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The rocky desertification management in Guizhou province under the localized governance system

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Guizhou Province has shown remarkable rocky desertification management results in this century. However, under the localized governance system, the division of Guizhou's rocky desertification management zoning map has also shown its drawbacks. The conflicts arising from the localized governance system in China and rocky desertification management in Guizhou are mainly demonstrated by the following manifestations: 1) areas originally required for integrated governance are divided by different municipal administrative affiliations, resulting in the inability to coordinate governance; 2) the same administrative affiliation of the counties is divided into different areas of governance. The key factor is the differentiation of governance due to administrative division, including constraints such as differences in the focus of governance, governance tools and governance philosophy. Based on this, it is recommended that local governance focus on cross-administrative cooperation as well as the reasonable adjusting and promoting of governance boundaries.

KEYWORDS

rocky desertification, localized management, Guizhou province, governance conflicts, territory

1 Introduction

Rocky desertification is the process in which a Karst area covered by soil is eroded to a rocky and desert-like landscape. It has a major disaster for the sustainable ecological and environmental development of the region affected, and has occurred in various countries and areas, including the European Mediterranean, North America, Southwest of China, Japan, and Indonesia. Among all the Karst landscapes in the world, the Karst region of Southwest China is one of the widest geomorphology-distributing areas and one of the most typical one in the world. The Karst region spans eight provinces in Southwest China, mainly concentrated in Yunnan, Guangxi and Guizhou; among those eight provinces, Guizhou Plateau is the largest, heaviest and most hazardous rocky desertification area in the country. According to the second rocky desertification monitoring results announcement of Guizhou Province, by the end of 2016, 24,701 km² of land in

Guizhou Province was covered by rocky desertification, accounting for 14.02% of the province's total land area. Such a large area of rocky desertification land is not only an ecological and environmental problem, but also causes serious social and economic issues, e.g., economic losses and delayed regional development (Jiang et al., 2014), reduction of livable space (Jiang et al., 2014) and an exacerbating of the poverty level (Bai et al., 2013; Jiang et al., 2014; Wang et al., 2019). For the government, it is an urgent ecological construction task in Guizhou, and even in the world, to control the rocky desertification of land.

The Chinese government has always paid attention to the Karst rocky desertification environments. The management of rocky desertification in China has gone through four stages, namely the stage of rocky mountain management (1950–mid-1980s), the initial stage of rocky desertification management (mid-1980s–1998), the stage of ecological construction of rocky desertification management (1999–2008) and the stage of setting up a special project for rocky desertification management (2009–afterward) (Zhang, 2016). Despite the remarkable success of rocky desertification management in China after the 21st century, there is still a large amount of rocky desertification land in the country that needs to be managed, especially in the Guangxi, Guizhou, and Yunnan provinces. In 2012, the State Council Leading Group Office of Poverty Alleviation and Development National Development and Reform Commission issued the Yunnan-Guiling-Guizhou Rocky Desertification Area Regional Development and Poverty Alleviation Plan for 2011–2020, targeting 216 counties (cities and districts) with concentrated contiguous special difficulties, autonomous local counties, old counties and border counties, as key areas for poverty alleviation and comprehensive management of rocky desertification. In the following year, Guizhou Province had responded to the policy by releasing the Implementation Plan for Regional Development and Poverty Alleviation in the Yunnan-Guiling-Guizhou Rocky Desertification Area (Guizhou Province) for 2011–2015. Following this, the prefecture-level cities in Guizhou Province also introduced city-level management policies according to the different degrees of rocky desertification and the potential rocky desertification crises within their jurisdictions.

Karst rocky desertification projects have been in the spotlight for scholars over recent years, with a large number of case studies offering practical experience of Karst rocky desertification control. After the introduction of the Ninth Five-Year Plan, the Chinese central government initially provided policy support, technological innovation, and financial support for rocky desertification restoration projects (Shen et al., 2022). Those projects include the South-North water diversion central line project (Chu, 2017), the poverty relocation project (Wu et al., 2022), the plant growing project, and animal breeding (Cheng et al., 2017; Yao et al., 2022). The implementation of rocky desertification control projects has significantly improved

the diversification and de-agriculturalization of the livelihoods of poor and backward households (Zhang et al., 2016). However, not all projects are equally effective in the management of rock desertification. The effectiveness of projects in each region is closely related to the combined effects of climatic conditions and human governance. For instance, the Guangxi Province has sufficient rainfall, which leads to high control effectiveness. In contrast, the poor management style and rugged landscape in the Yunnan and Guizhou provinces lead to lower project effectiveness (Tong et al., 2017).

Thus far, scholars have compiled extensive literature as a result of case studies and experiences from different regions regarding the management of rocky desertification in the Southwest region of China. Scholars have proposed various models and types of practical experience with application value for the comprehensive control of rocky desertification, such as the Qing-long modes (Yao et al., 2022), small watershed management (Li et al., 2019), the ecological industry governance model (Li et al., 2019) and vegetation coverage (Cheng et al., 2017). According to different regions' governance methods, scholars have also summarized various rocky desertification management experiences. For instance, studies have identified that human land use and settlement were critical factors in determining the rocky desertification (Xu et al., 2013; Zhang et al., 2021). Therefore, Guizhou Province has reduced the area and extent of its rock desertification by implementing poverty alleviation and relocation projects (Wu et al., 2022; Zhou et al., 2022). Moreover, different plants are planted to improve the ecology of the area and promote the local economy while controlling rock desertification (Cheng et al., 2017). In the Qing-long experiences of desertification control, grass suitable for local growth is planted and goats are raised so as to enhance the ecological livestock agriculture in the Karst area and increase household income (Yao et al., 2022).

The existing literatures show the following characteristics: first, there are limited studies discussed rocky desertification management from the perspective of local governance behavior; second, there are massive research results illustrating the governance model of specific regions, while lack of studies comparing governance model between regions, and the mechanism underline governances variances between regions from the perspective of local governance. In regard to the shortage of the literature, this study aims to sightsee different rocky desertification management behavior within Guizhou Province under different city jurisdictions. This study argues that the overlapping and ambiguous responsibilities and accountabilities in localized practical governance led to differences in guidelines for rocky desertification control. Counties are divided by different administrative affiliations that form a governance boundary and rocky desertification treatment in these territory are paid different attention. This results in disparities in governance focus between regions that originally should have been integrated governance. This paper

will take the rocky desertification control among multiple regions in Guizhou Province to analyze how different administrative jurisdictions cause well targeted rocky desertification control to be implemented differently. In doing so this research contributed to the literature in the following: Focusing the rocky desertification governance on administrative boundary conflict enhanced the theory of governance boundary and promoted in-depth study of administrative governance intersection in practice, address the contradiction and conflict of regional governance on rocky desertification governance. From the theoretical perspective the research enriches the understanding of ambiguous localized management by explicate the delegation of tasks and cross-administrative or multi-regional crossover governance can lead to policy implementation variations.

The following paper is organized as follows: Section 2 explains the theoretical analysis framework. Section 3 introduces the research materials and methods, while Section 4 demonstrates the rocky desertification control in Guizhou Province. Follow by the discussion section which discusses the effect of localized management and the impact on rocky desertification control in the study area. Finally, the conclusion section.

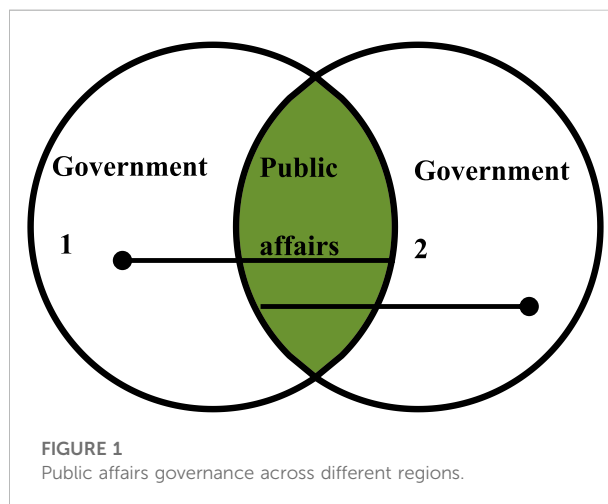
2 Theoretical analysis

This study adopts an analytical framework that centers on division of administrative affiliation under localized management. Localized management is a micro mechanism in China’s administrative system. The system emphasizes the division of intergovernmental responsibilities by territory and gives territorial governments a certain degree of autonomy in daily governmental affairs. Under administrative decentralization, each administrative jurisdiction is responsible for the public affairs within its territory. Every public affair has a clear boundary of authority and responsibility. This division of powers and services from the territorialized management is called administrative subcontract (Zhou, 2016). Under this form of division, all levels of government are duplicates of the higher level of government in terms of institutional structure, authority, affairs and authority over lower levels of government, which is also known as responsibility homogeneity (Clark, 1984).

Some scholars had argued decentralization of power and localized governance has led to an imbalance of power and responsibility of local governments. However, the management system itself does not necessarily lead to an imbalance of power and responsibility in grassroots governance; it is the anomalies process that led to imbalance of power and responsibility, because localized management system intended to clarify the governance main body in a specific area. The purpose is segment administrative district as the boundary and implement “in whose jurisdiction, by who is responsible for”. Under a single governance jurisdiction, the

TABLE 1 Differences of government levels under localized governance.

Territorial level	Responsibility	Power
City government	Little	Great
County-level government	Great	Little



territorial space and local responsibilities are clear. All matters can be found in the corresponding administrative districts. However, in actual process of governance, there is often the phenomenon of alienation of governance among accountability and responsibilities, case by two factors. First is the mismatch of authority and responsibility due to the devolution of responsibilities from higher levels of government with the task. Form China’s administrative structure, the powers of every level of government are decomposition and refinement of it’s superior. In this way, each level of government can intervene directly with its subordinates. For example, the city government can assign and monitor the county-level government, while putting forward specific requirements. The decentralization of tasks at all levels of government has led to an increase in the number of daily governance routine undertaken by the grassroots, forcing local government to complete the various tasks assigned by their superiors. Thus, the original localized management and hierarchical responsibility are decomposed layers by layers after the task are assigned, resulting in an obvious mismatch between the actual responsibilities of the grassroots government and power. Specifically, the power and responsibility differences of governments at different levels under localized governance are shown in Table 1.

Second is the involvement of multiple administrative regions in public governance, resulting in unclear power boundaries. Even within the same jurisdiction, it takes the cooperation of

multiple government unions to accomplish public affairs. Once there is cross-administrative or multi-regional crossover, there will be a blurring of accountability and responsibility boundaries. As public affairs require the cooperation of multiple unions to achieve, this leads to ambiguity in the functions and responsibilities of departments. For the reason that the administrative governance system restricted local government to cross the boundaries of an administrative district to exercise jurisdiction over the public affairs of another district. Hence, when confronted with cross-regional governance issues and guidance, local governments are limited to matters within their own jurisdictions and restricted to overstep other regions. The public affairs governance across different regions is shown in Figure 1.

With the above concept, the current article assumes that, the division of administrative regions and the autonomy of local governments in local affairs result in the blurry of governance authority and boundaries. Cross-regional governance planning has emerged in the management of rocky desertification in Guizhou Province, causing ambiguous boundaries power and governance.

3 Materials and methods

3.1 Methods

Our study is built principally on interviews and case studies. The data of our research consist of first-hand material including semi-structured interviews with local contractors. Furthermore, we systematically collected various policy documents, government reports, statistical yearbooks, news report on specific cases to examine Guizhou rocky desertification management. In particular, taking advantage of the opportunities to consult with some of government contractors, we undertook participatory observations various type of management models to deepening our understanding and comparison of governance model. This proved critical evidences to our assumption of the framework of ambiguous localized management cause by cross-administrative or multi-regional crossover governance.

3.2 Study area

Our study area is Guizhou Province. Guizhou Province is located in Southwest China, covering an area of 1,76,200 km². Guizhou's land form is dominated by plateau mountains, hills and basins. Within its jurisdiction, there are 6 prefecture-level cities, 3 autonomous prefectures and 88 county-level administrative regions. Guizhou Province is one of the largest, most diverse, and most harmful karst rocky desertification landscapes in the world. The karst land area in Guizhou

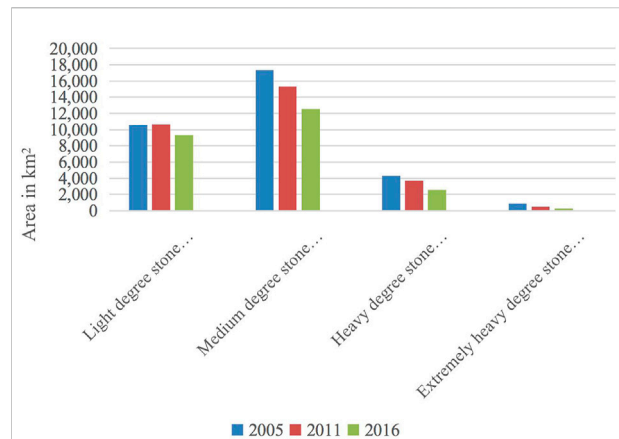


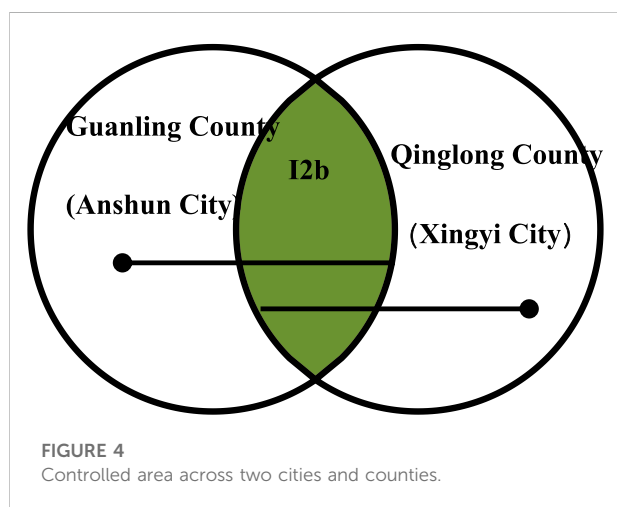
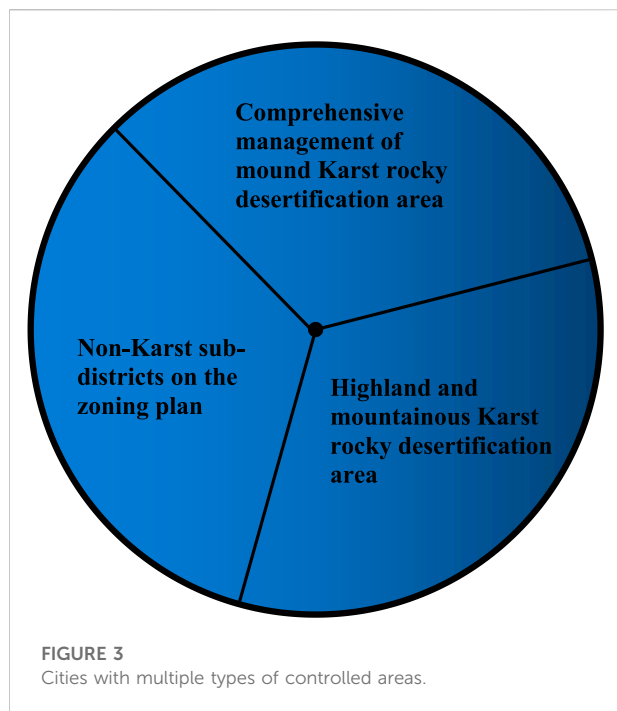
FIGURE 2
Evolution of different degrees of stone desertification in Guizhou (2005–2016).

Province is approximately 1,12,472 km², accounting for 63.80% of the province's total land area. Among the karst land, the rocky desertification land area occupies 24,701.3 km², and the potential rocky desertification land area is 36,385 km², which leave 51,385.2 km² non-rock desertification land, accounting for less than half of total Guizhou land. In 2012, the State Council Leading Group Office of Poverty Alleviation and Development National Development and Reform Commission issued the Yunnan-Guiling-Guizhou Rocky Desertification Area Regional Development and Poverty Alleviation Plan for 2011–2020; 44 cities, districts and counties in Guizhou Province were included in the plan, 35 of which are on the key list of rocky desertification comprehensive management. The 44 cities, districts and counties cover a total area of 86,700 km², accounting for 38% of the entire land area of Yunnan-Guiling-Guizhou, which is a rocky desertification area that makes up 49% of the entire land area of Guizhou Province. It is the largest of the three concentrated contiguous special difficulties areas in Guizhou Province.

4 Rocky desertification management in Guizhou

4.1 Overall situation and differential distribution of rocky desertification in Guizhou

The detection of rocky desertification in Guizhou Province began in 2001 and completed data collection for the whole province in 2005, 2011, and 2016 respectively. According to the three reports on rocky desertification in Guizhou Province, the situation of rocky desertification has been effectively suppressed. Moreover, there has been a significant decline in



different degrees of rock desertification (Figure 2). By 2016, the total area of rocky desertification land in Guizhou Province had decreased to 24,701 km²—a total decrease of 84,600 km² from 2005 (25.51%). Contingent upon the classification of light, medium, heavy and extremely heavy degrees of rocky desertification, the reduction was 11.7%, 27.6%, 40.7%, and 72.4% respectively. Although the total rocky desertification area has decreased, the potential rocky desertification area increased from 29,839 km² in 2005 to 363,85 km² due to natural causes and human factors. This indicates that, although granting Guizhou Province has achieved remarkable

results in the management of rocky desertification, there is still a shortage in the prevention of potential rocky desertification land.

Table 2 reports the distribution of rocky desertification degree in different regions of Guizhou Province. We find that the degree of rocky desertification in different regions of Guizhou Province show a significantly differentiated distribution, and the composition of light, medium, heavy and extremely heavy rocky desertification was completely different. For example, in terms of the degree of light rocky desertification, the largest area is Qiannan; In terms of moderate rocky desertification, Bijie city has the largest area; As far as the degree of severe rocky desertification is concerned, the largest area is Qianxinan prefecture; In terms of extremely severe rocky desertification, the largest area is Qianxinan prefecture. This shows that the regional differences in the effectiveness of rocky desertification control in Guizhou Province are large.

The results of rocky desertification management in Guizhou are integral to the overall land differentiation of Guizhou Province. The division of land adheres to the following rules of conduct: based on the integrity of the county-level administrative region, regional spatial and connectivity, the governance sector is divided according to the leading factors of rocky desertification, current situation, governance direction, rocky desertification prevention and regional economic division. Hence, on the basis of Karst Stone Desertification Area Comprehensive Management Planning Outline 2006–2015, Guizhou Province's rocky desertification prevention and control management is divided into three prevention and control categories, namely the comprehensive management of highland and mountainous Karst rocky desertification area in the Qian-Southwest Plateau region, the comprehensive management of mound Karst rocky desertification area in the Qian-central Plateau region, and the comprehensive protection region of low mound Karst rocky desertification in the Qian-East Plateau region. Each region is further divided into two or three sub-regions, and each sub-region is further classified into sub-districts according to the degree of rocky desertification. Every individual sub-region has different governance objectives, such as ecological governance of forest agriculture animal husbandry in some areas, whereas some regions focus on ecological control.

4.2 Governance differentiation due to constraints of administrative districts

The zoning planning is conducive to the overall planning of rocky desertification. However, the division of administrative districts and jurisdictional constraints also increase the difficulty of promoting rocky desertification management. The difficulty of watershed coordination across different levels of municipal and

TABLE 2 Differential distribution of the degree of stone desertification in different regions of Guizhou Province (2016).

	Total	Light degree stone...	Medium degree stone...	Heavy degree stone...	Extremely heavy degree stone...
Guizhou province	2470132.1	934210.67	1254119.61	256421.14	25380.68
Guiyang city	145832.95	72828.52	69587.5	3218.5	198.43
liupanshui city	234228.81	103015.77	92080.45	30872.88	8259.71
Zunyi city	293202.3	119145.77	155305.2	18484.24	267.8
Anshun city	244948.48	78510.56	115824.64	48595.87	2017.41
Tongren	223219.13	94616.72	112503.95	15541.6	556.86
Qianxinan prefecture	303275.45	58566.47	183693.37	52368.25	8647.36
Bijie city	496761.53	146412.27	296300.7	50326.13	3722.36
Qiangongnan prefecture	109774.29	58012.53	49207.5	2459.66	94.6
Qiannan	412287.83	202244.36	175664.9	32766.62	1611.95
Gui'an new area	6601.33	858.41	3951.33	1787.39	4.2

county administrative districts has greatly increased. Of note here is the fact that the rocky desertification management zoning is based on the spatial distribution of rocky desertification and rocky desertification grade, but the implementation of local policies in China and the arrangement, validation and operation of projects in rocky desertification management are all coordinated according to the administrative properties. In light of this, many contradictions are bound to arise between the two.

If the classification of three boundaries of Guizhou rocky desertification management is designed to differentiate management according to different degrees of rocky desertification to improve efficiency, then the distribution of sub-regions and sub-districts of governance makes the administrative area governance fragmented. Different counties within the same municipal jurisdiction but difference in the sub-regions or sub-districts under Guizhou rocky desertification control zone need to adapt to different governance orientations and implement different governance measures. It may also be that some sub-districts are within the same zoning direction but are under different municipalities, resulting in differences in municipal policies. Although this may lead to innovative policies, it might also affect the region that needs to be integrated; governance is divided by several counties with different administrative affiliations. Due to the different degrees of economic development between counties, as well as the different governance concepts, different emphases, and different kinds of implementation, it is impossible to coordinate regional governance, which seriously impacts the overall governance effect. The regional conflict between the administrative region planning and the rocky

desertification prevention sub-area makes it more difficult to coordinate between administrative regions.

4.2.1 Same municipal jurisdiction, different control regions

In the first case scenario, counties within the same municipal jurisdiction are distinguished into two control regions in Guizhou's rocky desertification zoning plan. For example, Luheng and Wangmu counties in Xingyi City are allocated to the comprehensive management of mound Karst rocky desertification area in the central district, while the remaining counties with Xingyi City are assigned to the comprehensive management of highland and mountainous Karst rocky desertification area in the Southwest. Wangmu and Luoheng County are even classified as non-Karst sub-districts on the zoning plan. Such division is in line with the principle of dividing regions based on different rocky desertification and internal differences in socio-economic development, but suffers from the constraints of administrative division and the drawbacks of governmental structure, leading to the fragmentation of territorialized administrative district management. Consequently, the rocky desertification control results are impacted. A difference in the approach and focus of governance is presented. For example, while most of the Xinyi areas emphasize the reversal of rocky desertification by artificial afforestation, grass planting and vegetation, Wangmu Counties' plan does not. Studies have shown that artificial afforestation, grass planting and vegetation play a leading role in rocky desertification management. The lower the vegetation cover, the higher the degree of rocky desertification (Cai et al., 2015). The evidence presented by Sun et al. (2022) through the spatial and temporal evolution of land use pattern and rocky

desertification landscape indicated that Wangmu County and Luheng County are showing a trend of deteriorating rocky desertification grading. This is as a consequence of the destruction of vegetation from indiscriminate logging as well as the deterioration of bedrock exposure. According to the statistics of rocky desertification in Guizhou Province, the improvement rate of rocky desertification in Wangmu County is as high as 19.61% (improvement rate refers to the land area where rocky desertification has improved), second only to Xinyi City. However, the degradation rate is also second only to that of Xinyi City, at 16.32% (Chen, 2015). The schematic diagram of cities with multiple types of controlled areas is shown in Figure 3.

4.2.2 Same control district, different municipal jurisdiction

Above and beyond, the other conflict of rocky desertification management with territorial division management is that two counties belong to the same management sub-districts in the Guizhou rocky desertification plan, but belong to different municipalities' jurisdictions. For example, according to Guizhou rocky desertification management zoning, Guanling County and Qinglong County are classified as moderate-intensity rocky desertification sub-districts (I2b). However, in terms of administrative division, Guanling County belongs to Anshun City, whereas Qinglong County belongs to Xingyi City. Despite the fact that there is consistency in the natural attributes and industrial development direction of rocky desertification within the sub-district, it is impossible to uniformly implement the industrial layout in the practice of rocky desertification control due to the different governance philosophy of the municipal government. The schematic diagram of the controlled area across two cities and counties is shown in Figure 4.

Although the two municipalities are, geographically speaking, neighbors, their planning guidelines and policies are divergent, resulting in different governance approaches for the counties that are part of the same sub-district. In terms of the policy perspective, the governance of rocky desertification in Xinyi City is mainly based on the Notice of the Office of Qianxinan Buyi Miao Autonomous Prefecture Government on the Issuance of Project Management Measures for Comprehensive Prevention and Control of Rocky Desertification Projects in Karst Areas of Qianxinan Prefecture (for Trial Implementation). The policy contains detailed planning of project arrangement, project management, governance methods, authority and responsibility relation. In contrast, Anshun City primarily focuses on the financial instrument for governance in the rocky desertification concentrated contiguous special hardship areas for poverty alleviation, and has introduced a series of loans, subsidies and other financial policies. From the governance methodic, the three counties are located in a region with large topographic relief, mainly high mountains, and poor grass

production capacity. The area ought to mainly control rocky desertification by artificial grass planting to reduce the demand for grass by grazing. In practice, Guanling County mainly plants *camptotheca acuminata* to restore rocky desertification land. The actual governance of Qinglong County is more diversified. Since 2001, Qinglong County has vigorously promoted the sustainable and healthy development of grassland planting and high-quality mammal husbandry. With years of operation, Qinglong County has completed the planting of 70.66 km² of pasture, improving 35.33 km² of grassland, and building 31 grass and sheep breeding sites, covering 68 villages. At the same time, different financing modes have been formulated in order to promote industrial financing.

5 Discussion

The critical factors for the differences in governance between counties in the process of rocky desertification management in Guizhou can be attributed to the conflict between the localized governance system due to the Chinese government governance structure and the three levels of governance division on rocky desertification in Guizhou Province. Various responsibility and promotion mechanisms are based on the higher level of government within the administrative districts, leading each county to follow the policy within its jurisdiction in rocky desertification governance. The rigid constraints of administrative divisions between counties lead to conflicts in governance philosophy, different policy focuses of municipal governments, and fragmentation of governance spaces and regions, which cause conflicts in rocky desertification management within the same sub-district or across regions.

Here we can take, as an example, the policy document content of the three cities in the Qian-Southwest Plateau region, namely Xinyi, Liupanshui, and Bijie. In terms of governance tools, Xingyi City and Bijie City have highlighted, in their policy document texts, the need to rationally allocate various governance measures in line with local conditions and to comprehensively manage rocky desertification. Meanwhile, there is also the need to list the tools and methods of rocky desertification. In contrast, Liupanshui City did not highlight the tools and methods of governance, but emphasized the organic combination of rocky desertification governance with economic and social development and poverty alleviation. This is not only the diversification of local governance models and tools, but also the focus of the governance. For example, in terms of accountability, responsibility and supervision mechanisms, Xingyi City has planned the responsibilities, working policies and cooperation between each department. Bijie City has more instructions between different governance tools and arranges corresponding departments to coordinate and implement relevant work. In contrast, Liupanshui City did not pay much

attention to the supervision of departments and the power and responsibility of governance tools and methods.

If the distribution of the three control areas is divided according to the situation of rocky desertification and is in line with the principle of internal differentiation, then the division of secondary and tertiary levels makes governance difficult. The coordinate between administrative regions is in conflict with the administrative management system of China. The implementation of specific projects in cross-regional governance has the disadvantage of administrative division, leading to the fragmentation of administrative districts. Counties within the same municipal jurisdiction are divided into different sub-regions or sub-districts, in order to comply with different governance orientations and implement different governance measures. However, this is the idealized governance system. In reality, due to the Chinese governance system, the selection and distribution of projects by counties are all delineated according to the administrative area (in this case the municipal government), which makes it difficult to take into account the individualized and differentiated governance needs, especially for some small townships at the edge of the collaboration area and the junction zone, which are often neglected, thus missing the great opportunity of rocky desertification governance.

6 Conclusion

This investigation has illustrated the conflict of the localized management system and the conflicts with Guizhou rocky desertification management zoning. It is important for government to understand that the governance differentiation caused by the division of administrative regions in governance includes counties belonging to the same administrative jurisdiction being divided into different governance zones and counties with different administrative jurisdictions being categorized into the same governance zones. Lessons from this study revealed that local governance should focus on regional cooperation across administrative areas as well as higher-level coordination. Furthermore, the current work provided important implications for policymakers for future rocky desertification management in terms of considering the influence of intermediate levels of government (municipal government in this case) on policy implementers (counties in this case).

However, this study has limitations, i.e., the fact that only Guizhou Province was investigated, with no consideration of other areas that also face rocky desertification disasters. Therefore, a more comprehensive understanding of the different management models is not possible. As such, future

work can compare the management models between different areas and conduct field studies as well as in-depth interviews with relevant workers to gain a deeper and more comprehensive understanding of the situation (Clark, 1984).

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

LY, WL, and ZC conceived the ideas and designed the research framework; SS performed the literature research; LY and WL performed the data collection and result calculation; LY, WL, SS, and ZC led the writing and revision of the manuscript; All authors read and approved the final manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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