



An analysis on the effect of settlements distribution changes to the NPS in the Xiaojiang River Basin after the construction of the Three Gorges Reservoir using SWAT model

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The introduction



The world-renowned Three Gorges Project is a key governance and development of the Yangtze River backbone project. Play a huge combined effect in flood control, power generation, shipping and other aspects.





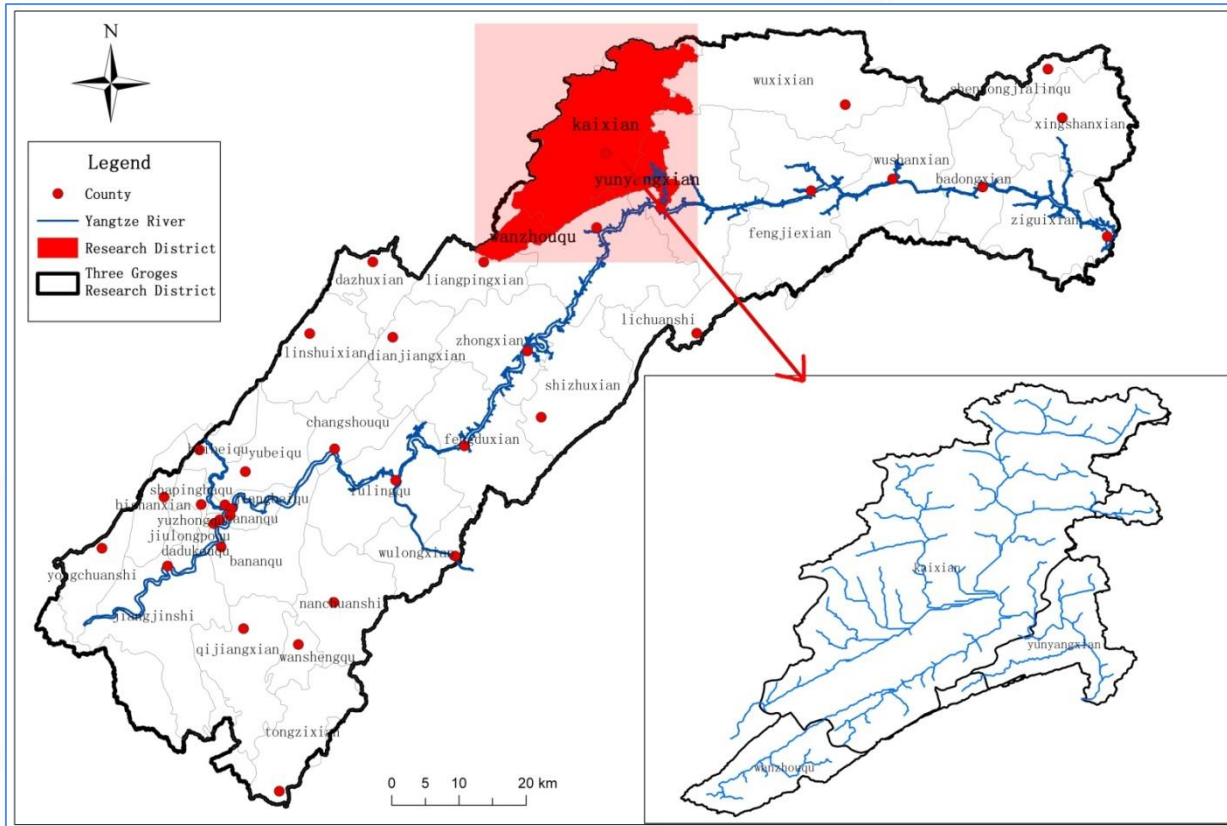
Part 1 Purpose and significance



- Three Gorges Project status is unique in the international arena.
- Xiaojiang River Basin is the largest tributary of the northern part of the Three Gorges Reservoir.
- The 1.2 million immigrants engineering directly influences the development of the reservoir.
- It is worth thinking about the new environmental problems with immigrants to change the way of living.



Part 2 Research methods

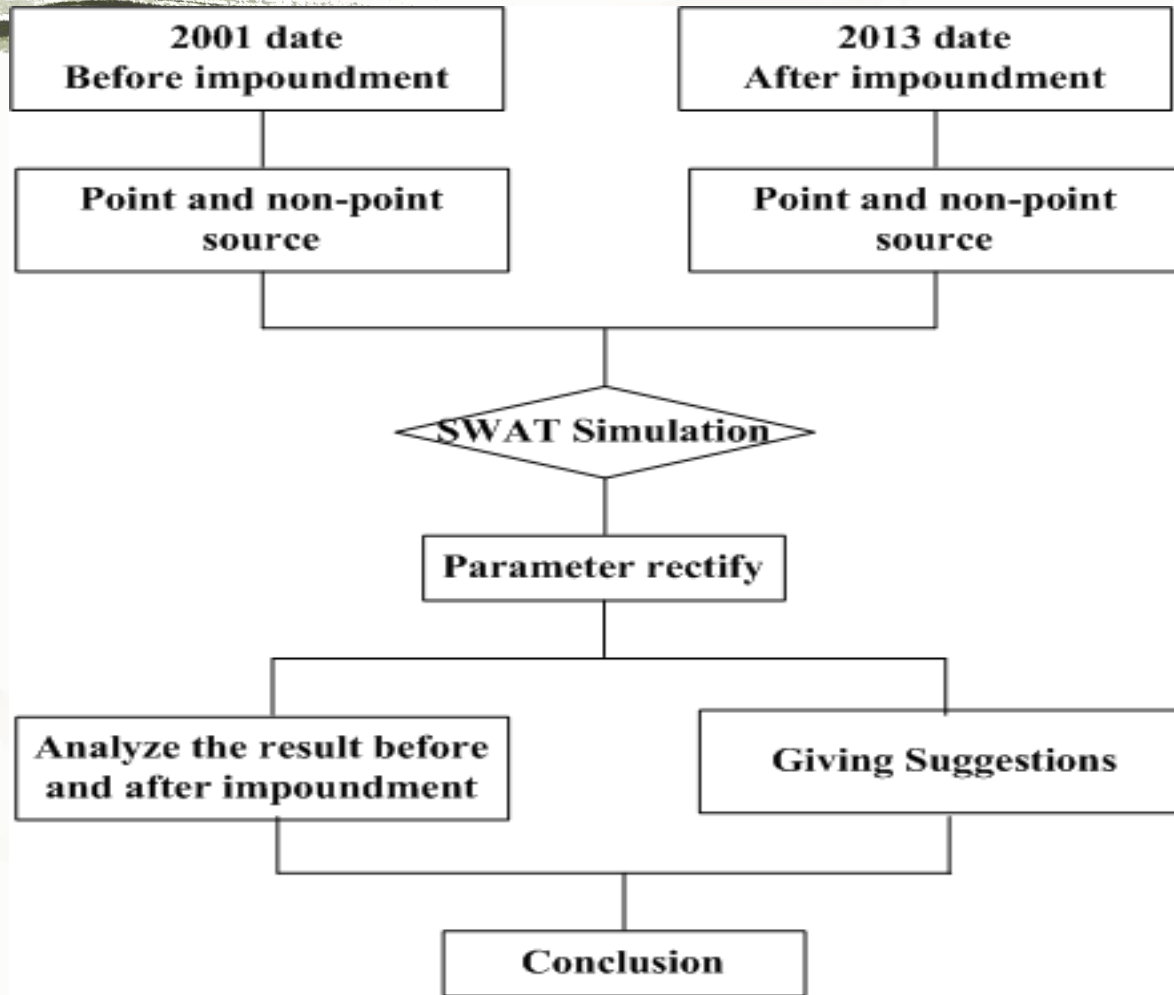


Xiaojiang River Basin is the largest tributary of the northern part of the Three Gorges Reservoir.

Figure 1 The location of Xiaojiang River Basin in the Three Gorges Reservoir Area



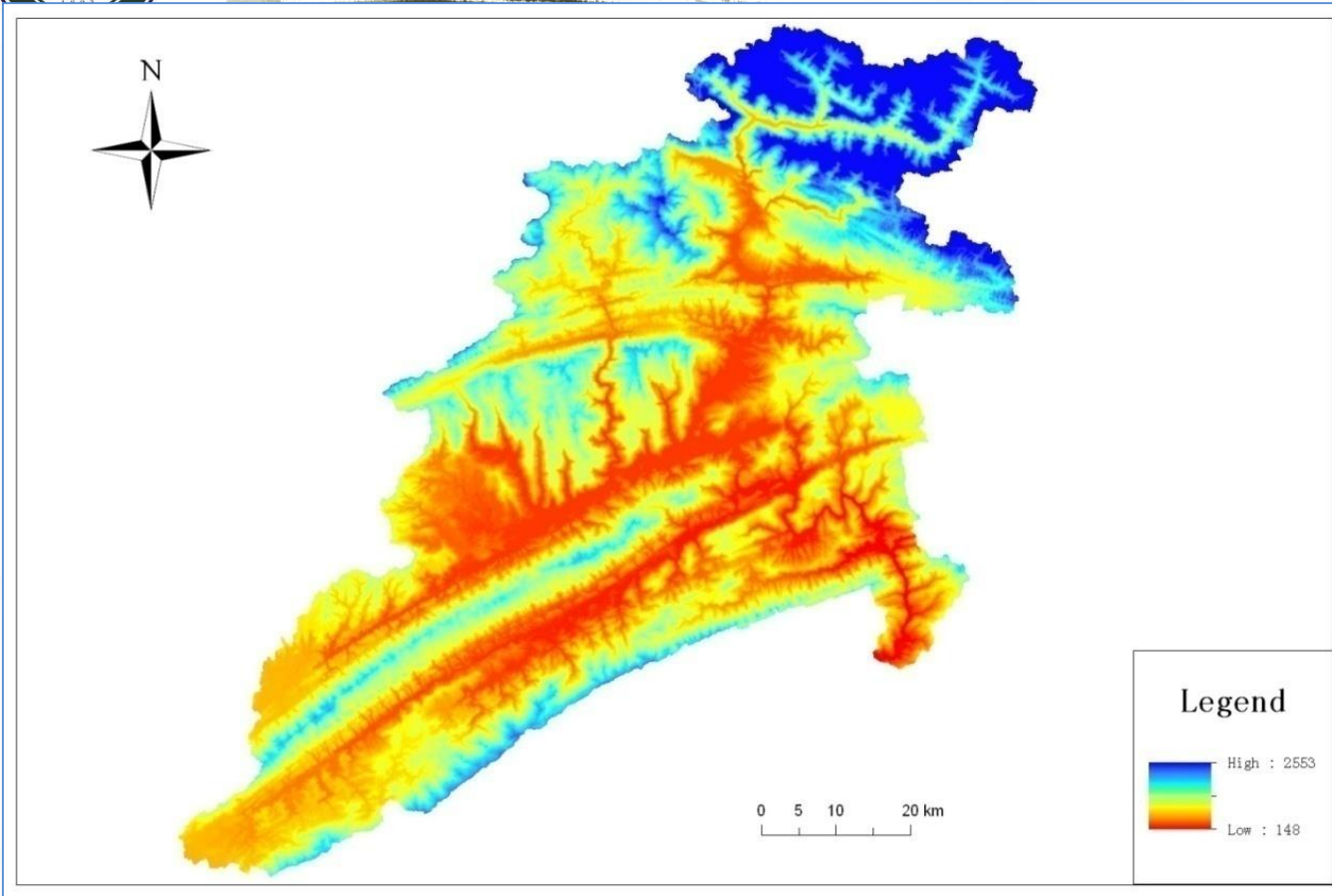
Part 2 Research methods



Fature2 research idea framework



Part 2 Research methods

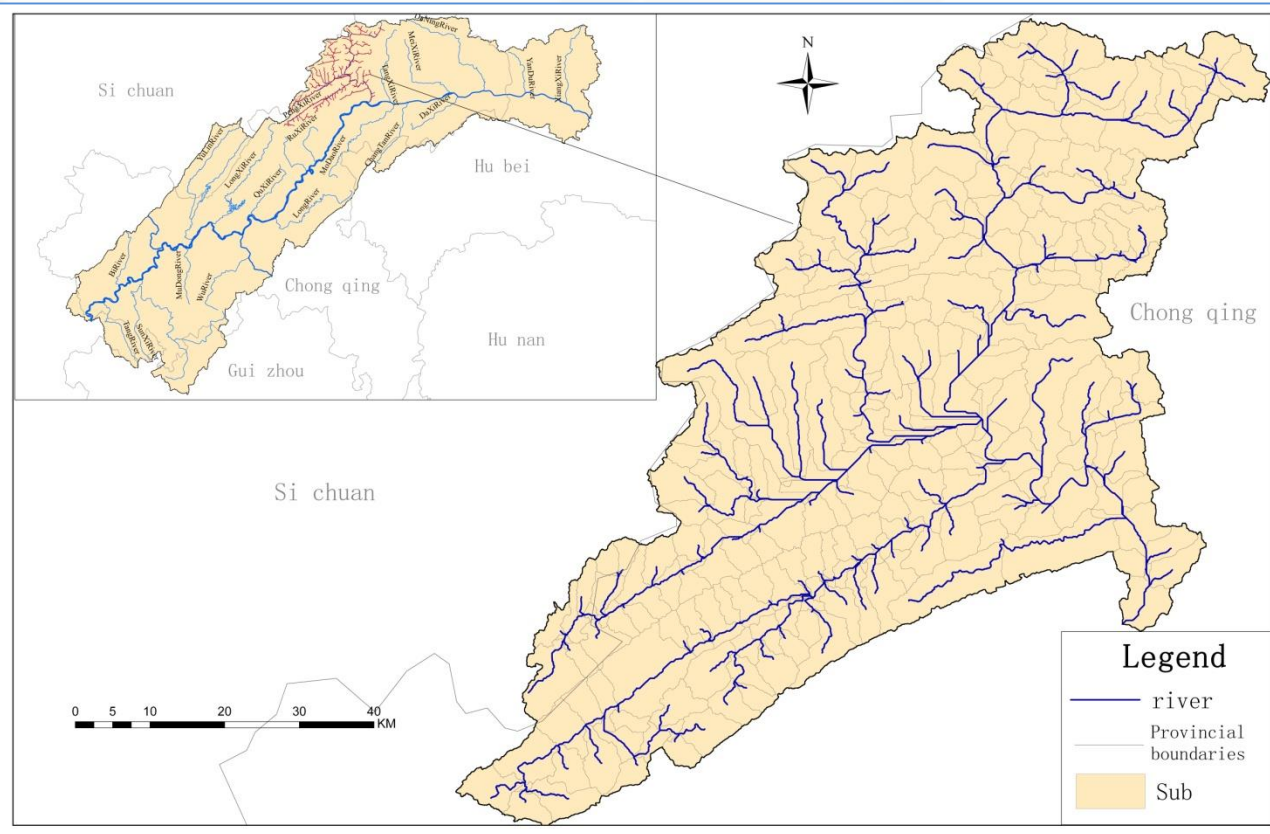


In this study,
the accuracy of
the DEM is 30
times 30.

Figure 3 DEM(30m) in Xiaojiang River Basin



Part 2 Research methods

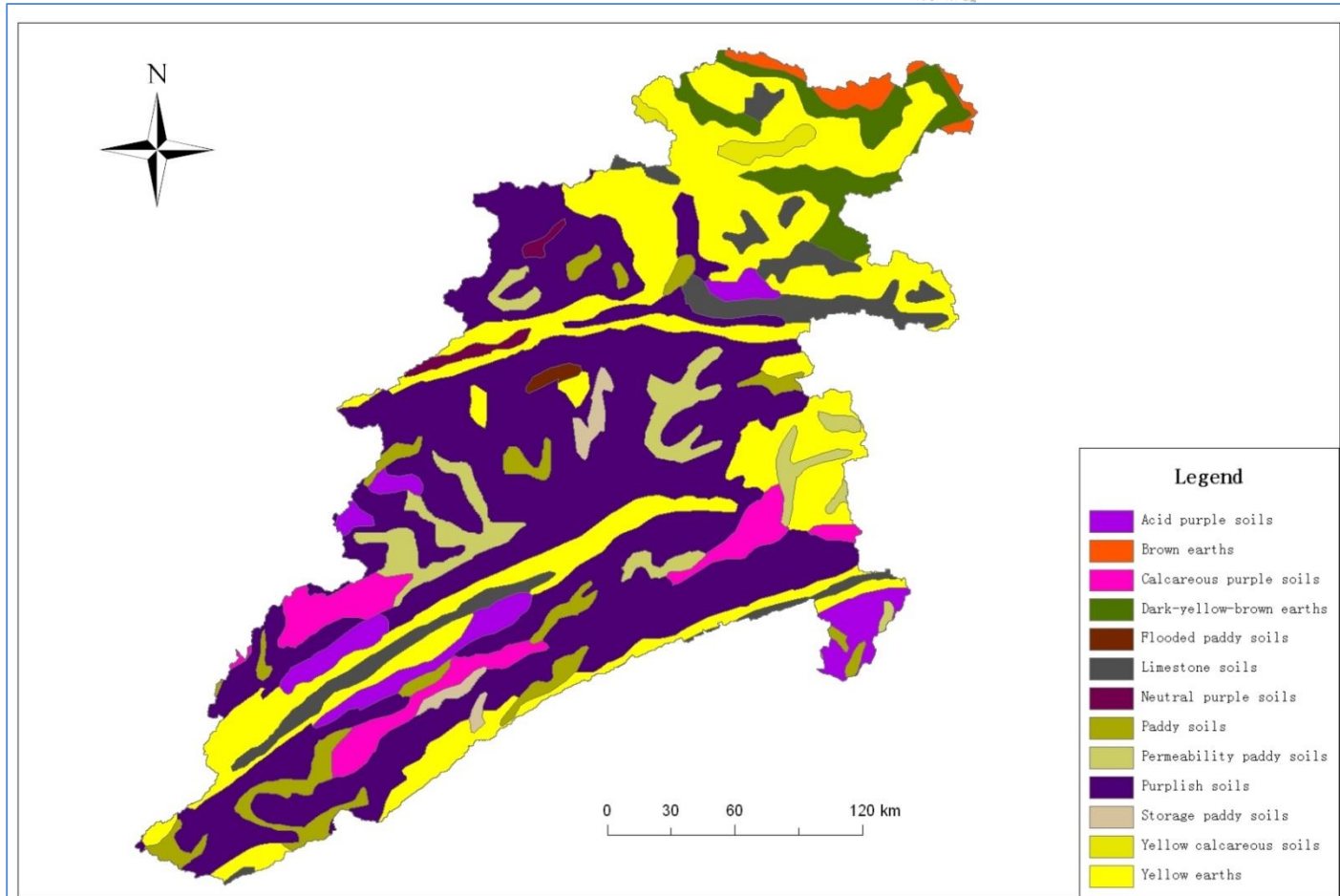


With the type of terrain, there is a big difference in the Xiaojiang basin.

Figure 4 River system in Xiaojiang River Basin



Part 2 Research methods



With the special climate, the soil types are diverse, most are yellow soil, purple soil or yellow brown soil, and they are all acidic soil.

Figure 5 Soil type in Xiaojiang River Basin



Part 2 Research methods

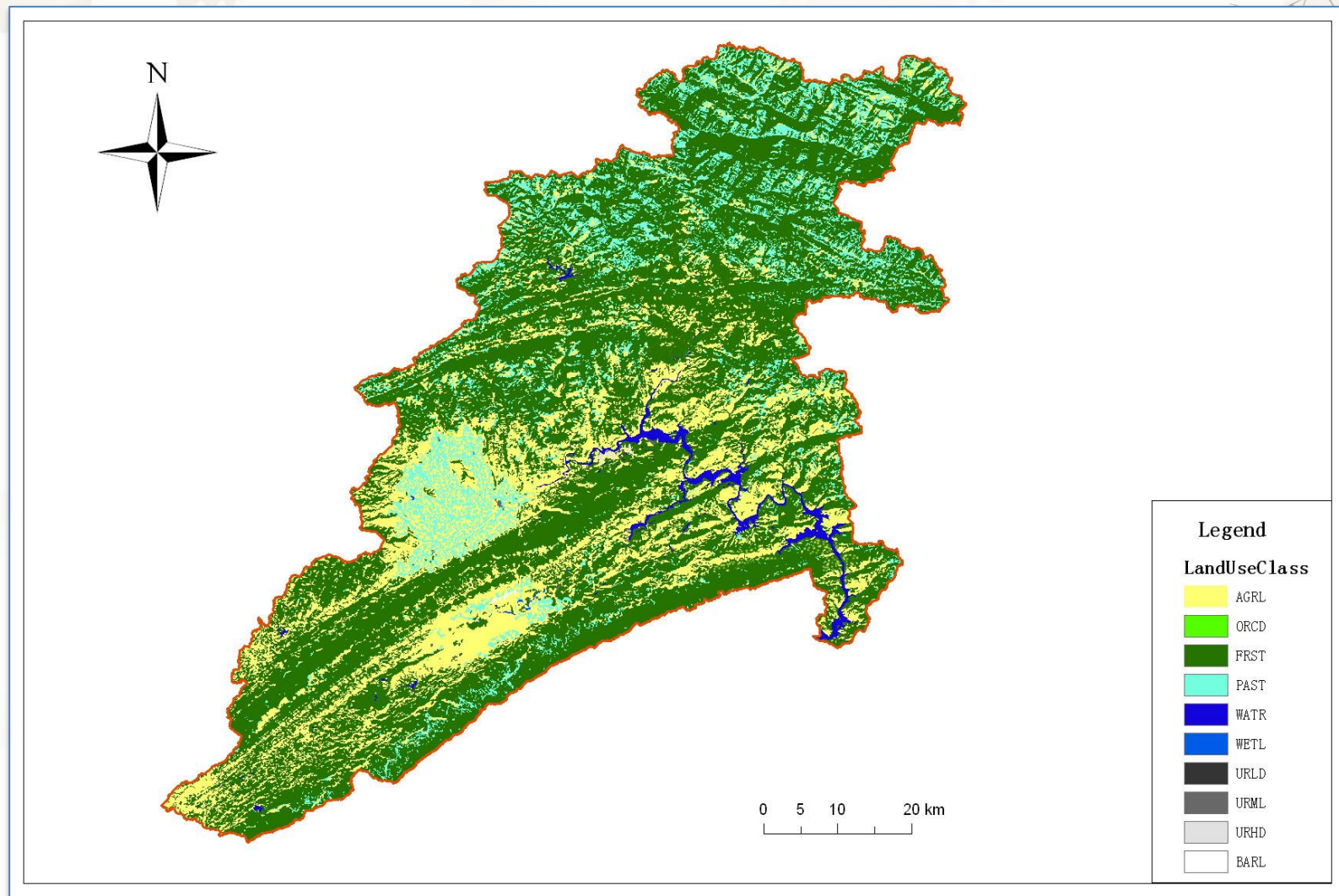


Figure 6 Landuse in Xiaojiang River Basin 2001



Part 2 Research methods

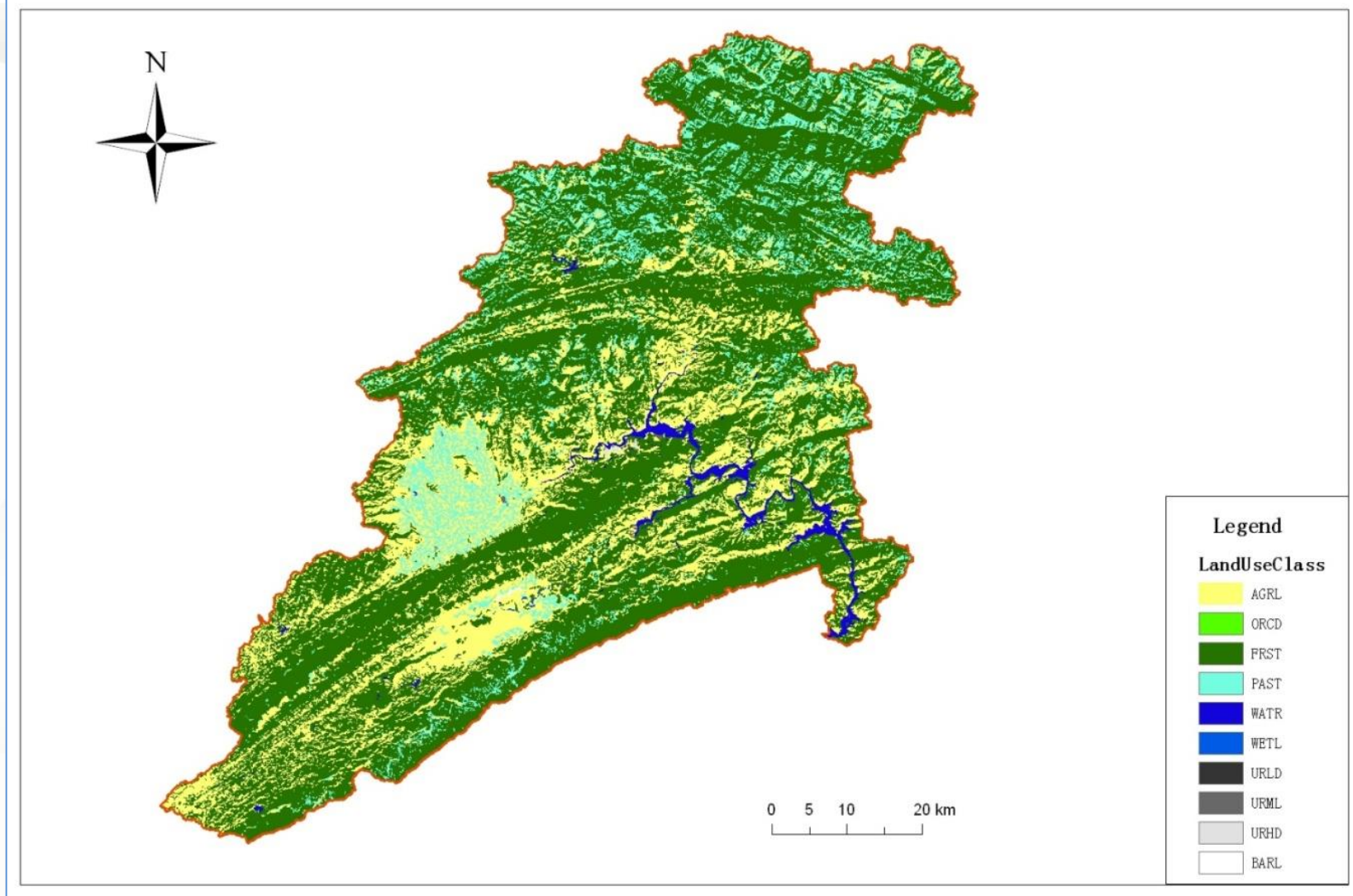
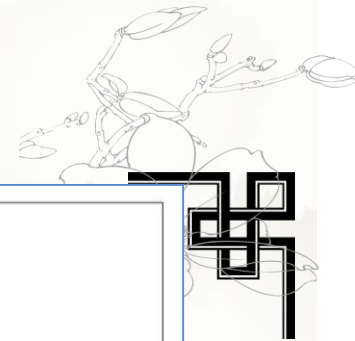
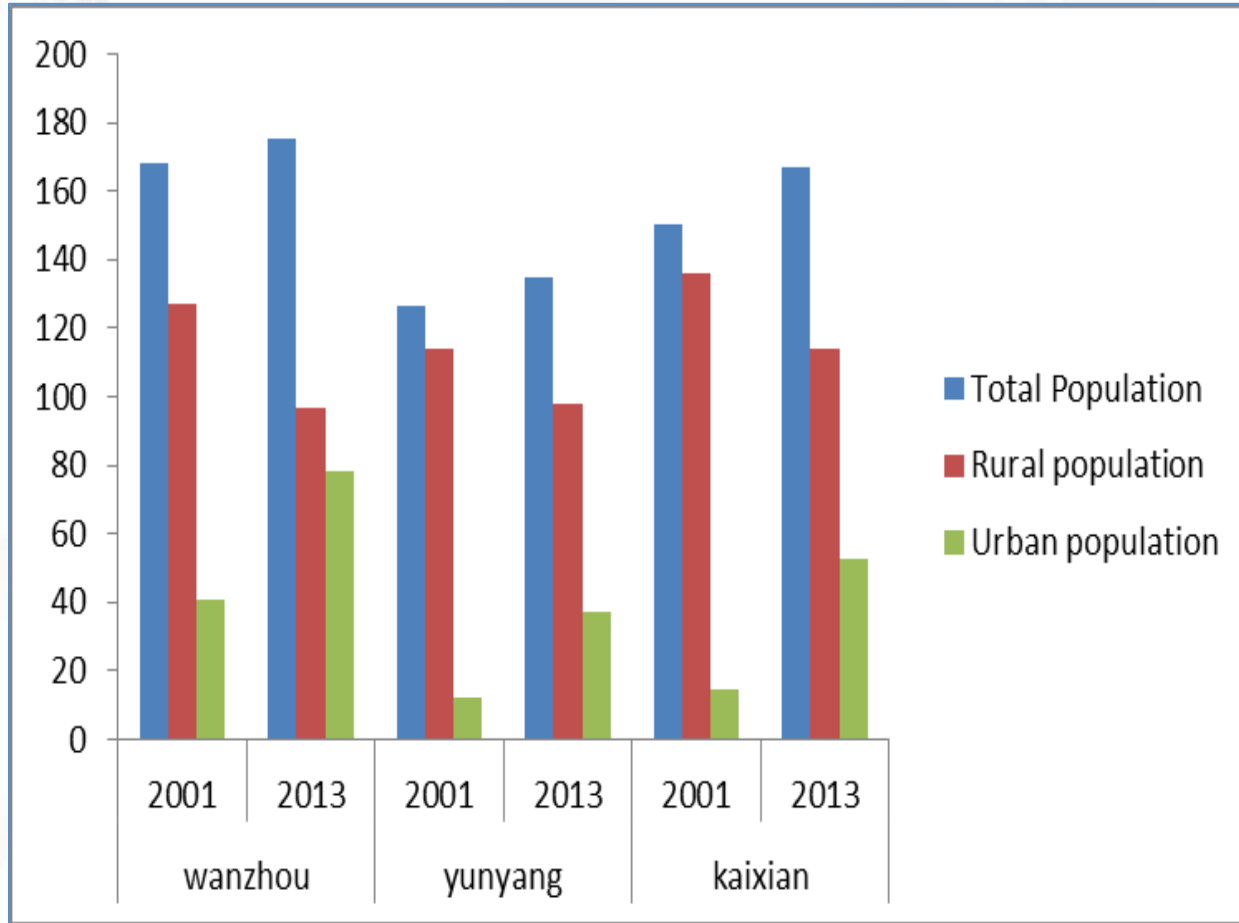


Figure 7 Landuse in Xiaojiang River Basin 2013



Part 2 Research methods

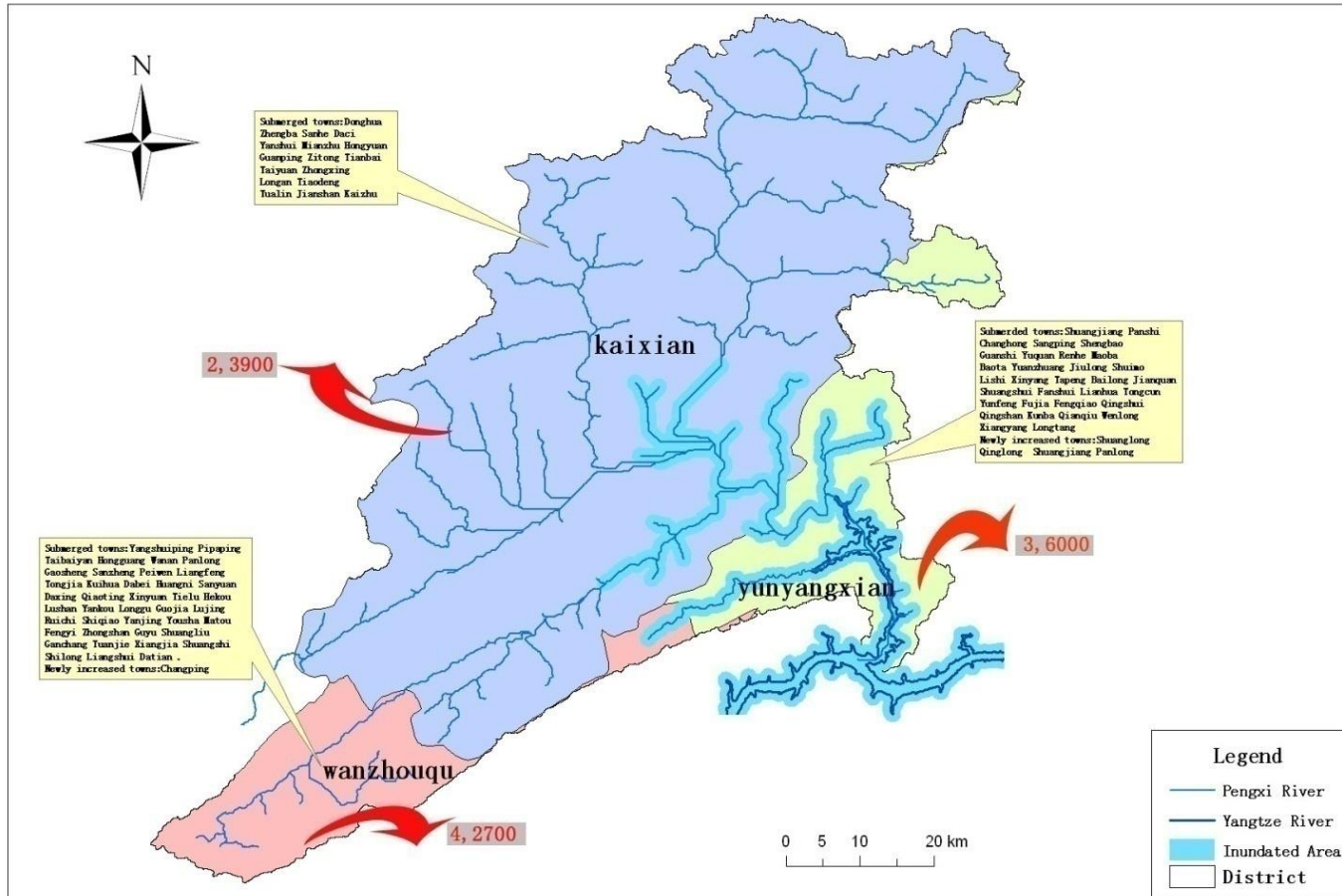


Based on 2001 and 2013, the urban and rural population and the proportion of the population distribution, it can be seen that the total trend of change.

Figure 8 Population in 2001 and 2013



Part 2 Research methods

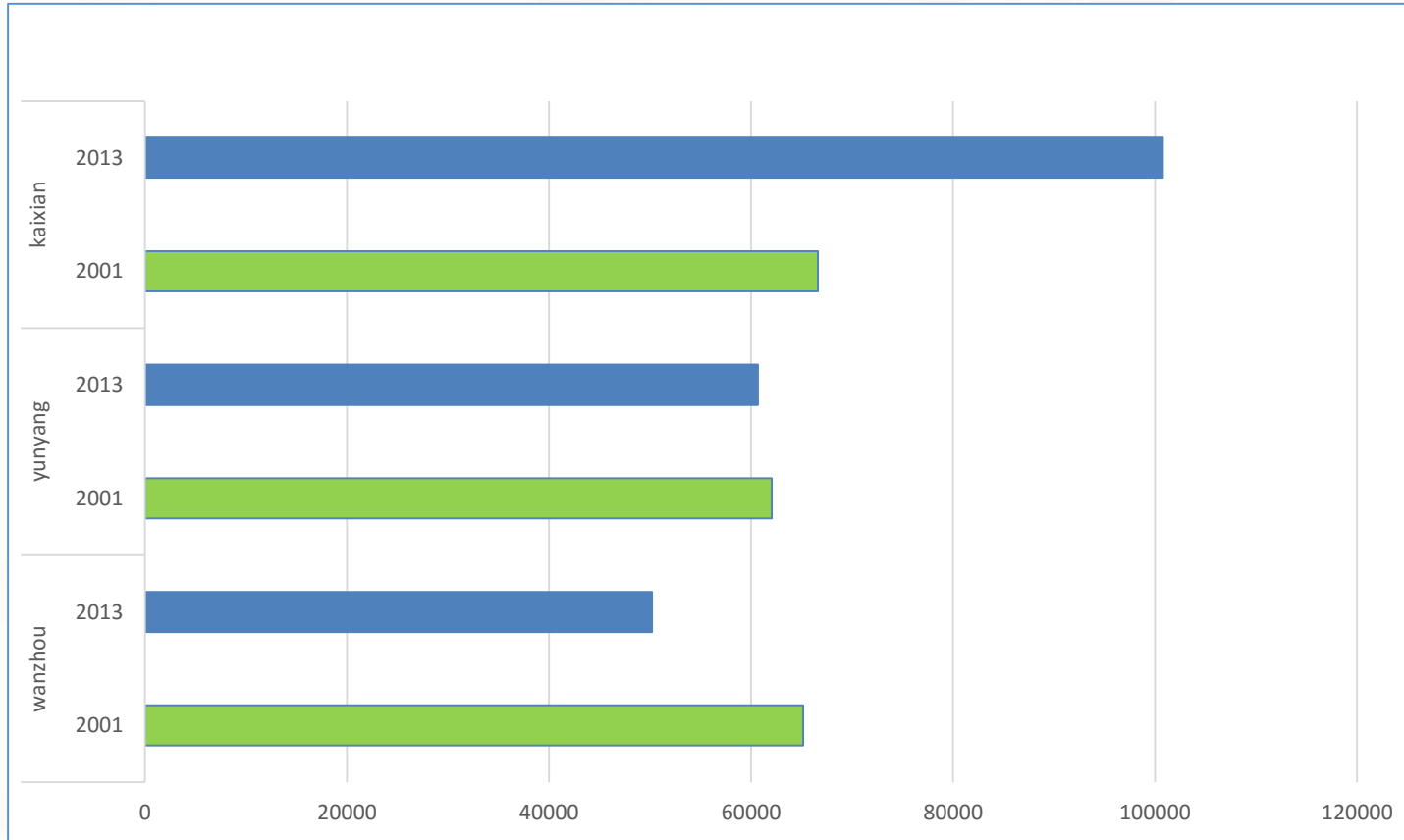


This picture shows that the immigrants are mainly concentrated in WANZHOU county, KAIXIAN county and YUNYANG county.

Figure 9 Immigration in Xiaojiang River Basin



Part 2 Research methods

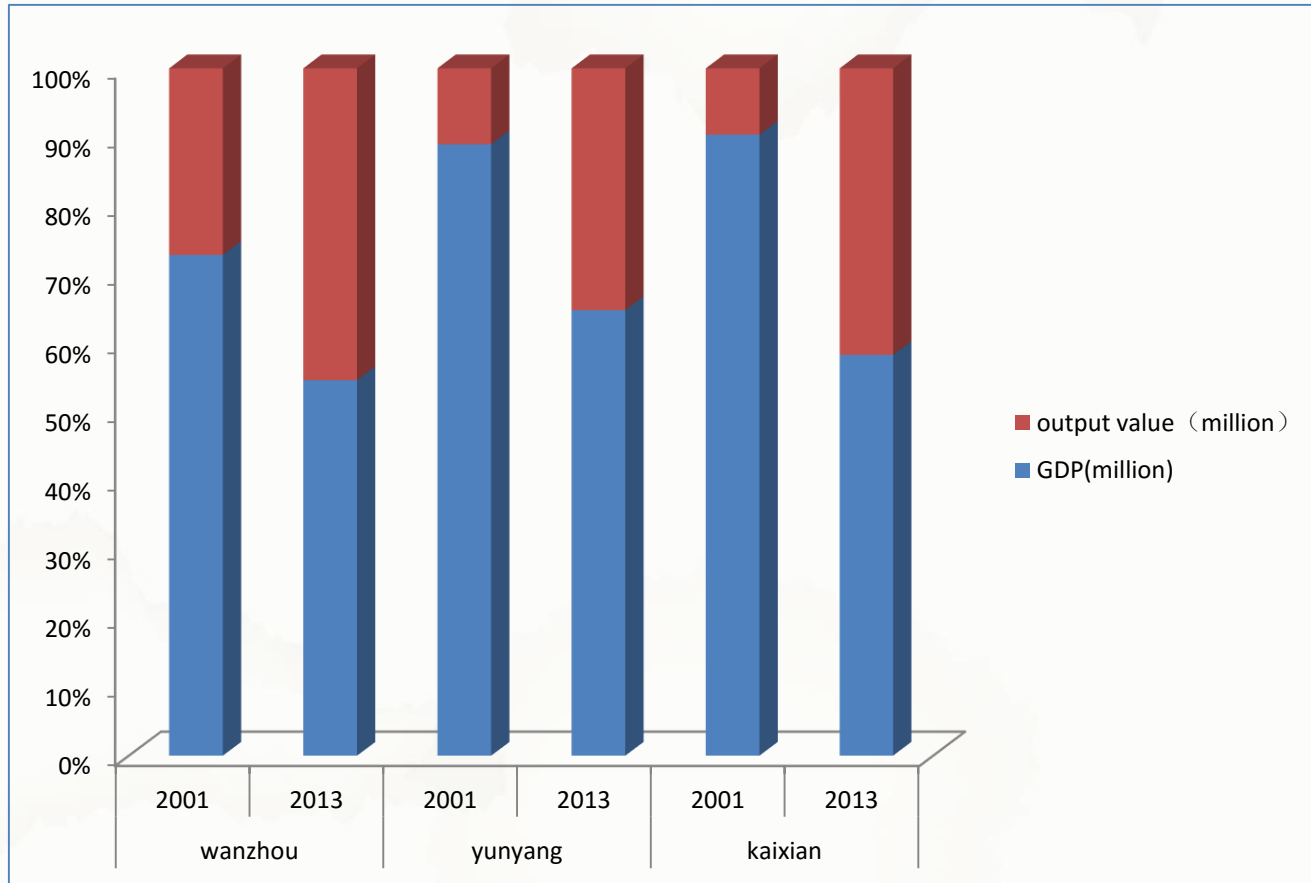


With the migration worked smoothly, some rural people moved into urban area gradually, the cultivated land area is shrinking.

Figure 10 Arable land in 2001 and 2013



Part 2 Research methods



As the migration work was completed, the region's urbanization speeds up.

Figure 11 Arable land in 2001 and 2013



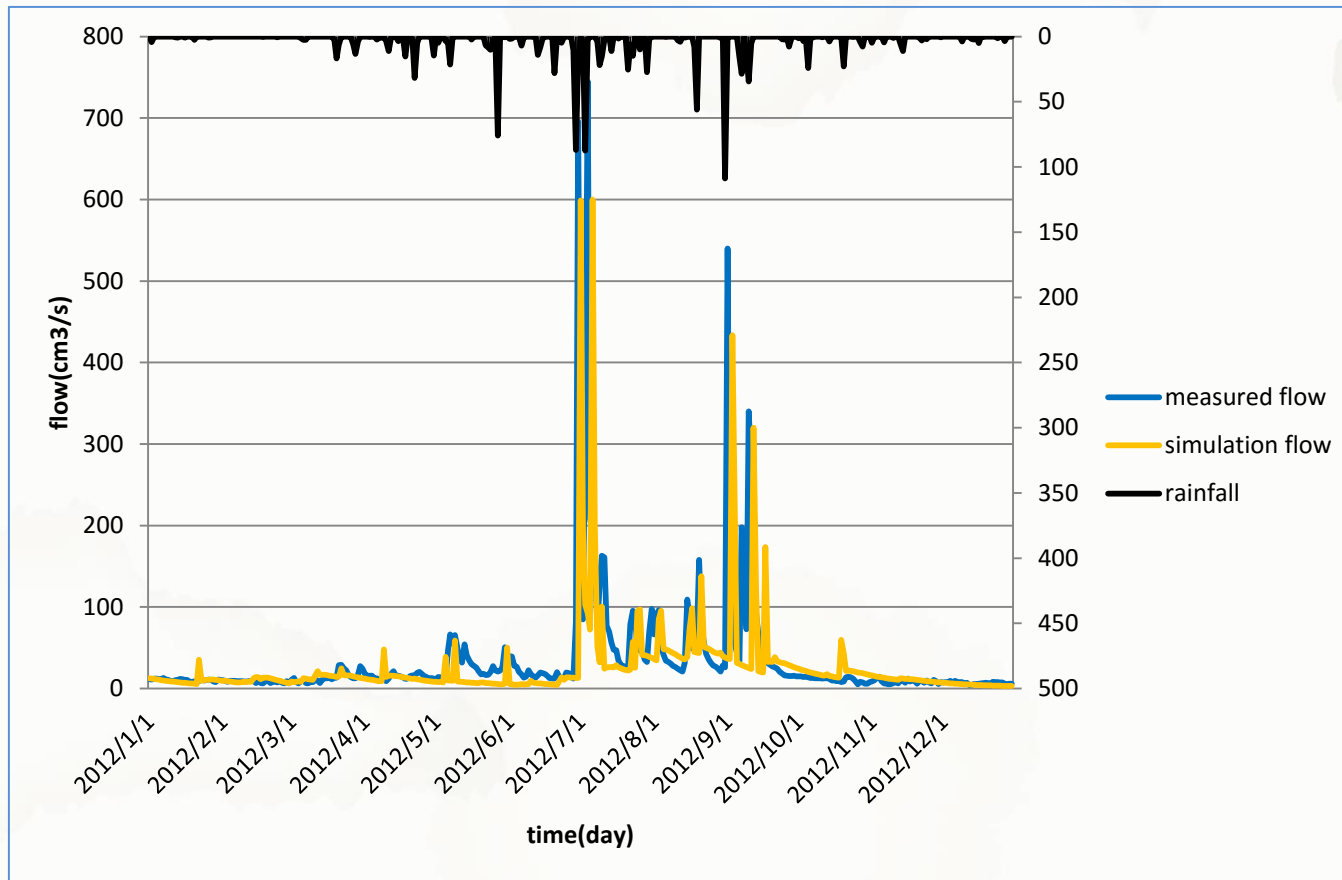
Part 2 Research methods



- After the construction of Three Gorges Reservoir, the spatial distribution pattern of the settlements has experienced a great change.
- Using these data about land use, soil structure, social and economic conditions in 2001 and 2013, the content of $\text{NH}_3\text{-N}$, TN and TP have been simulated in SWAT model.
- Assess the effect of the Three Gorges project on the increasing environmental pollution in Xiaojiang River Basin, based on the change of the spatial distribution of the settlements and pollution emissions.



Part 3 The results



This is rainfall and flow diagram of PENGXI River.

Figure 12 Flow verification in wenquan station



Part 3 The results

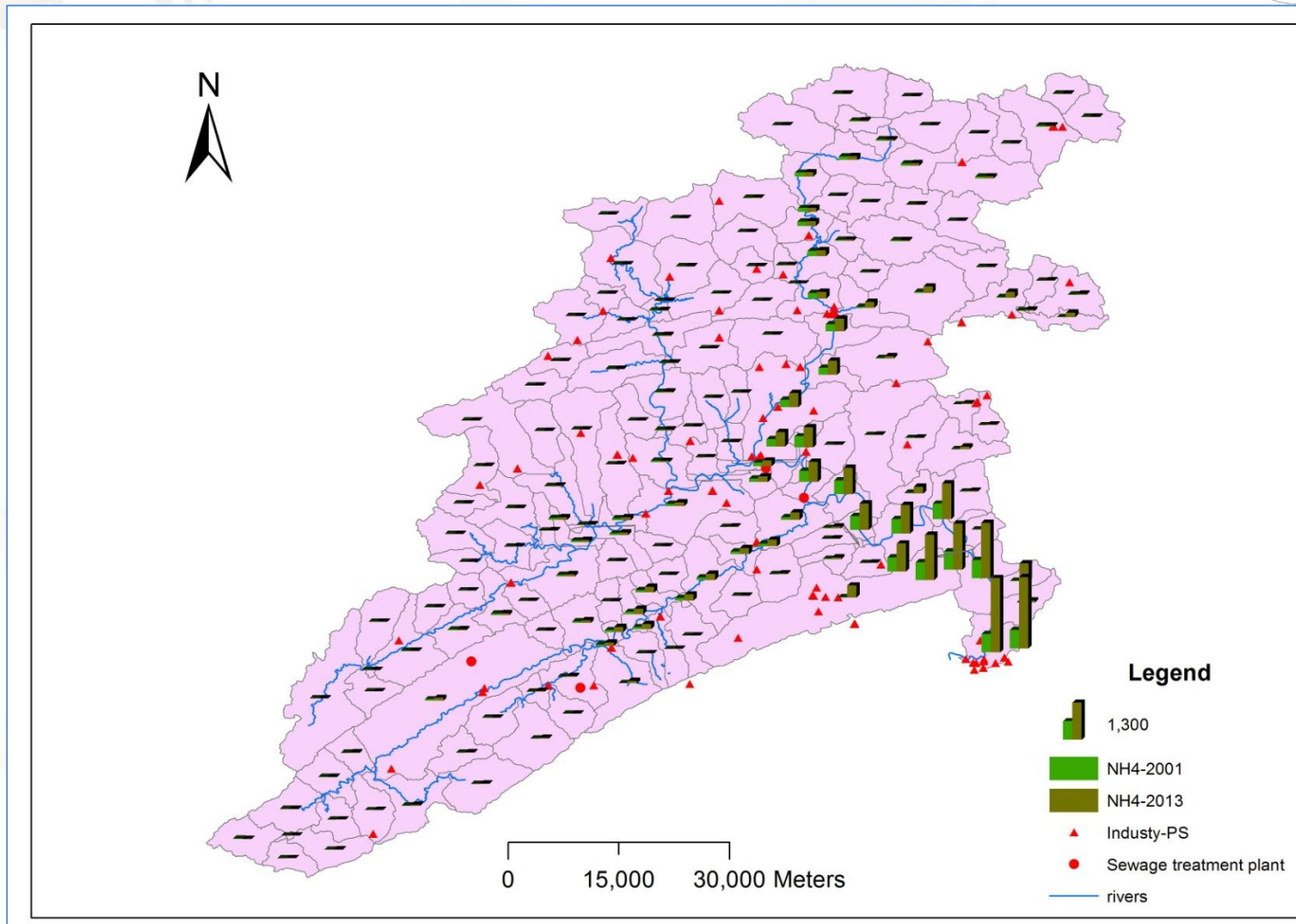


Figure 13 The immigration influence on $\text{NH}_3\text{-N}$



Part 3 The results

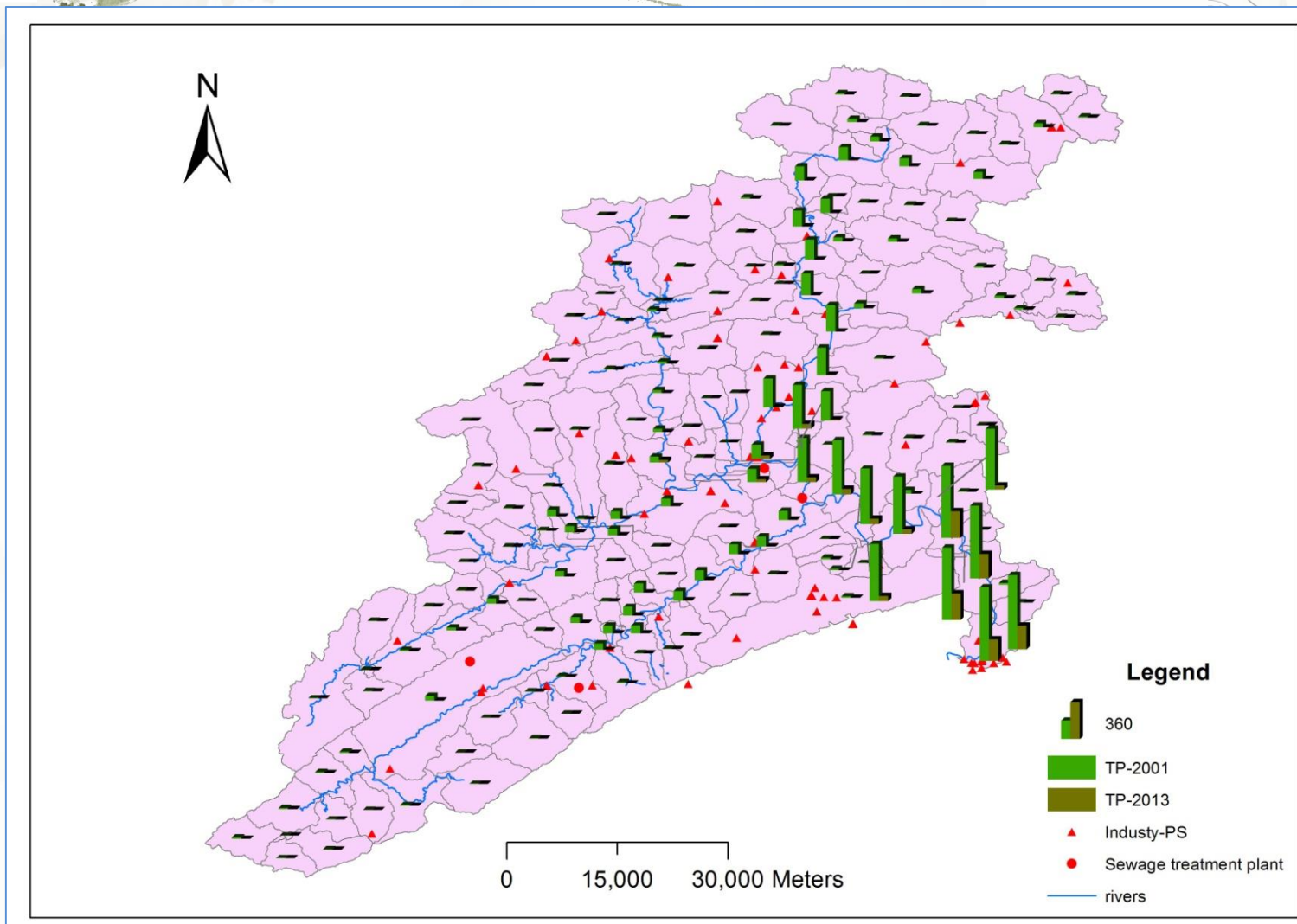


Figure 14 The immigration influence on TP



Part 3 The results

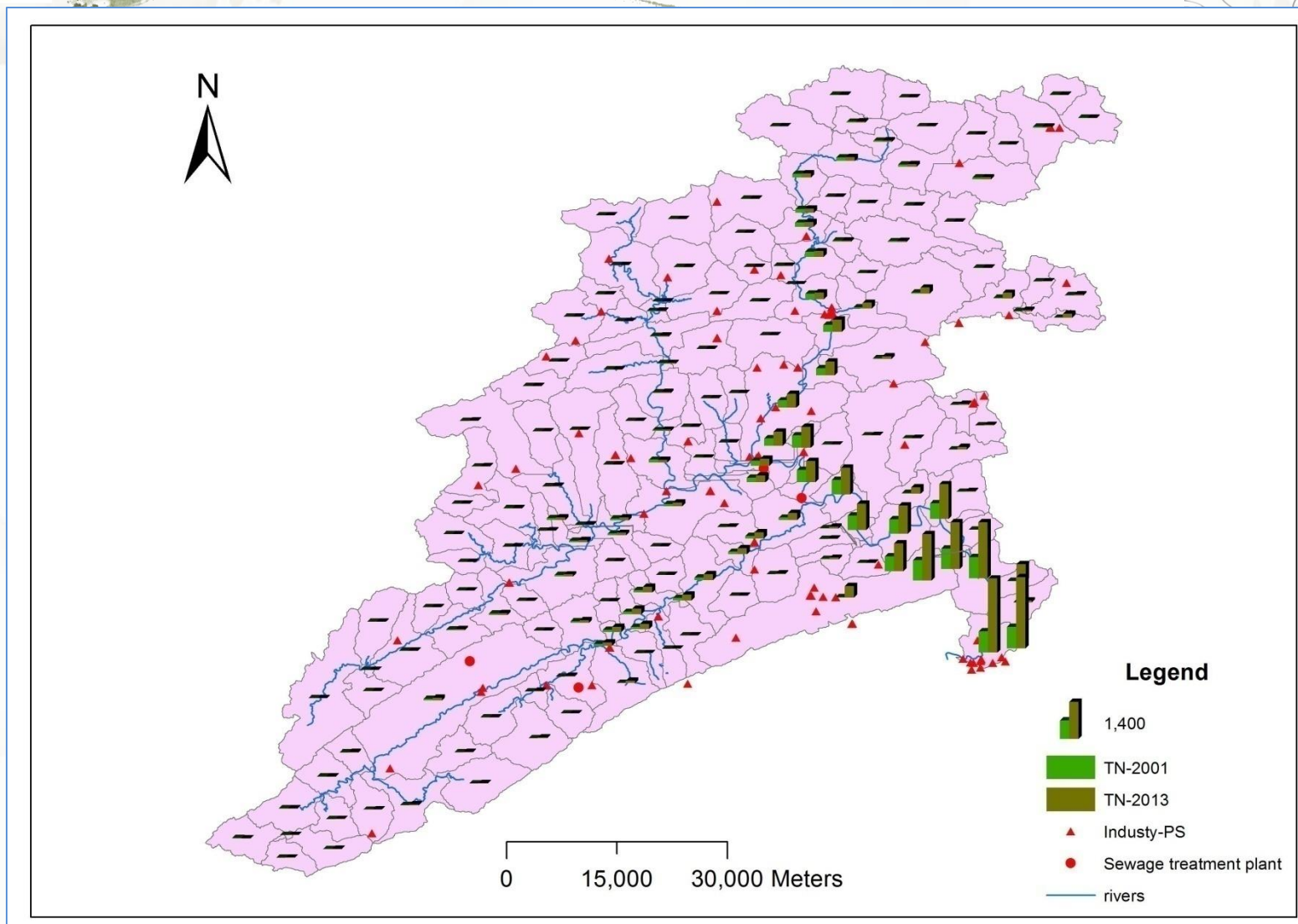
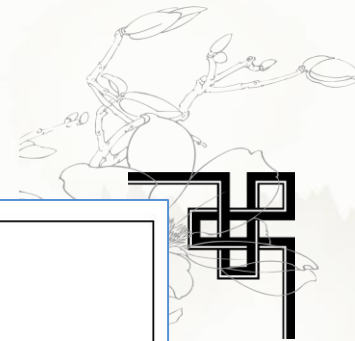


Figure 15 The immigration influence on TN



Part 3 The results



- The results shows that the initial total amount of pollution has varied little after immigration, but the non-point source pollution flow into the water body increased a lot.
- On the one hand, the hardening of the land inhabited by immigrants leads to the infiltration of pollutants reducing, the pollutants directly flowing into the water with the rain from the storm sewer or imported artificial river channels.



Part 3 The results



- On the other hand, after immigration, the non-point source (NPS) pollution is collected together and discharge into the river through sewers like the point source pollution. Comparing with the dispersive NPS before immigration, the concentrated NPS has smaller losses.
- While, the wastewater treatment methods in the area are not enough, which leads to the worse water quality and more amounts of the pollutants directly discharging into the water.



Part 3 The results



This study suggested that sewage treatment efficiency should be improved in the TGR areas in order to reduce the amount of pollutant flowing into the Reservoir.





Part 3 The results



As the three gorges project follow-up work to be carried out orderly, a concept of “BIG THREE GORGER” will make the regional economic rise further, and this sure will make the economic and social development of this area much more powerful and full of vitality. Eventually, we will build a beautiful, rich, green and harmonious new three gorges, and realize the never old myth legend of beautiful Three Gorges.

**Thank you
for your attention!**

