



Effect on Water Environment Due to the Conversion of Land Use at Xiangxi Watershed and Pollution Control Measures

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PART ONE

Introduction



Abstract

With the rapid development of the control technology of point source (PS) pollution, non-point source (NPS) pollution has become the main factor contributing to the water pollution. Conversion of land use will change the natural condition and humanity factor in the area and is one of the most important factors affecting the non-point source pollution.

Abstract

The research used the Conversion of Land Use and its Effects at Small regional extent (CLUE-S) to predict the changes of land use from 2010 to 2020, and then simulated their effect on water environment(TN,TP) by Soil and Water Assessment Tool (SWAT) model at Xiangxi River watershed , one of the main tributaries in the Three Gorges reservoir .

PART TWO

Background



Background



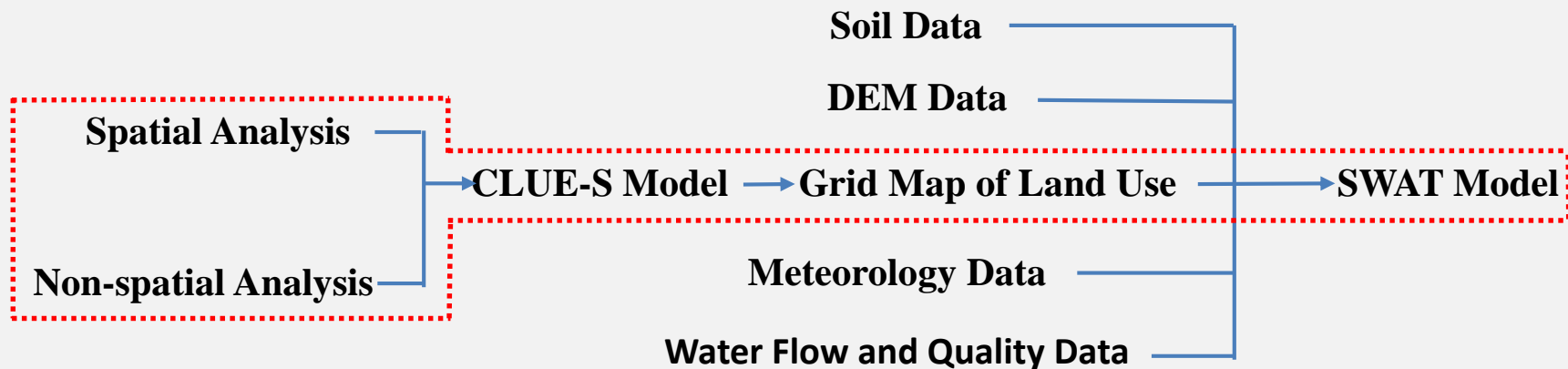
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PART THREE

Methods



Technology Roadmap



1

Predict the change of land use by CLUE-S

2

Simulate the water pollution by SWAT

3

Put forward control measures based on BMPs

1

Predict the change of land use by CLUE-S

CLUE-S model was developed from CLUE model , it can predict land use change by analyzing driving factors, demand of land use and so on. CLUE-S model mainly uses binary logistic analysis to calculate the correlation between the change of land use and the driving factors.

1

Predict the change of land use by CLUE-S

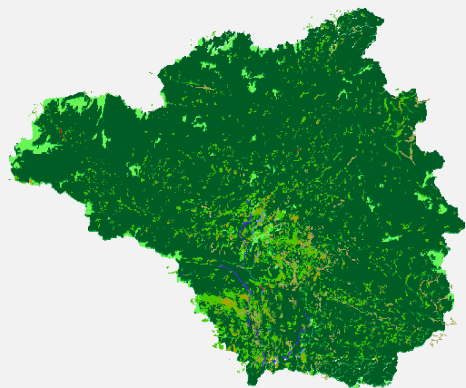
The elastic coefficient of land use change is confirmed by experience and the demand of land use is confirmed by overall planning of the study area. Finally, the simulation is done by using iteration analysis.

1

Predict the change of land use by CLUE-S

Before the simulation, the data need to be preprocessed to be imported to the CLUE-S model. Such as the land use data, the driving factors data, the elastic coefficient and so on.

Methods



Forest

Grassland

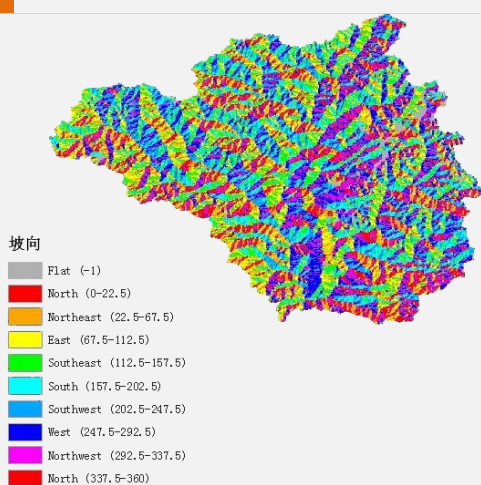
Water area

Dry land

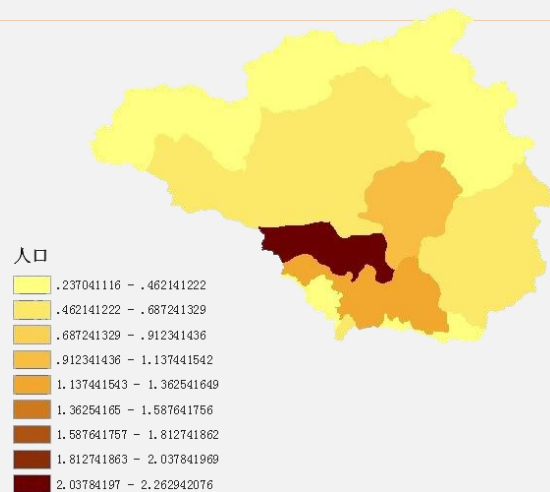


1

Predict the change of land use by CLUE-S



Aspect raster data



Population raster data

2

Simulate the water pollution by SWAT

Data

Digital elevation model
(DEM) (30m)

Land use data

meteorological data

Flow and water quality data

Data sources

National Geomatics Center of China

Land use in 2020 was predicted by CLUE-S

Land use raster graph of Xiangxi watershed

Xingshan and Zigui weather bureau

Yichang Bureau of hydrology
and water resources monitoring

3

Put forward control measures based on BMPs

BMPs are the efficient measures to control the agriculture non-point source pollution , it has been used in American first. It can be classified into engineering and non-engineer.

PART FOUR

Results and Discussion



Results and Discussion

01.Prediction by CLUE-S

02.Simulation by SWAT

03.BMPs

04.Research content in
the future

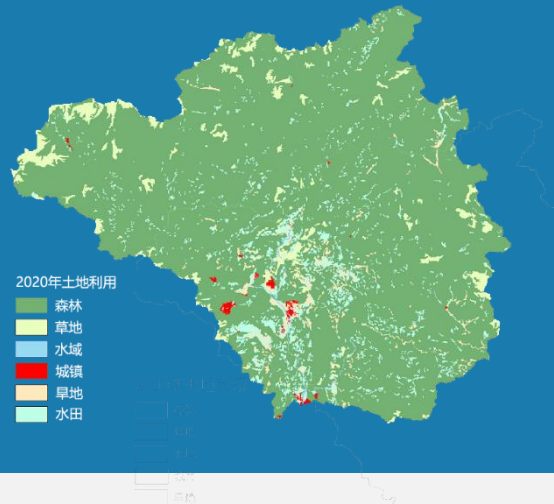
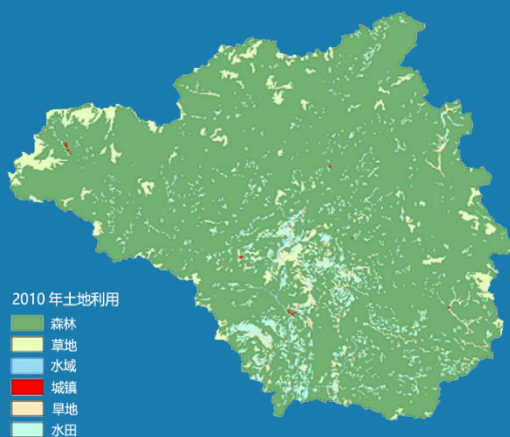


Results



1

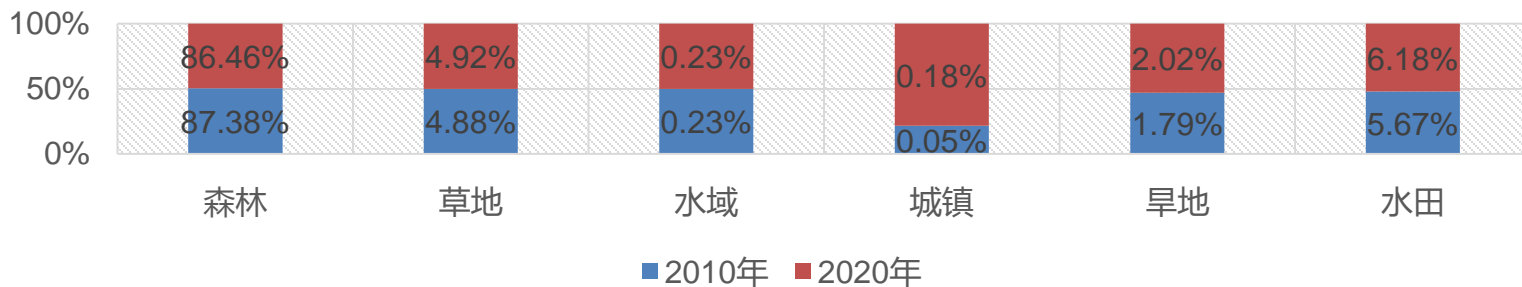
Prediction by CLUE-S



1

Prediction by CLUE-S

Distribution and Comparison Table of Land Use



1

Prediction by CLUE-S

Land use	2010		2020		Sliding scale (%)
	area (ha)	proportion (%)	area (ha)	proportion (%)	
Forest	262779	87.38%	260026	86.46%	-1.05%
Grassland	14680	4.88%	14802	4.92%	0.83%
Water area	693	0.23%	693	0.23%	0.00%
Urban	152	0.05%	550	0.18%	261.84%
Dry land	5370	1.79%	6076	2.02%	13.15%
Paddy field	17060	5.67%	18587	6.18%	8.95%

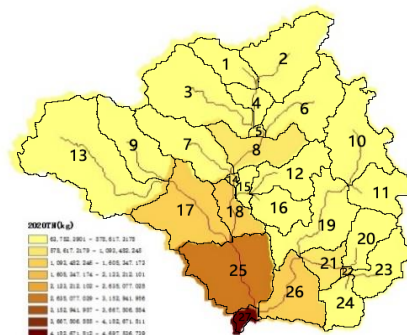
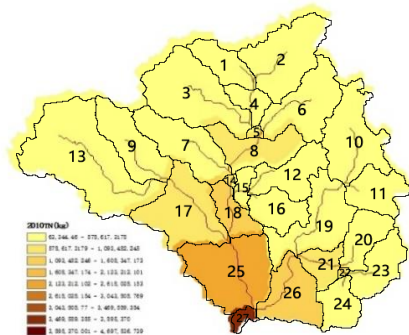
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Prediction by SWAT

	TN(kg/ha)	TP(kg/ha)
2010	1.039513293	0.29438423
2020	1.162347788	0.339544047
Variation	0.122834495	0.045159817
Rate of change(%)	11.82%	15.34%

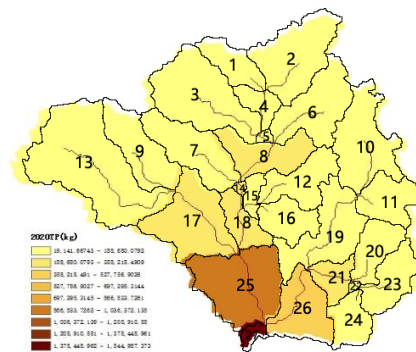
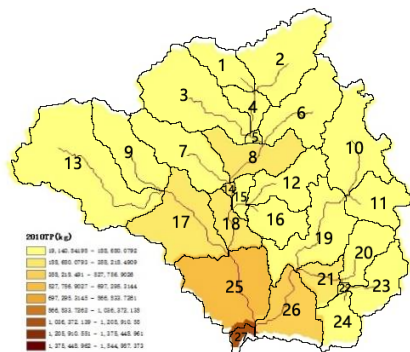
Results and Discussion

2



Results and Discussion

2



3

BMPs

Paddy fields and urban area are the main factors which need to be considered by consulting lots of reference.

3

BMPs

Unreasonable fertilization practice is the main factor resulting in water pollution. The excessive use of fertilizer not only did not promote the growth of crops but also put the fertilizer which did not been absorbed into the water. This will cause the phenomenon of Eutrophication.

3

BMPs

So we need to control the use of the chemical fertilizer. Reduce the amount of N and P in the fertilizer. And ecological agriculture need to be developed to realize the circulation of the materials. Then we can control the pollution before it is produced.

3

BMPs

With the development of society and Economy , the speed of urbanization accelerates. Wastewater discharge is the main factor leading to the pollution. And the living places are dispersed so that the pollution can not be controlled uniformly.

3

BMPs

To solve the problem, we need to upgrade the facilities for dealing with the wastewater. To solve the pollution in countryside, we need to develop the ecological agriculture. Such as using clean energy, reusing the materials and so on.

3

Research content in the future

I used CLUE-S model and SWAT model to predict the land use change and simulate the water pollution. According to the results, we can achieve a trend of the water pollution change.

3

Research content in the future

But the pollution data may be different from the real situation because the research was based on the condition that other effect factors are the same from 2010 to 2020 except the land use.

3

Research content in the future

So, in the future, I will consider more in my research. Make the parameters more accurate, and maybe I can take different scenes into consideration.



Thank you for listening !

