content of this paper we have offered some of the following methods

- Interpretation, analysis and processing of arial image data with the use of cubism plate and photo interpretative Camera.
- Digitalized topographic maps and images
- Creating DTM processing of photo and editing maps with the use of Photomod technology and GIS software and module, on the whole of MapInfo and so on and the paper's author.
- Field check and ground truth survey
 - + Survey of geological and hydro logical sections, engineering geology
 - + Collection of same researching samples
 - + Interviewing the local people about the process of river channel changes, landslides and damages

3. RESULT OF INVESTIGATION

3.1 Editing maps are the same of rate is 1: 25 000

1. Lineament map of the Cau river basin
2. Lineament distribution density map of investigation area
3. Height distribution map of the Cau river basin
4. Topographic slope zoning map of the Cau river basin

3.2 Combining with investigation methods which is point out of landslide potential, erosion, channel changes ...is the integrated result of many factors, these factors are in accordance with importance as follows:

- + Composition and physical - mechanical properties of the rocks and soil and weathered crust along the two sides of the river
- + Slope and relative height of the river bank
- + Direction and speed of flow
- + Tectonic activities
- + Geological and hydro geological characteristics and to engineering geology
- + Distribution characteristics of population and public utilities, economic activities of the local people

From the result of study, there are four areas of landslide potential but the most serious ones are as follow:

- Coc Po village, Thanh Binh commune
- Khuoi lot village, Thanh Binh commune
- Na Ben village, Nong Ha commune
- Than Chu village, Dong Vien commune, Cho Don district. In these every area, the authors have established maps height and slope zoning is more detail than 1:5000

4. MEASURES FOR PREVENTION AND MITIGATION

The main measure is landslide mitigation. The authors suggest the following measures:

1. Regulation of flow by two methods
 - Strengthening the cover in the upstream area.
 - Construction of dams in the upstream.
- 2 Reinforcing the river bank to increase its bearing capacity, Taluy road and reducing the direct impacts of the water on the bank, by the methods
 - Construction of embankment along the river banks Taluy rod (slope eagle is less than 40⁰)
 - Planting trees with a lot of roots (Bamboo) along the river banks
3. Regulating the flow direction by two methods
 - Construction of soldering - iron
 - Changing the river channel
4. Planning the population settlement and cultivation appropriately
5. Organizing regular monitoring and warning, Developing methods for taking prompt actions against Landslides and mitigation of damages when incidents occur.
6. Strengthening the education and the awareness of the community (preventing from cut trees down, planning the population settlement).
7. Close cooperation between different sectors at various levels, environmental protection and enduring development.

5. CONCLUSION AND RECOMMENDATIONS

In spite of the interpretation sample, analysing arial image the result is persuasive that helps for estimating environmental of the river, obtaining more effect on many factors. However, because of the difficulties hasn't taken photos at many times and that's the main reasons to lead to short out of investigating data first of all. It's very necessary for us to build a meteorological station landslide monitoring station but it always occurs where we have mentioned.

6. REFERENCES

- Trinh Van Lam and NNK, 2000 - BacKan's geography. The Ministry of Education and Training of Backan Province.
- Thomas M. Likesand and Ralph W.Kefer, 1979 remote sensing and image interpretation John willey and sons.
- The Union of geological map Geological and mineral resources map of Dien market region of BacKan province Geological Archives of HaNoi.
- Photo1: Topographic height zoning map Coc Po village Thanh Binh Commune
- Photo 2: Topographic slope zoning map of Coc Po village Thanh Binh Commune
- Photo3: Topographic height zoning map of Khuai Lot Thanh Binh Commune.