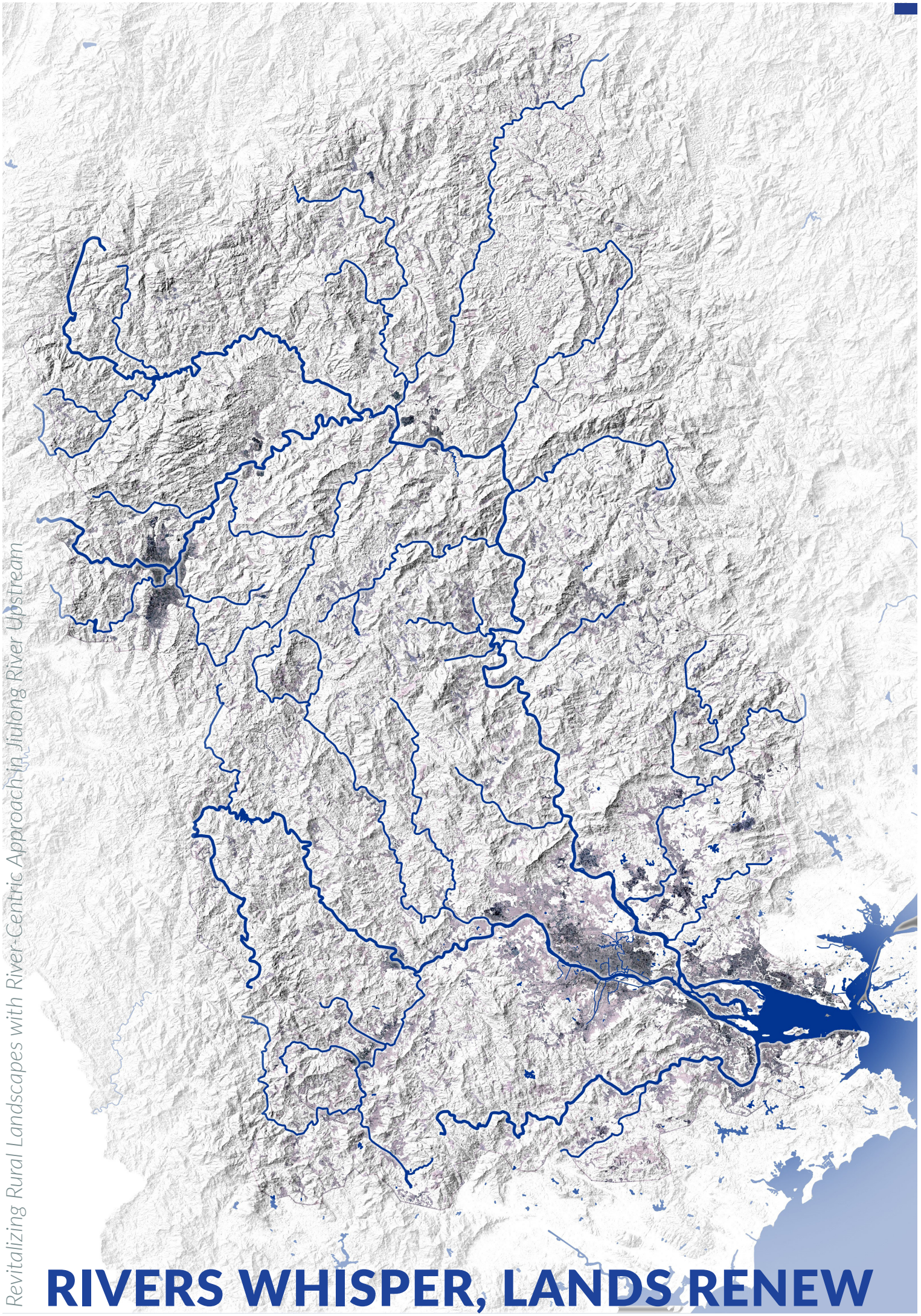

Revitalizing Rural Landscapes with River-Centric Approach in Jiulong River Upstream

RIVERS WHISPER, LANDS RENEW

COLOPHON

Rivers Whisper, Lands Renew:

Revitalizing Rural Landscapes with River-Centric Approach in the Jiulong River Upstream region

Masters Graduation Thesis 2023-24
P5 report

Jiheng Li
5761921

Research studio
Planning Complex Cities
Department of Urbanism
Faculty of Architecture and the Built Environment
Delft University of Technology

Mentor team
First mentor: Lei Qu
Spatial Planning and Strategy

Second mentor: Steffen Nijhuis
Landscape Architeture

June, 2024

Urbanism

TU Delft

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From September 2023 to June 2024, I used this graduation project to discuss rural revitalization with river-centric approach, which also marks the culmination of my two-year urbanism studies. This ten-month journey has been mixed with passion, confidence, as well as feelings of loss and confusion. Being able to achieve this outcome is not just the result of my own effort, but also thanks to many people who have helped me through difficulties and accompanied me through this precious process.

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Thanks to my parents for their unconditional love and support, allowing me to follow the path I chose without worries. Thanks to my beloved, June, for emotional support, sharing my joy and partaking my stress.

This journey is about to draw to a close, but it will become a precious memory in my life, worth revisiting often, and will encourage me to face the future with anticipation.

Baisha Village, Xinlong County, Longyan city *(VCG.COM, n.d.)*

Rivers are the arteries of our planet; they are lifelines in the truest sense.

– Mark Angelo

ABSTRACT

The phenomenon of rural decline in China has long existed, and discussions on rural revitalization are increasingly intense. Facing the vast diversity of Chinese rural areas, this study focuses on villages closely linked to rivers, selecting the upstream region of the Jiulong River in southern Fujian as the case study area. It explores how a river-centric design can contribute to the sustainable rural revitalization of the Jiulong River Upstream region, fostering ecological integrity and socio-economic resilience.

The research delves into the issues facing rural China and summarizes them, using layer approach as the primary method to analyze the entire watershed, upstream region, and specific villages. It identifies ecological challenges such as segmentation of the river system, water pollution, flood risk, soil erosion, and monoculture, as well as social challenges including alienation to the river, underutilized economic opportunities, and low awareness of the ecological and economic importance of the river. In response to these challenges, corresponding strategies and principles were developed, and specific measures were integrated to form a comprehensive strategic framework. Additionally, the framework links ecological and social measures or strategies to explore the integration of socio-ecological systems. Each principle within the strategy framework corresponds to multiple measure options, providing implementers with flexibility and operability, and strengthens bottom-up governance through an analysis of stakeholders. The strategies are spatialized and expressed through designs or plans at three different scales.

Key words: Rural revitalization, River-centric approch, Socio-ecological intergration, Integrated watershed management, regional design

MOTIVATION

China's urbanisation and modernisation since the Reform and Opening Up have played a huge role in China's development, especially in terms of the economy, but the urban-rural dichotomy has also widened the gap between the urban and the rural areas, with the city becoming the superior choice for almost everyone, while more and more problems have emerged in the countryside, such as hollowing-out, environmental degradation, cultural loss, etc. The Chinese government has already paid attention to these problems and some relevant measures are being implemented, but there is still a long way to go.

As the source of the urban, the rural area has great historical and cultural significance, and is more closely connected to nature than the city, so as a student of urbanism growing up in the city, I would like to learn more about the rural area and join in the discussion of rural issues and development. The case study of this thesis Jiulong River Basin with its rich ecological tapestry and vibrant rural communities interests me a lot and has great potential. How to revitalize the villages in this area by using the Jiulong River which is a "mother river" as a centre and a clue is a fascinating and valuable question for me.

TERMINOLOGY

Rural area/village/countryside

These terms describe less urbanized regions in China, often characterized by agricultural activities and lower population density. The countryside typically refers to a large, rural area outside of towns and cities, characterized by open fields, farms, and natural landscapes. In contrast, a village("cūn" in Chinese) area is a small settlement within the countryside.

Villager/peasant/farmer

Farmers in China have been sometimes referred to as "peasants" in English-language sources. However, the traditional term for farmer(nongfu in Chinese), simply refers to "farmer" or "agricultural worker". And villager here means a person who, for a certain period of time, has his/her household registration in a rural area and is an agricultural household or lives in a rural area or village, engages in matters related to the construction of the village and is subject to the leadership and management of the organization of a rural area or village.

Villages' committee

According to the Organic Law of the Villagers' Committees of the People's Republic of China, villagers' committees are grass-roots mass self-governance organizations of villagers for self-management, self-education and self-service, and they are subject to democratic election, decision-making, management and supervision. The villagers' committee handles the public affairs and public welfare of the village, mediates in civil disputes, assists in the maintenance of public order, and reflects the views and demands of the villagers and makes recommendations to the people's government. The villagers' committee is responsible to the villagers' meeting and the meeting of villagers' representatives and reports on its work. The people's governments of counties and townships give guidance, support and assistance to the work of the villagers' committees, but may not interfere in matters within the scope of villagers' self-governance in accordance with the law. The villagers' committee assists the people's government of the township, nationality township or township in carrying out its work.

Table of content

1 INTRODUCTION

1.1 CONTEXT OF CHINA

1.1.1 Rural issues
1.1.2 Rural revitalisation
1.1.3 Watershed management

1.2 CASE AREA

1.2.1 Jiulong River Watershed
1.2.2 Upstream region
1.2.3 Jiebu village

1.3 PROBLEMATIZATION

3.1 Problem field
3.2 Problem statement

1.1 CONTEXT OF CHINA

1.1.1 Rural issues

Rural-urban dichotomy and rural marginalisation

The pattern of economic growth established since the Industrial Revolution has allowed the agglomeration effect of urban activities to expand further under capitalist globalisation, leading to the concentration and expansion of urban processes on a global scale (Brenner & Schmid, 2015). In turn, the survival and development of the rural areas, which in many cases are considered urban appendages and peripheries, are heavily dependent on industrial and technological progress, compensation, remittances, or financial transfers from the cities, especially in developing countries (Mormont, 1990; McDonald, 2008; Rempel and Lobdell, 1978). There has been a wide decline of the rural all over the world(figure 1.1). Much of the worldwide rural decline stems from urban-centred growth patterns and the industrialisation and commodification of contemporary capitalist agriculture (He & Zhang, 2022). Although the concept of sustainable development is beginning to be embraced in all regions of the world in response to challenges such as climate change and environmental degradation, there is still a greater focus on the city itself, ignoring the equally important region of the countryside, which holds even more potential for sustainable and more harmonious human-nature relationships (He & Zhang, 2022). In the context of this dichotomy, the city, as a more financial and political agglomeration, naturally marginalises the countryside from the human perspective. At the same time, unlike the city's perception of diversity and continual change, this marginalisation also represents a static and monolithic understanding of the rural and the countryside.

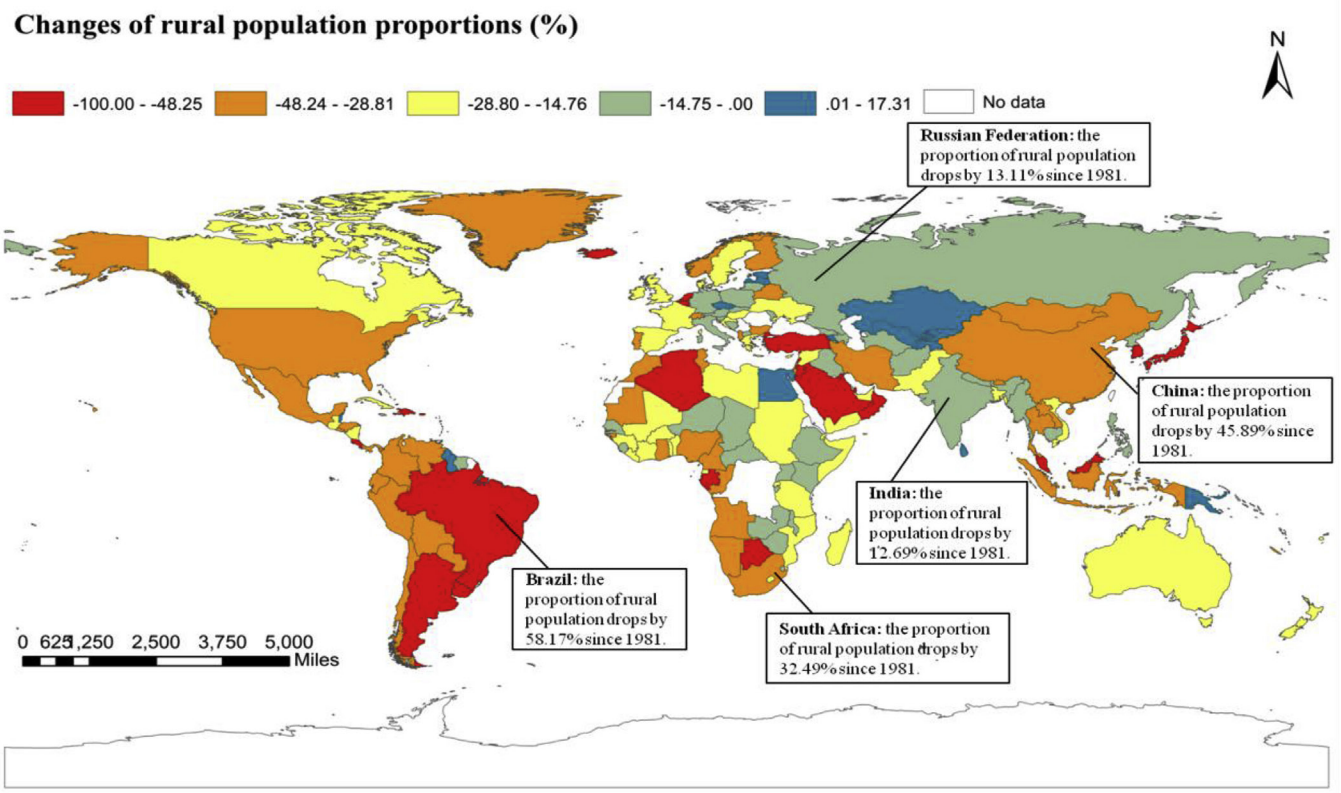


Figure 1.1: The changes of rural population proportions in the world, 1981–2016. *(Li et al., 2019)*

China has also always had a very sharp urban-rural dichotomy, and from the political system's point of view, the most widely known policy is the household registration system (hukou), which was introduced in the 1950s to establish a dichotomy between "farmers" and "non-farmers" and has been in use ever since(figure 1.2). Although the restrictions on urban-rural mobility have been gradually loosened since 2010(gov.cn, 2014), the half-century-old dichotomy has had a huge impact on the economy, culture, politics, and people's lives. Economically, the income gap between urban and rural areas is vast, with rural areas still maintaining an agriculture-based rural economy, while urban areas have become more industrialised with more varied industries and more opportunities to generate higher incomes(figure 1.3), as well as economic policies that favour urban areas; Culturally, because of the loss of population, traditional rural lifestyles and cultural practices are gradually being forgotten and weakened, and the old people who remain in the countryside have become more disconnected from the next generation, resulting in a greater gap between them and the next generation. Politically, there have been many policy reforms aimed at rural development and poverty alleviation, as well as reforms to the hukou system, but the gap between urban and rural areas is still huge; In terms of people's lives, people in the rural areas have fewer opportunities for healthcare, education, and employment than those in the urban areas, and they face many restrictions on the quality of life in terms of infrastructure and recreational choices, and are unable to enjoy the same level of quality of life as those in the cities. In terms of people's lives, people in rural areas have fewer opportunities for health care, education and employment than those in urban areas, and face restrictions on the quality of life in terms of infrastructure and recreational choices. Meanwhile, many families are separated for long periods due to urban-rural migration, and their emotional needs are not being met.

Figure 1.2: Hukou system *(X. Wang, 2010)*

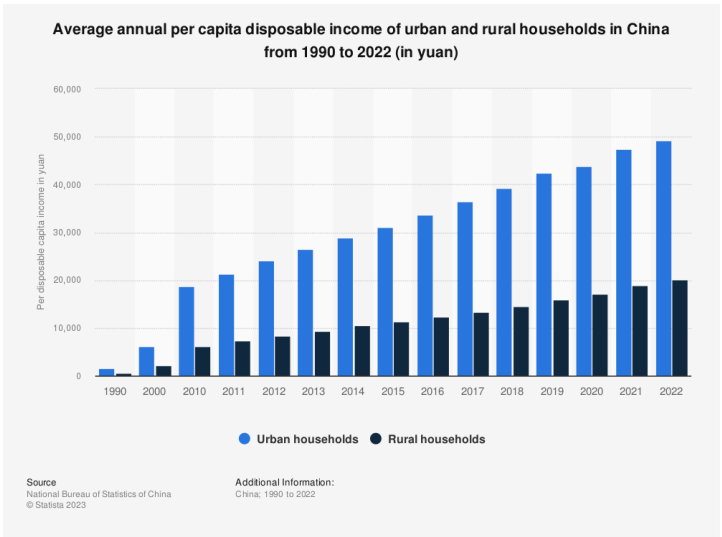


Figure 1.3: Urban-rural income in China *(World bank, 2023)*

1.1.1 Rural issues

Rural hollowing-out

Rural hollowing out is a global phenomenon that has emerged in the process of urban-rural development transition. It includes the migration of rural residents to urban centres, the abandonment of agricultural land and the decline of rural economic activities (Liu et al., 2010; Long, 2014)(figure 1.3). The challenges posed by rural hollowing out are presented both in the developed world where urbanisation and industrialisation have led to the exodus and weakening of rural industries (Blumin, 2006) and in the developing world where climate fluctuations, resource depletion, and economic constraints have led to the exodus (Ogwu, 2019). Its causes are multifaceted, both natural and social, and are fundamentally a consequence of the uncoordinated development of humans and nature, and humans and society in this special realm of the countryside (Zhang, 2022). On the natural aspect, the region's water resources, land resources, and geographic location constrain the development of villages; On the social aspect, the erosion of capital and weakening of connections within and among rural communities lead to hollowing out (Xu et al., 2023); Also economic and policy aspects have a great impact, from an economic perspective, the sufficient employment opportunities, as well as higher incomes in the cities, attract young population and labour force to come over (Y. S. Liu et al., 2009); and from a policy perspective, compared to the large government investments and preferential policies in the cities, the rural areas lack of support and development opportunities (Ji et al., 2019).

Rural hollowing out is also an urgent issue in the Chinese context and also faces unique challenges. Since the 1990s, China's rapid urbanisation and industrialisation has led to the generation of huge labour demand, providing job security for rural labour migration, with the number of people moving to the cities to work climbing, rural labour force mobility across regions and industries, and the size of the rural population diminishing year by year (National Bureau of Statistics of China, 2023)(figure 1.4). The specific manifestations of China's hollowing out of the countryside are mainly in the following aspects: 1. hollowing out of the main body of development, on the one hand, the farmer population, which is the main body of the countryside, has declined greatly, on the other hand, those who leave the countryside are mainly young and strong, while those who are left behind are mainly the elderly, women, children or those who are incapable of working, which also leads to the dislocation of structural proportions and the decline in the quality of productivity; 2. hollowing out of agricultural production, which has gone from being diversity during the natural economy to homogenisation after modernisation and commercialisation; 3. hollowing out of rural housing; and 4. hollowing out of cultural construction(Zou, 2019)(figure 1.5).

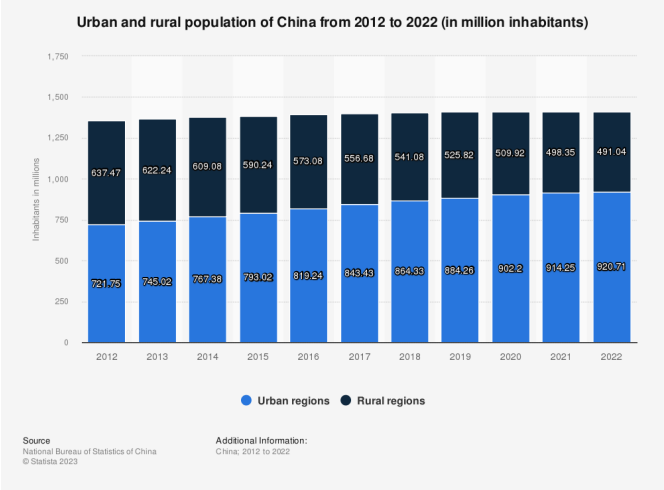


Figure 1.4: Urban-rural population in China *(World bank, 2023)*






Figure 1.5: Rural-urban migration *(Sina, n.d.) (Cheng Guoqiang, n.d.) (Li Jie, n.d.) (Baijiahao,n.d.) (Baidu, n.d.)*

1.1.2 Rural revitalisation

As a latecomer to the global economy, maximising agricultural productivity was a primary objective of rural development in China until 2005, with policies focusing on agricultural mechanisation and modernisation (He & Zhang, 2022). A similar process in the EU and other developed economies has led to a series of problems brought about by productivism since the 1980s, such as deterioration in food quality, increased environmental pollution, and the decline of rural culture (Walford, 2003). In addition to these global problems, China faces its unique challenges.

As a large country with a population of 1.4 billion, China built its national economy on agriculture at an early stage to feed its population (Long et al., 2010). To develop faster and compete in the world, industrialisation became an unavoidable choice, and the national economy developed into a "two-track system", where agriculture and farmers were sacrificed to promote industrialisation, resulting in a highly unbalanced development of industry and agriculture (Wu, 1997).

In the 1950s, when China's rural population accounted for 80% of the total population, production and development in rural areas were crucial from both economic and political perspectives as well as from the point of view of social stability, so the central government was committed to improving land ownership and agricultural management (Wu, 1997). Thus, from the land reform of 1952 until 1957, when land and other production materials ceased to be privately owned, and until 1978, this traditional policy of communal ownership of land and cooperatives was implemented in rural China, and the rural population was confined to collective agriculture with weak labour incentives (Long et al., 2007).

Deng Xiaoping's launch of Reform and Opening up in 1978 led to China's rapid transformation, most notably from a Planned economy to a Market economy, and from a predominantly rural economy to an urban industrial economy. Although the rural economy was no longer dominant, the introduction of the "household contract responsibility system" stimulated rural economic growth to a certain extent (Chow, 2015; Heilig, 2003; Lin, 1992), and its de-collectivisation and privatisation of land use rights mobilised Chinese peasants and promoted the rise and development of rural enterprises, which contributed to the increase of rural incomes and employment. But at the same time, it also brought some problems, such as the shortage of material, energy and capital in some places, or the deterioration of environmental quality due to the low level of management, etc. Moreover, this initial prosperity turned into a recession in 1997, as the household contract responsibility system, while liberating productive forces, also generated a large surplus of labour (Wu, 1997), most of whom shifted from agriculture to a variety of production in households, villages or townships, or migrated to cities in search of job opportunities (Ma, 1999). At the same time, industrialisation and urbanisation caused by Reform and Opening up have changed the natural and human landscape of rural areas, which is manifested in the accelerated pace of rural housing development, rural-urban migration, the shift of agricultural land to non-agricultural land, the widening of the income gap between urban and rural areas, and inequality in the rural areas, etc. (Long et al., 2010).

1950

Land Reform

1978

China's Reform and Opening-up

2000

Reform of the household registration system(Hukou)

2005

New Countryside Campaig

"New Countryside Campaign" (Xin Nong Cun Jian She)

In 2003, China's GDP reached US$ 1,090, signalling an important new period in China's economic and social development. At the same time, the widening income gap between urban and rural areas and the pressure of the "Three Rural Issues" also became apparent (Long et al., 2010), and in 2005, the central government issued a programme for the "New Countryside Campaign", which set out multiple goals for rural development, including "advanced production, improved livelihoods, clean villages, a civilised social culture, and efficient rural management". For the first time, the definition of "rural development" went beyond agricultural production to encompass environmental and social objectives (He & Zhang, 2022). Until 2014, there have been about 200 similar programmes across the country attempting to reverse the rural decline by injecting economic and cultural vitality into sparsely populated villages (Ou, 2015). However, while the programme has developed the countryside to some extent, it has also been problematic, as Kristen E. Looney has shown through the example of Ganzhou City in Jiangxi Province that despite its initial emphasis on rural participation and moderate change, the New Socialist Countryside has evolved into a top-down campaign to tear down villages and rebuild them. In addition, the political imagination that draws heavily on urbanisation and industrialisation (He & Zhang, 2022) and the direct injection of capital has ignored the loss and destruction of valuable culture and wisdom in the countryside, creating the dilemma of the same villages in different locations, as well as the emergence of detached "prestige projects", which only formally show a renewed appearance without actually solving the real problems of farmers' production and life.

Rural Revitalisation (Xiang Cun Zhen Xing) strategy

In 2017, the Rural Revitalisation Strategy (RVS) was officially released, and in these policy narratives, the countryside is depicted as a natural socio-economic complex with multiple functions such as production, living, ecology and culture. While agriculture has never lost its importance in rural China due to food security concerns, China's central government is now placing greater emphasis on green development and ecological values to respond to global climate and environmental challenges and align with the UN SDGs (He & Zhang, 2022).

The National Strategic Plan for Rural Revitalisation (2018–2022)

The National Strategic Plan for Rural Revitalisation (2018-2022) further specifies the goal of integrating functions such as ecological civilisation, leisure and tourism, cultural experience and healthcare into the countryside to promote rural revitalisation. He and Zhang's analysis of the use of different terminology in national policies is noteworthy, as the traditional term "nong cun" was used in the New Countryside Campaign proposed in 2005, and changed to "xiang cun" in the Rural Revitalisation Strategy. Although translated into English they are the same words, in Chinese there is a subtle difference in that they represent different understandings of rural areas. While the former denotes the close connection between rural and agricultural areas or the sense that agriculture is the mainstay of rural areas, the latter, "xiang", carries the meaning of hometown, home village or native place, which is a reminder of the search for roots, a renewed emphasis on culture, and an exploration of the meaning of rural areas in addition to agriculture, and represents a new connotation and potential for rural development.

2011

The urban population overtook rural population for the very first time in Chinese history(He & Zhang, 2022).

2017

Rural Revitalisation strategy

2018

The National Strategic Plan for Rural Revitalisation (2018–2022)

(Gaokaohelp.com, n.d.)
(Sina,n.d.)
(Wangyi. n.d.)
(Ren Zhong. n.d.)
(Baidu, n.d.)
(Sohu, n.d.)

Figure 1.6: Timeline of China's rural development

1.1.3 Watershed management

In recent years, there has been growing interest in integrated watershed management (IWM) and a broad consensus on its potential to promote sustainable urban development, as environmental and resource issues often transcend political and administrative jurisdictions (Kidd & Shaw, 2007; Peng et al., 2013).

In China, IWM has been closely watched and debated. For urban areas, the National Development and Reform Commission (NDRC) in 2014 called for the establishment of a nationwide pilot programme for "the integration of several plans into one"(duoguiheyi)(Brombal et al., 2018), which, based on the Integrated Territorial Management(ITM) principle, underpins the theory and practice of IWM (De Quevedo, 2014). Meanwhile, the "river chief system" (a new model of water ecosystem governance and management derived from the chief responsibility system for water pollution prevention and control and ecological accountability, in which key party and government leaders at all levels serve as river chiefs and are responsible for the management and protection of rivers under their jurisdiction.) emerged in 2003 and got its promotion and deepening nowadays (Wang & Chen, 2019), it also shows the trend of watershed-based governance.

Since the late 1990s, many Integrated Watershed Management (IWM) programmes in China have been initiated at the county, provincial, regional and national levels (SEPA, 2006). The effectiveness of these programmes has been controversial, especially for large watershed management programmes such as the Huaihe River, Taihu Lake, Dianchi, and Clean Bohai Sea programmes, which have failed to achieve the desired goals (Peng et al., 2013). The Jiulong River has also begun watershed management in 2001, and the Provincial Party Committee Standing Meeting in 2001 passed the Measures for the Prevention of Water Pollution and Ecological Protection in the Jiulong River Basin of Fujian Province, which played a role in the environmental protection of the Jiulong River Basin in the social context at that time, but with the rapid development of the regional economy of the watershed in recent years and the construction of the Economic Zone on the West Coast of the Taiwan Straits, it has not been able to adapt to the development of current situations (Cai, 2019).

Peng et al., (2013) established a systematic framework and a set of indicators for a detailed evaluation process of watershed management plans by combining process, output, outcome and implementation gap analyses, demonstrating that the JRWP clarified more and more actionable goals, objectives and measures, established a high level of co-ordination mechanisms, and set up an innovative eco-compensation system and a rigorous constraint mechanism. However, after nearly 10 years of efforts and more than RMB 4 billion of investment, JRWP has only partially achieved its stated objectives and concluded that there are two reasons for the poor results of the IWM programme in China: on the one hand, there are deficiencies in the planning and design, and on the other hand, it is related to China's socio-economic and political complexity(figure 1.7).

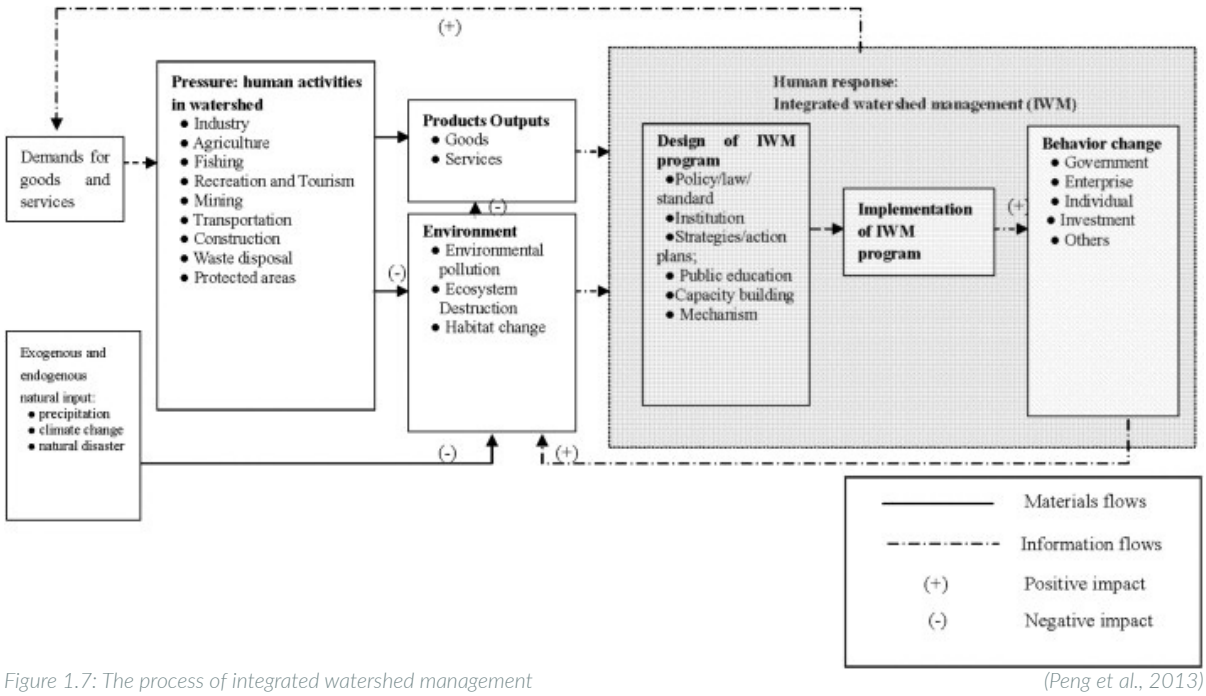


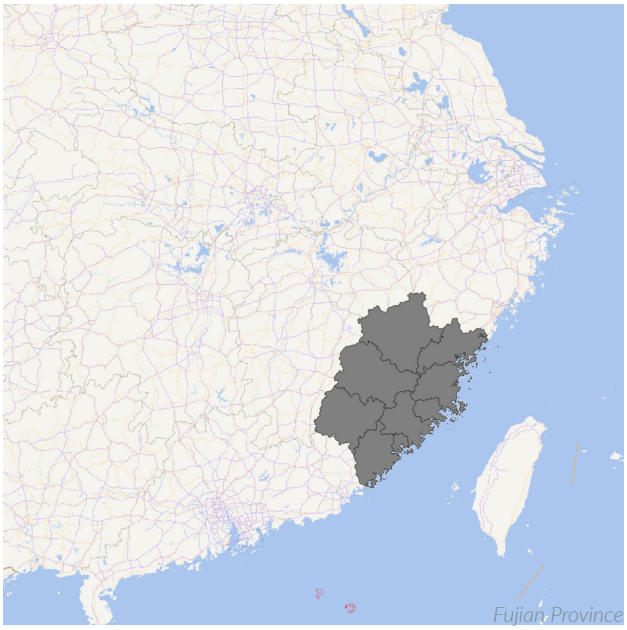
Figure 1.7: The process of integrated watershed management *(Peng et al., 2013)*

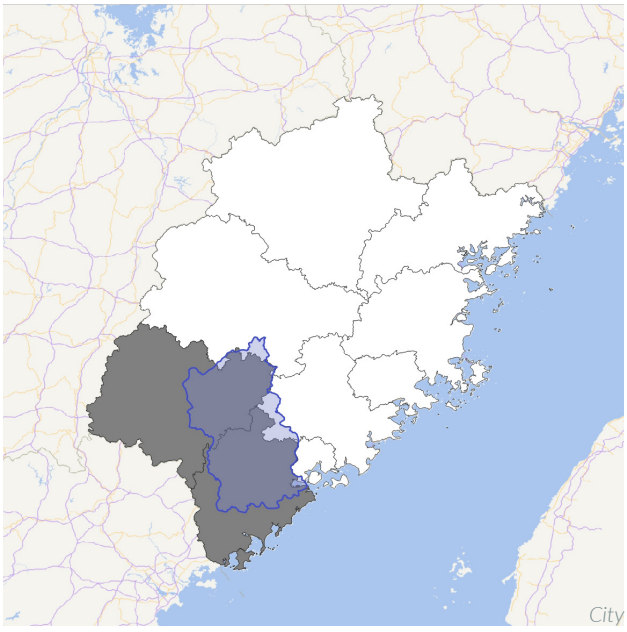
2.2 CASE AREA

2.2.1 Jiulong River Watershed(JRW)

Although China has undergone rapid urbanisation in the last two decades, with cities expanding tremendously, rural areas are still vast and diverse, and the logic of rural agglomeration generation and development varies; this diversity poses a great challenge to rural revitalisation, but at the same time, it also confers unique values on individual villages, and therefore also represents an opportunity. The distribution of rural settlements has a close but non-linear relationship with natural conditions, demographic factors, and economic factors, with natural conditions being one of the most important factors (Xiao et al., 2021), and rivers, as the "veins" of the earth (M. Angelo, n.d.), naturally being a key factor in the generation and development of rural areas. The project is therefore mainly concerned with the relationship between rivers and rural development. Therefore, this project focuses on rural areas that are closely connected to rivers, and uses rivers as the main clue to think about their development, which is previously mentioned"river-centric", and the Jiulong River Watershed (JRW) is used as a case study area here(figure 2.1).

Jiulong river is the second largest river in Fujian Province after the Minjiang River, with a total length of 258 kilometres, from the Jiulong River by the convergence of the main stream Beixi and tributaries Xixi and Nanxi, over Zhangzhou in Xiamen bay across the Taiwan Strait, downstream of the Zhangzhou plain is one of the four major plains in Fujian Province. Its watershed area is about 14,741 square kilometres, accounting for about 12% of the province's land area. The total population of the basin accounts for 17% of the total population of the province, about 7.1 million, and the total economy accounts for about 26.7% of Fujian Province, covering the political and economic centres of the two prefectural-level cities of Zhangzhou and Longyan, as well as the areas of Zhangzhou, Xinlou, Zhangping, Hua'an, Changtai, Pinghe, Longan, Changtai, Changtai, Pinghe, Longan, and Changtai. Zhangzhou, Xinlou, Zhangping, Hua'an, Changtai, Pinghe, Longhai and Nangjing (Liao et al., 2023).





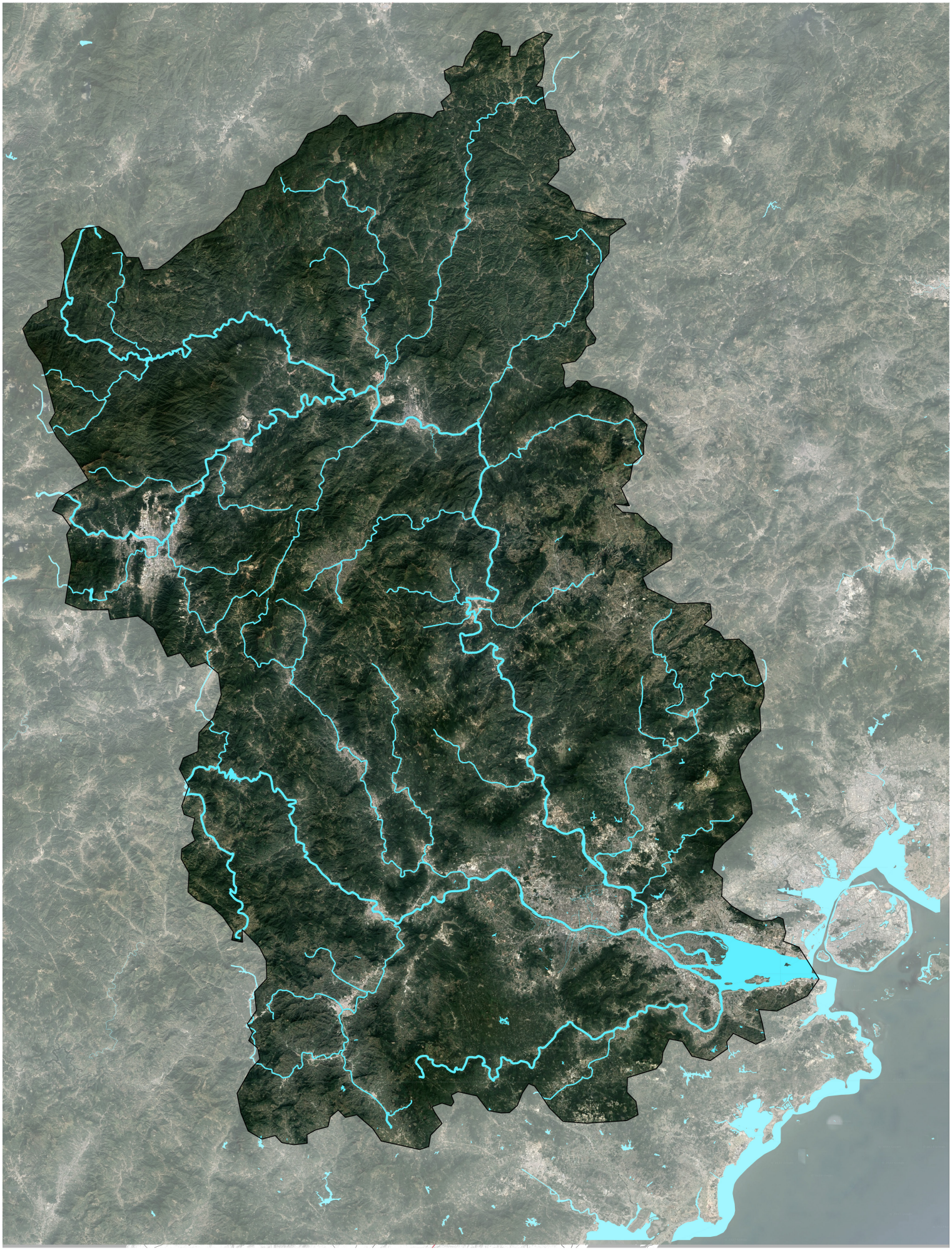
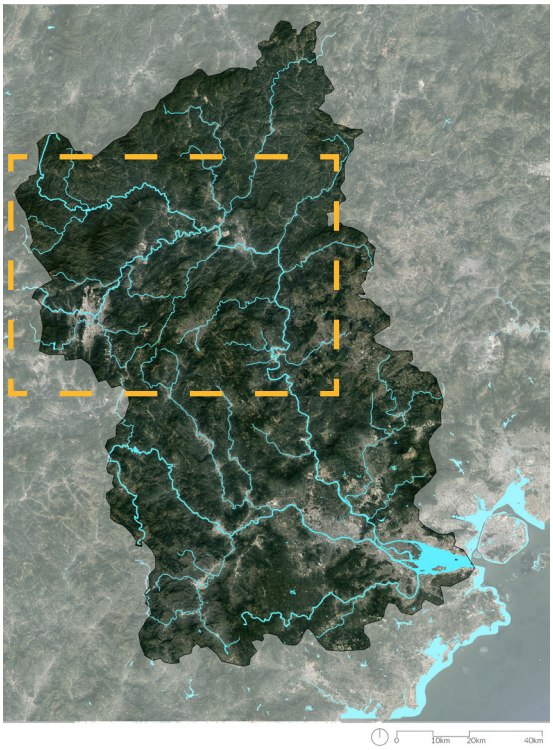


Figure 2.1: Jiulong river watershed
(Adapted with the data from Google Earth, 2022)

2.2.2 Upstream region

The upstream region of the Jiulong River consists mainly of Xinluo District in the south of Longyan City, Zhangping County and Hua'an County in the north of Zhangzhou City. The region has a good ecological base due to its mainly hilly terrain covered with a large amount of vegetation, and human settlements are mainly concentrated in inter-valley basins such as the Longyan City Basin, the Zhangping City Basin, the Hua'an County Basin, and the Xinqiao Town Basin, which are crossed by the Jiulong River. At the same time, the small valleys formed along the Jiulong River are also home to a large number of traditional villages, and the Jiulong River, as their 'mother river,' influences the lives and cultures of these villages while being influenced by the activities of the villages and the city. This close connection makes the upstream area of the river of great value for research(figure 2.2).



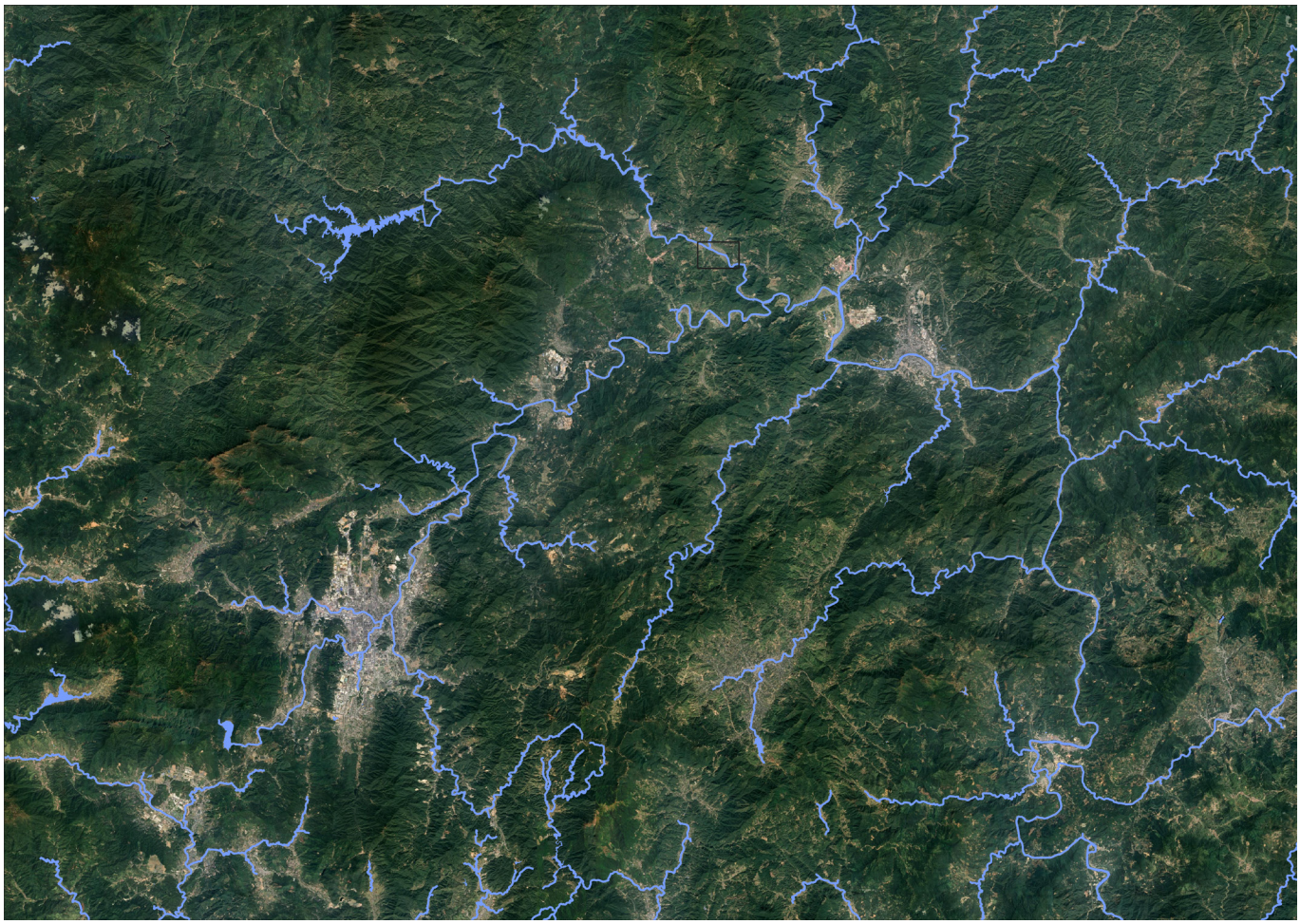


Figure 2.2: Jiulong river upstream
(Adapted with the data from Google Earth, 2022)

2.2.3 Jiebu village

Jiebu Village, known as Xipuying in ancient times, is located in Baisha Town, Xinluo District, Longyan City, Fujian Province, and is a traditional village with deep historical and cultural heritage. The village not only occupies an important location geographically, but also has remarkable characteristics and values in terms of socio-economic development and cultural heritage(Sohu, 2016).

For geography and environment, it is located in the upstream area of the Jiulong River, with abundant water resources and a good ecological environment. The natural environment around the village provides villagers with abundant natural resources and also serves as an important basis for agricultural production. For its history and culture, Jiebu Village was historically a major waterway transport route, which enabled it to enjoy prosperity for a certain period of history. The architectural and cultural relics in the village, such as the carved and painted courtyards and houses, reflect the strong Republican flavour and historical changes(figure 2.3).

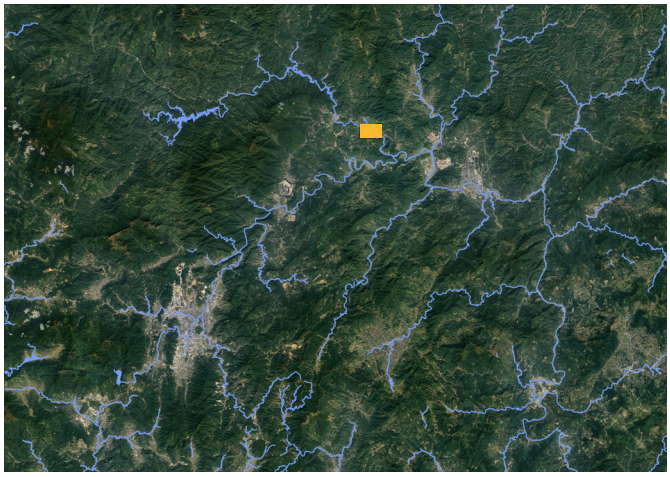


Figure 2.3: Jiebu village
(Adapted with the data from Google Earth, 2022)

Summery from context to case area

Rural challenges, such as the urban-rural dichotomy, marginalisation, and hollowing-out, are pervasive issues globally. Confronted with the decline of rural areas, China is actively implementing measures for revitalisation, yet the journey towards substantial improvement remains extensive. Motivated to contribute to this revitalisation, the author has selected a rural type intimately linked to river systems, using the Jiulong River watershed as a case study within the context of Integrated Watershed Management. This study seeks to investigate approaches to "river-centric rural revitalisation," aiming to enrich the discourse on sustainable rural development in fluvial environments(figure 2.3).

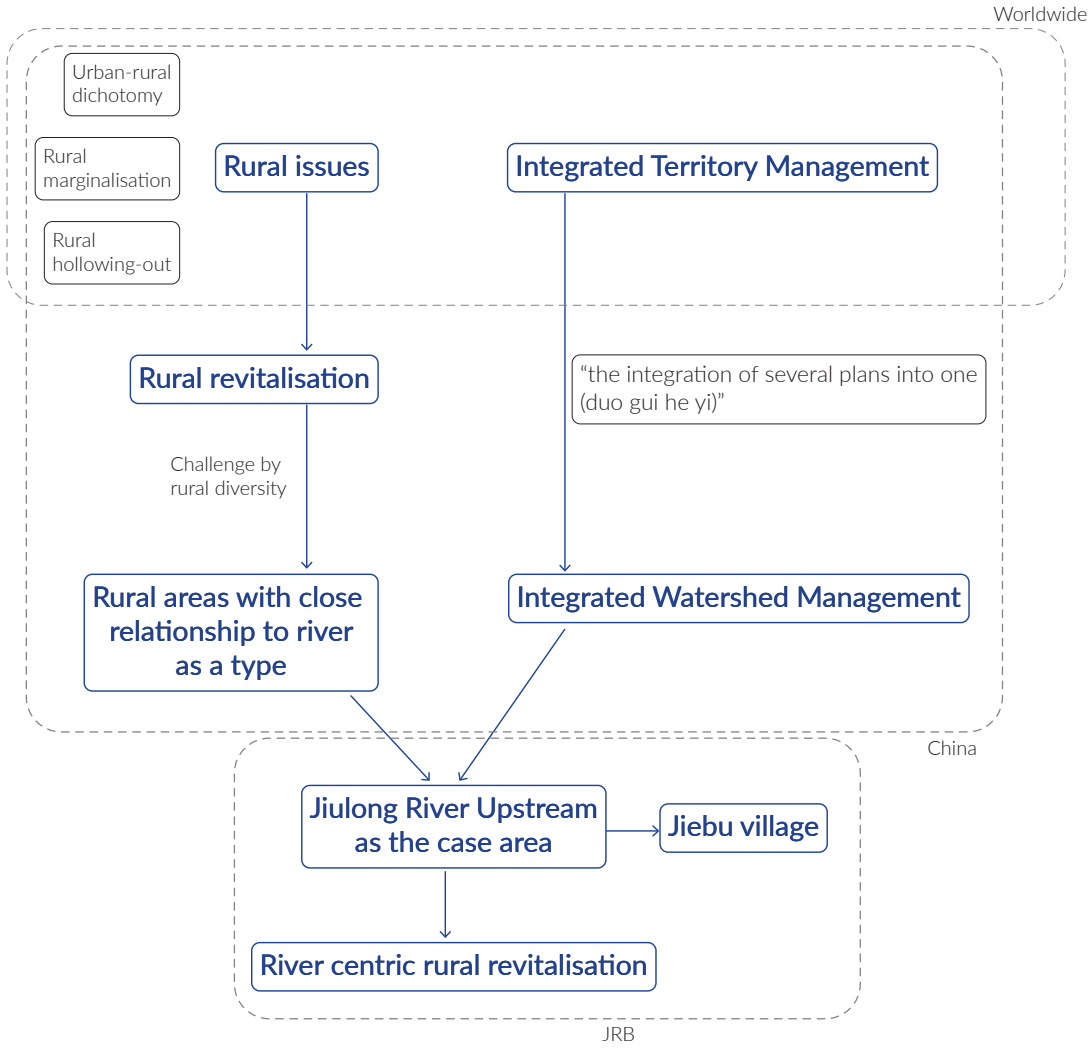


Figure 2.3: From context to case area diagram

1.3 PROBLEMATIZATION

1.3.1 Problem field

Environmental degradation

In the broader context of China's large urbanisation and predominantly economic growth, Jiulong River watershed has also inevitably neglected environmental quality to the extent that environmental degradation has become a major issue, including:

Water pollution: according to Sea Knowledge Bank(2014), Water pollution is still an outstanding issue, in particular from livestock farming. Non-point source pollution Non-point source pollution contributed 44 per cent and 22 per cent to nitrogen and phosphorus loading in Xiamen Bay, and livestock contributes 21 per cent and 46 per cent respectively. The water is also polluted by chemical substances discharged from factories and waste materials that are not adequately treated(figure 3.1).

Soil Pollution: Huang et al. (2019) showed that the average contents of Cr, Cu, Zn, As, Cd, Pb, and Hg in Fujian soils were higher than the background values, and the contents of each heavy metal showed moderate variability. The rice soil was moderately to heavily contaminated by Cd and lightly contaminated by Hg, Pb, As, and Zn.The results of the RI method indicated that there was a high potential ecological risk of heavy metals in the rice soil, with Cd and Hg contributing the most. Agricultural activities contributed the most to Zn, Cd and Pb; industrial emissions contributed the most to As; and coal combustion emissions contributed the most to Hg with 89.03%(figure 3.2).

Habitat Destruction and Biodiversity Loss: The expansion of urban areas and agricultural land has led to habitat destruction. This, coupled with pollution, has resulted in a decline in biodiversity, impacting species that rely on the river's ecosystem. There are hollows in biodiversity intactness mainly in urban areas(figure 3.4).

Effect of hydropower reservoirs and dams: In order to meet the growing energy demand for socio-economic development, a large number of hydropower plants have been constructed in recent decades relying on the rich hydropower resources in the basin (G. Li et al., 2021), More than 190 reservoirs (for irrigation, flood control, power generation) have been built on the Jiulong River (Lu et al., 2018). Along with the economic benefits, there are also ecological impacts, with heavy metal contamination in reservoir sediments (Kang et al., 2021)(figure 3.3). In addition, 193 dams have been built in the JRW, and the hydrological changes they produce may trap aquatic organisms in diffuse lakes and terrestrial organisms on diffuse islands, as well as reduce hydrological connectivity, which impedes the exchange of materials, energy, and organisms between the floodplain and the river system, which can reduce the spawning area and replenishment success of riverine fishes, and lead to a decrease in the richness and abundance of waterfowl species Impacts of habitat fragmentation on wetland vegetation (Lü et al., 2018).

Figure 3.1: Water pollution *(Mnw.cn, 2014)(Xiamen daily,2013)*

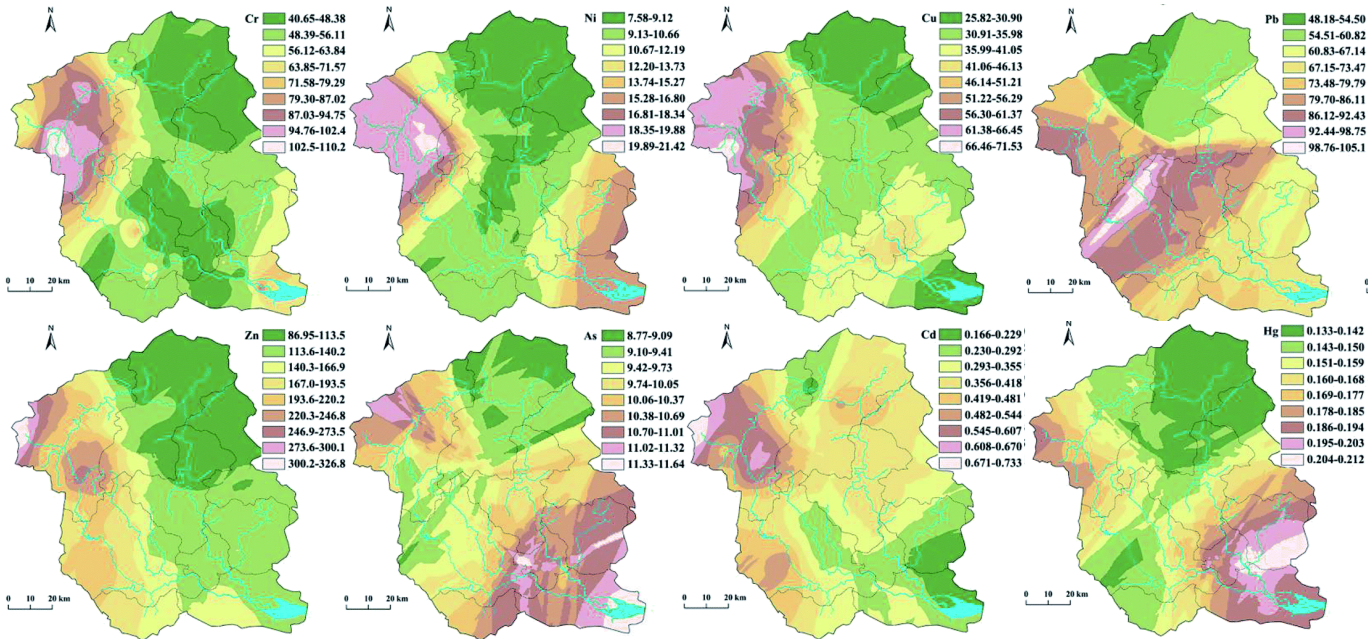


Figure 3.2: Soil pollution *(Huang et al, 2020)*

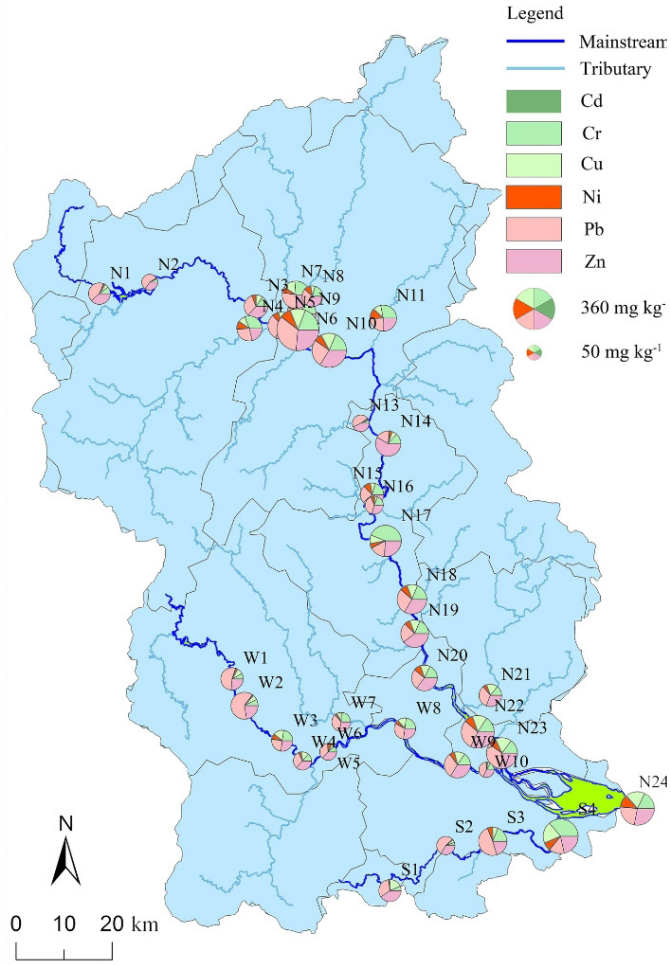


Figure 3.3: Heavy metal contents in surface sediments *(Kang et al, 2020)*

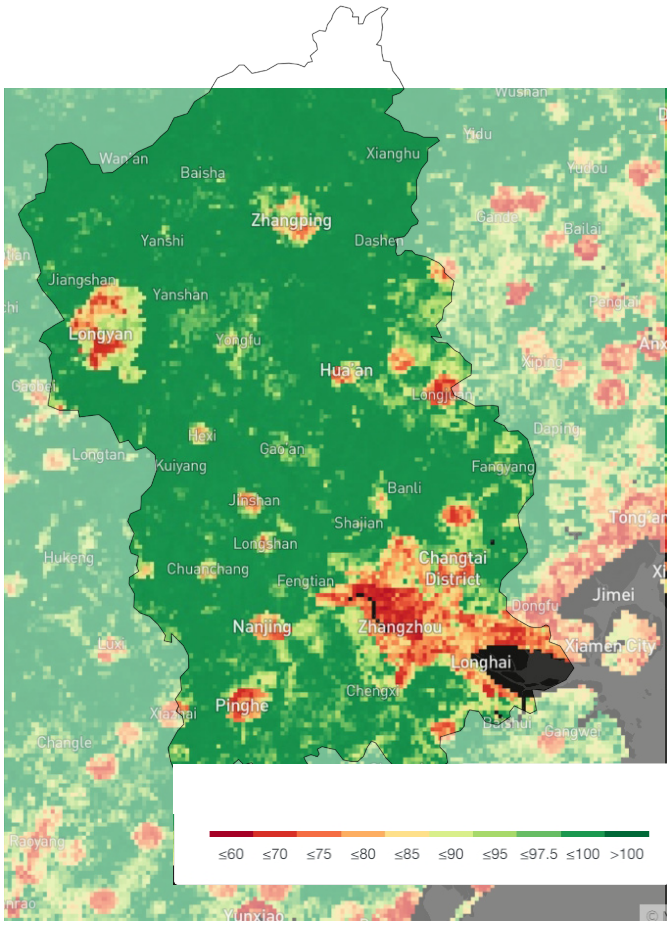


Figure 3.4: Biodiversity intactness *(Newbold et al, 2016)*

Socio-economic challenge

Urban-Rural Disparity: There is a disparity in economic development(figure 3.6), and quality of life between urban areas and rural communities in the JRB.

Infrastructure and Service Gaps: Rural areas in the JRB often lack adequate infrastructure and services(figure3.5), including healthcare, and education, hindering socio-economic development.

Migration and Labor Shortages: Rural depopulation(table 3.1) due to migration to urban areas has led to labor shortages in agriculture and other challenges in the rural sector. This migration also impacts social structures and community dynamics.

Agricultural Challenges: According to Xie, (2006), the problem of agricultural development in Zhangzhou is on the one hand the factor of water resources, although the natural water resources conditions are superior, the spatial and temporal distribution of water resources is not balanced, there are more in the summer before the autumn and less in the winter before the spring, and there are more in the mountainous areas and less in the coastal areas of the regularity of the phenomenon. On the other hand is the land resources factor, Zhangzhou land resources of regional differences are obvious, although located in Fujian coastal area, but the ratio of coastal and mountainous areas is 0.64:0.34, due to the coastal and inland mountainous areas, in fact, the real meaning of the coastal and mountainous areas almost half each.

Education and Skill Development: Limited access to quality education and vocational training in rural areas of the JRB hinders the development of skills necessary for economic growth and diversification.

	2020	2021	2022
rural population	1.9528m	1.881m	1.858m
rural proportion	38.64%	37.1%	36.7%

Table 3.1: rural population in Zhangzhou (Zhangzhou Bureau of Statistics)

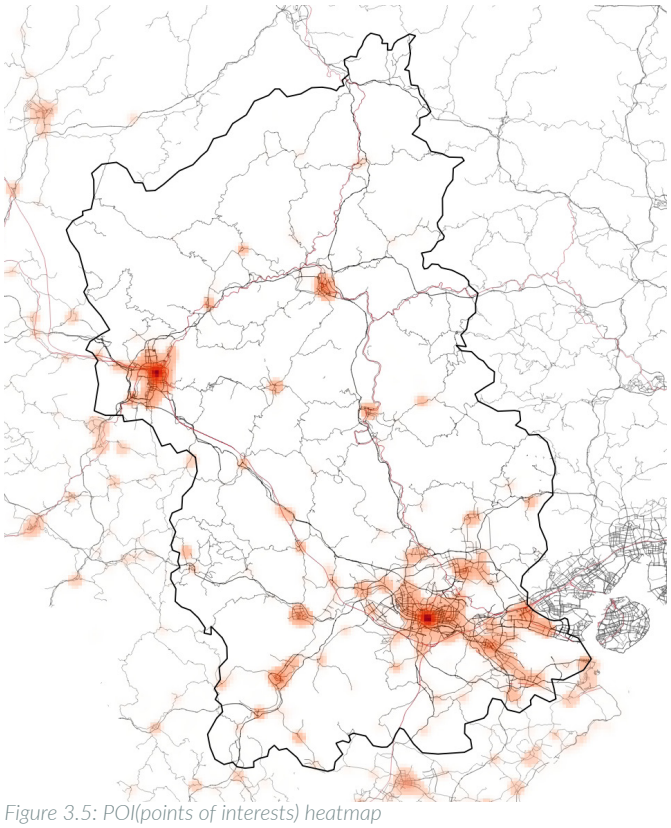


Figure 3.5: POI(points of interests) heatmap

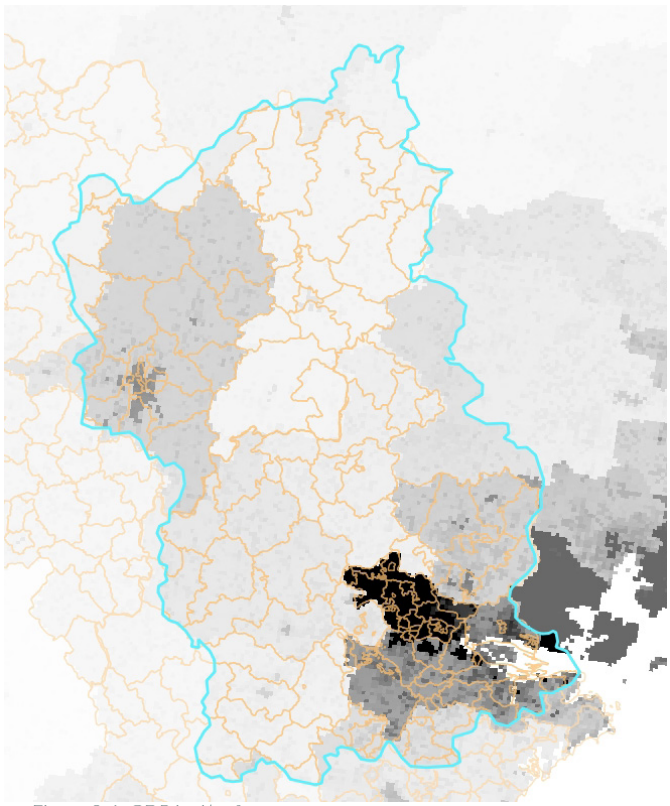


Figure 3.6: GDP in 1km²

Culture and Heritage Loss

The Jiulong River Watershed, rich in cultural heritage, faces challenges in preserving its unique cultural and historical legacy. The rapid urbanisation and modernisation have led to a dilution of traditional cultures and lifestyles.

Impact of Migration: The migration of younger populations to urban areas for better opportunities leads to a breakdown in the transmission of cultural knowledge and practices, risking the loss of unique cultural identities.

Ignorance of traditional living wisdom: The village is a product of human settlement in the farming era, where human beings exchanged material and energy with nature through production and living, and carefully maintained the balance of energy circulation and regeneration of the ecosystem, which resulted in a unique survival wisdom (King, 1911). However, the traditional living wisdom from the farming era has been gradually endangered by industrialised agriculture and impacted by commercialised tourism development. Yuan, (2019) illustrates this dilemma with the example of Hekeng Village, which is located within the scope of the JRW, and Hekeng Village is not an isolated case, as there are many other villages and lifestyles that were originally full of wisdom and have gradually disappeared due to ignorance.

Destruction of traditional architecture and village fabric: Also endangered by industrialisation and commercialisation is traditional architecture and village fabric. figure 3.7 shows a satellite image of Baisa village in 2004 compared to the present, with the historical and typical southern Fujian enclosure buildings replaced by copy and paste new houses, and the original organic village fabric replaced by a large concrete square, just as in the city. This trend still exists, as traditional villages do not know the value of their original environment, but rather create urban landscapes, greatly destroying the traditional built environment (figure 3.8).

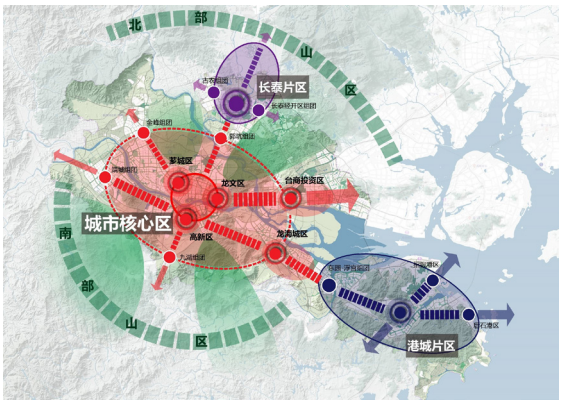
Figure 3.7: Baisha village (Google earth)

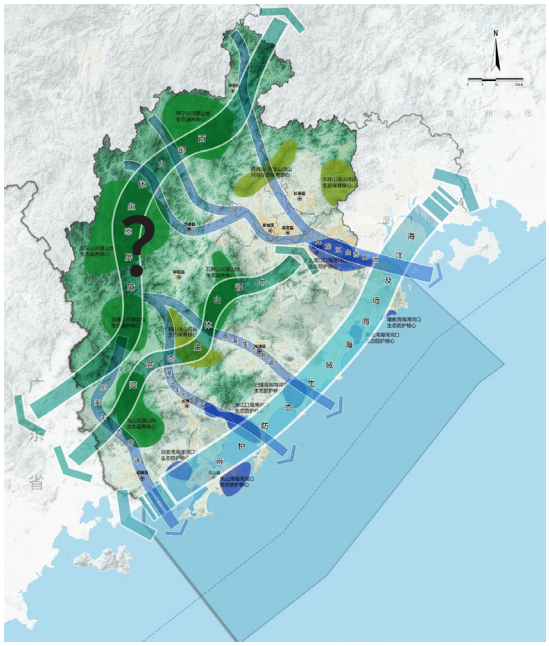
Figure 3.8: Villages in Fujian (Shangyexinzhi, 2022)

Governance gap

While the government makes detailed plans for urban areas, rural areas, which are less populated, more widely spread, and less economically productive, are passed over or simply called "agricultural areas" or "green belts" (figure 3.9). The lack of planning and design makes it difficult for rural development to keep up with the boarder trend, and although the government strongly supports rural revitalisation, villages may use the funds in the wrong places, such as for "vanity projects". In addition, although a certain degree of autonomy in the rural has the potential to make the voices of the bottom of the earth heard, the low level of education and lack of information make it difficult for the countryside to develop on its own. Neglect by higher levels of government coupled with the limitations of the villages themselves creates a huge gap.

At the same time, there is also a gap between policy formulation at higher levels and implementation at the local level, where policy formulation tends to be more abstract and can be greatly misunderstood when transmitted to the local level.





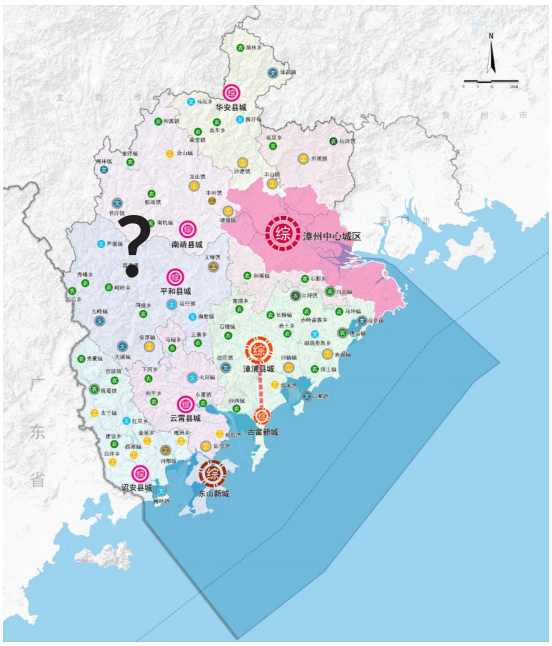


Figure 3.9: Zhangzhou planning (Zhangzhou Planning Bureau, 2020)

1.3 PROBLEMATIZATION

1.3.2 Problem statement

At the heart of this research lies the complex challenge of revitalizing the rural areas in the Jiulong River Upstream region where ecological fragility intersects with socio-economic vulnerability. This region, once thriving with vibrant riverine ecosystems and robust rural communities, now faces a confluence of environmental degradation and socio-cultural erosion. The degradation includes escalating water pollution, diminishing biodiversity, and disruption of natural habitats. Concurrently, the socio-economic fabric of rural communities along the Jiulong River is unravelling, marked by dwindling traditional livelihoods, rural depopulation, and a gradual fading of cultural practices intimately linked to the riverine environment.

Compounding these issues are governance gaps, including inadequate resource management and limited community participation in decision-making processes. The problem is not merely ecological or economic in isolation; it is the weakening of an intricate socio-ecological system where the river has historically been a central axis for community life and ecological harmony.

Addressing this multi-dimensional challenge requires a nuanced understanding of the interdependent dynamics between the river's ecological state and the socio-economic and cultural well-being of the communities it sustains. The core question is how to rejuvenate the river and its surrounding landscapes in a way that is ecologically restorative, economically viable, and culturally enriching, thereby re-establishing the Jiulong River as the lifeline for a resilient and revitalized rural landscape.

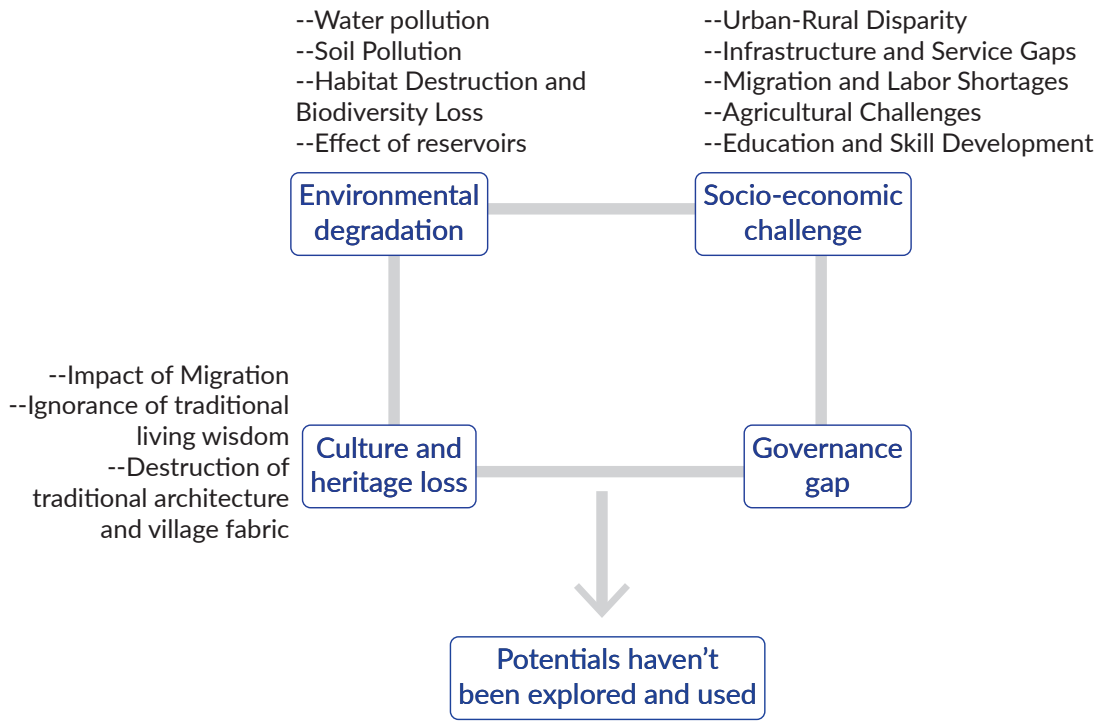


Figure 3.10: Summery of problematizaiton

2 RESEARCH FOUNDATION

2.1 RESEARCH AIM

Research aim

1. Understanding of the Ecological and Socio-Economic System using river as the center:

-Conduct a comprehensive analysis of the Upstream's ecological state.

-Assess the socio-economic dynamics, including demographics, livelihoods, economic activities, and urban-rural interactions.

2. Development of Integrated Conservation and Revitalization Strategies:

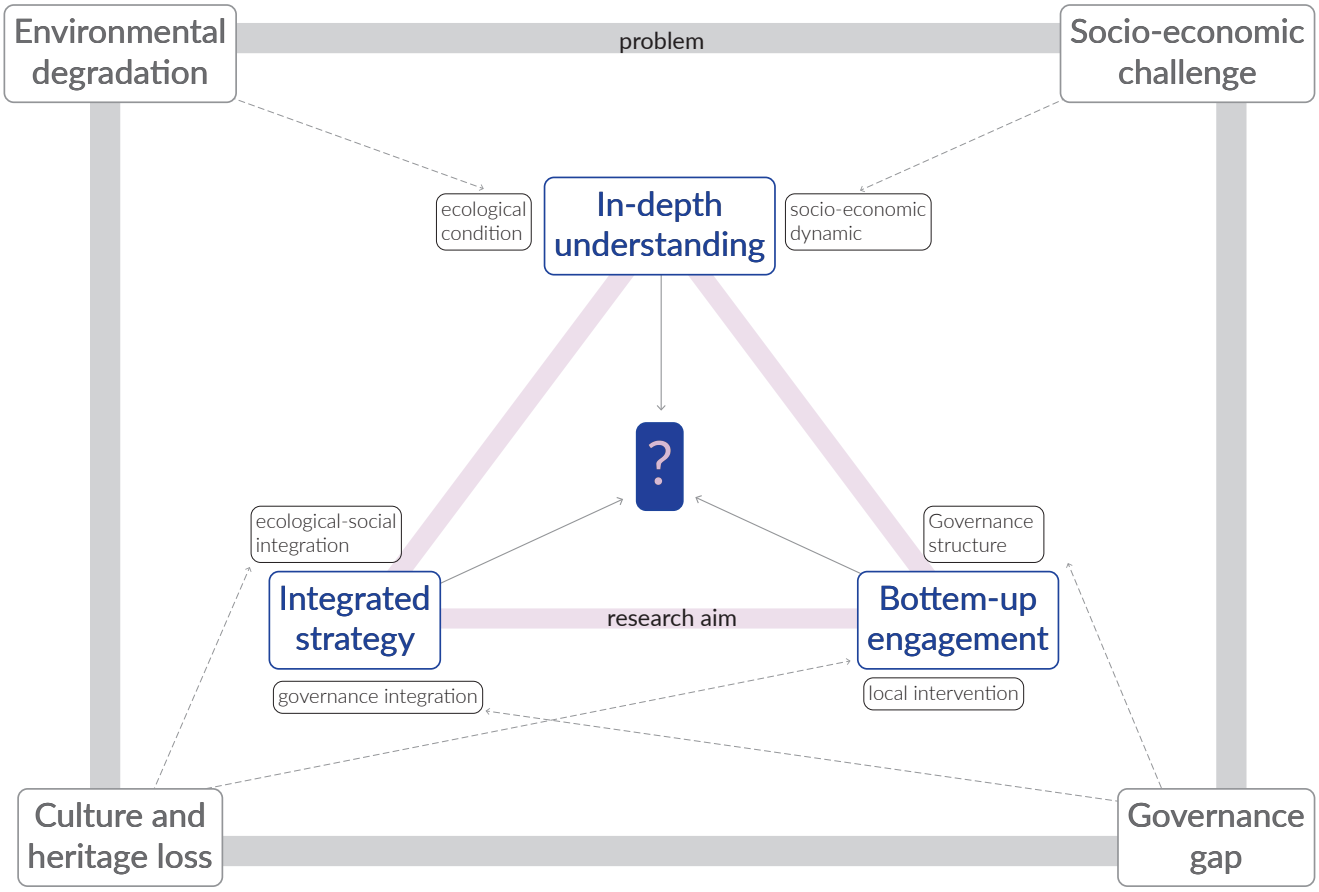
-Formulate strategies that combine ecological conservation with rural social and economic revitalization.

-Explore sustainable practices in agriculture, water management, and planning that benefit both the environment and rural communities.

3. Enhancement of Bottem-up Engagement and Cultural Preservation:

-Improve governance structure to actively involve local communities in decision-making processes and conservation efforts.

-Identify and implement measures to preserve and promote the cultural heritage and traditional practices linked to the village.



2.2 THEORETICAL FRAMEWORK

Integrated watershed management(IWM)

A watershed is an area depicted by the topography of the river system draining it, which is the total area above a point on a stream or river that flows past that point(Wang et al., 2016). Watershed management addresses the socio-economic, human institutional and biophysical interrelationships between soil, water and land use, as well as the linkages between upland and downstream areas (Ffolliot et al. 2002). The integrated watershed management approach reflects the importance of focusing on multiple uses of watershed resources rather than just hydrology. It attempts to balance human and environmental needs while protecting ecosystem services and biodiversity (Bakker 2012). Since the late 1990s, many Integrated Watershed Management (IWM) projects in China have been initiated at the county, provincial, regional and national levels (SEPA, 2006) but most of them failed to achieve the desired objective(Peng et al., 2013b). And Peng et al., (2013b) evaluated the Jiulong River Watershed program and showed that the failures are closely related to China's socio-economic and political complexities, in addition to program design issues. IWM has shown great potential to address the problems of the Jiulong River Basin as mentioned in the project, and to effectively integrate the regional design to restore or enhance the balance of the socio-ecological system. And the rural areas in JRB have a close relationship to the river ecosystem and the local communities within their own vibrancy and deep culture, which also offers a chance to explore a better interaction between humans and nature. Nevertheless, IWM needs to be optimised for specific areas and the shortcomings mentioned by previous scholars.

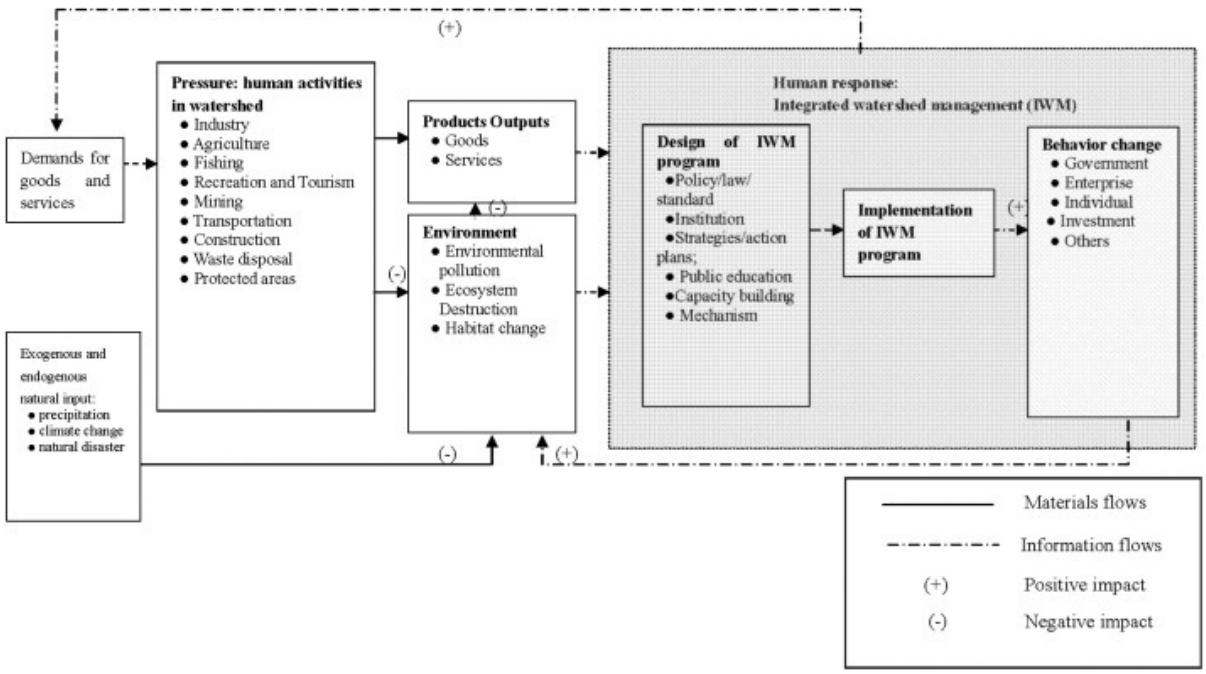


Figure 2.2: The process of integrated watershed management *(Peng et al., 2013)*

Regional Design

Regional design (RD) as an argumentative method in urban planning refers to the ability to build strong argumentative structures and articulations of visions of the future (Thierstein & Forster, 2008; Balz & Zonneveld, 2014; Lingua, 2017). It is based on the use of spatial representations of future developments or visions, both to indicate physical change and to stimulate debates about responsibility and resource sharing (Balz & Zonneveld, 2014).

The complexity of China's political structure, which is strongly top-down from the national level to the county level, with a degree of autonomy at the village level, makes it difficult for management to a better degree, as the perceptions of the region itself, and of the design project, vary enormously. Given the differences in planning cultures, systems and processes, the experience of the last decade outlines the role of the RD approach in not only defining physical interventions but also in helping to build institutional and organisational capacity (Balz & Zonneveld, 2014). This style of development-orientated planning requires improved coordination between government agencies and social actors, demonstrating how growing spatial integration transcends restrictive administrative boundaries and showing why and how these barriers can be overcome (Förster et al., 2016). Therefore, RD may be a new way of thinking about the problems of the Jiulong River Basin and China's political structure, and it also coincides with the emphasis on public participation in IWM, and is able to demonstrate management in a more spatial way.

Despite the growing body of research on RD planning methods (Von Seggern et al., 2008; de Jongh, 2009; Meesmans, 2010), there are few empirical studies on the impacts of RD on the environments of complex and dispersed transboundary or natural areas, such as bioregions or river basins, which tends to highlight the great difficulty in applying the tools relevant to their management (Danish and Chica, 2007). In this project, the Jiulong River occupies an important position in both the ecosystem and the human society, so using it as a central axis to discuss the present issues and as a clue to explore future development is a new attempt to design the region.

Socio-ecological integration

Socio-ecological integration theory emphasizes the need for a balanced interplay between human societies and their environmental contexts, advocating for strategies that ensure the sustainable management of natural resources while promoting social equity. According to Pope, Bonatti, and Sieber (2021), embedding socio-ecological justice within legal frameworks is crucial for sustaining ecological integrity and ensuring fair resource distribution, thus fostering a just environmental governance system. Elsen et al. (2023) further argue that enhancing ecological integrity through climate adaptation interventions not only safeguards biodiversity but also stabilizes socio-economic conditions by shifting ecosystems towards healthier, more sustainable states.

Long-term environmental monitoring is vital in understanding and managing the interactions within socio-ecological systems, as discussed by Mollenhauer et al. (2018). They highlight the importance of consistent, comprehensive data collection across different ecological zones to assess and manage the ecological pressures and changes effectively. Additionally, Kumaraswamy (2012) emphasizes the critical role of integrating socio-ecological perspectives in agro-ecology, where sustainability indicators can help maintain regional ecological integrity and promote sustainable agricultural practices.

Eisenmenger et al. (2020) critique the Sustainable Development Goals for prioritizing economic growth over sustainable resource use. They argue for a socio-ecological approach that values ecological preservation alongside economic development to truly achieve sustainability. Moreover, Diaz-Delgado et al. (2018) demonstrate the application of UAV technology in ecological monitoring, providing precise, real-time data that can enhance our understanding of ecological dynamics and facilitate informed decision-making for conservation and restoration efforts.

Collectively, these scholarly works underscore the necessity of an integrated socio-ecological approach to manage and sustain natural resources effectively. They advocate for policy frameworks, scientific research, and community engagement that recognize and address the intricate dependencies between ecological health and human well-being, aiming for resilience and sustainability in facing environmental challenges.

River-centric design

The River Centric Urban Planning Guidelines introduced by the Ministry of Housing and Urban Affairs in India outline strategies for conserving river ecosystems within urban settings. These guidelines stress the importance of maintaining natural river functions and advocate for integrated planning that includes water conservation, pollution prevention, and floodplain management. Urban planners are encouraged to consider the entire riverine ecosystem in their development plans, including aspects like biodiversity, ecological balance, and community engagement near river zones, which is relevant to this research, but this study focuses on rural areas that have better ecological foundations but weaker social foundations, so a new definition of river-centred design was developed, which is a design that combines the broader framework of integrated watershed management with the design methods of regional design and faces the requirements of socio-ecological integrity. It can be understood in three time frames: past, present and future.

The layout of rural settlements usually reflects a balance between maximising the advantages provided by rivers and minimising the risks posed by rivers (Ambe et al., 2018). Wang & Zhang, (2021) also mentioned in their study on the evolution of rural settlement patterns and the analysis of its influencing factors in China from 1995-2015: water conditions are related to water for humans and animals, affecting irrigated agriculture and industrial production, so 68.91% of rural settlements in China are within 30 km of the main stream of a river. From 1995 to 2015, the area of rural settlement land added within 30 km of the mainstream of a river accounted for 74.39 per cent of the incremental area of rural settlements. Presently, rivers face significant ecological pressures that necessitate targeted interventions. Strengthening riverbanks and enhancing ecological conservation can bolster rural areas, improving the well-being of local populations, including the elderly, by fostering sustainable interaction with these natural resources (Du et al., 2023). Looking forward, developing comprehensive methodologies for managing river ecosystems promises to integrate environmental and socio-economic factors, which is crucial for the sustainable evolution of both rural and urban populations. Such approaches are pivotal in ensuring the future sustainability of river-dependent communities (Koundouri et al., 2016). Thus, in the past, rivers represented a confluence where human activities and natural ecosystems interacted, deeply influencing the evolution of rural communities and their relationship with the environment. In the present, River serves as a lens to assess and address the challenges of rural decline and ecological degradation, spotlighting areas for intervention and revitalization. In the future, rivers become a keystone in envisioning and realising a harmonious coexistence between rural communities and their natural environment, shaping innovative strategies for sustainable living and ecological stewardship.

2.3 CONCEPTUAL FRAMEWORK

This conceptual framework illustrates the dynamic interactions between a river and its ecological and societal contexts, with governance as a foundational element.

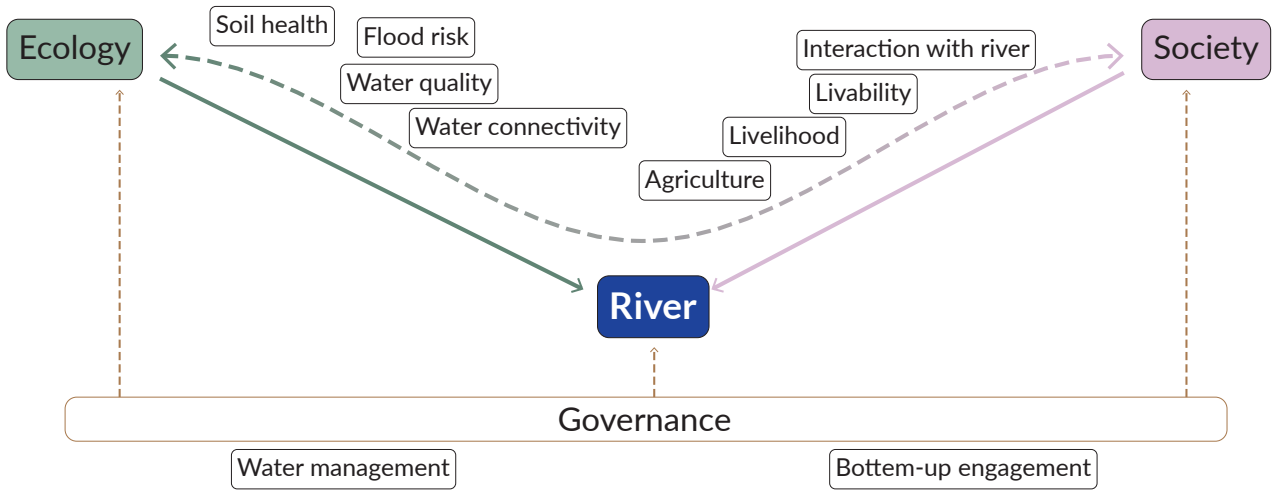
Ecology and River: Soil health: Highlighted as a fundamental ecological aspect influenced by the river, possibly through deposition or erosion processes. Flood risk and Water quality: These are direct ecological impacts of the river, affecting both the surrounding land and the broader ecological health. Water connectivity: This refers to the connectivity of different water bodies facilitated by the river, which is crucial for maintaining ecological balance.

River and Society: Interaction with river: Indicates the direct relationship between the river and societal benefits like recreation or spiritual value. Livelihood and Agriculture: Points to the economic dependence on the river for activities such as farming, which can be central to a community's way of life. Livability: Refers to how the river affects the quality of life in nearby communities, possibly through the provision of essential resources or aesthetic value.

Governance:Acts as a bridge connecting ecological and societal components, suggesting its role in managing resources, regulating usage, and ensuring sustainable interactions with the river. Water management: Explicitly linked to governance, highlighting the organized efforts to optimize the use and preservation of water resources. Bottom-up engagement: Implies the involvement of local communities or stakeholders in decision-making processes, ensuring that governance reflects the needs and input of those directly affected by the river.

The dashed line connecting Ecology and Society represents the indirect and complex interactions between ecological and social systems through the river. This line symbolizes several key aspects: Bi-directional Influence: Ecology and society mutually influence each other. The ecological conditions of the river, such as water quality and flood risks, affect societal aspects like agriculture, livability, and livelihood. Conversely, societal actions, such as agricultural practices and urban development, impact the river's ecological health. Feedback Loops: The relationship suggests ongoing feedback loops where ecological changes prompt social adaptations, and these social changes in turn affect the ecology. Integrated Approach: The connection underscores the need for an integrated approach to river management that considers both ecological and social dimensions. This integrative perspective is essential for sustainable development, ensuring that both environmental protection and human welfare are addressed.

Overall, it depicts the river as a central axis influencing and interacting with ecological factors and societal needs, all underpinned by governance structures that manage these interactions for sustainability.



2.4 RESEARCH QUESTION

How can a river-centric design contribute to the sustainable rural revitalization of the Jiulong River Upstream region, fostering ecological integrity and socio-economic resilience?

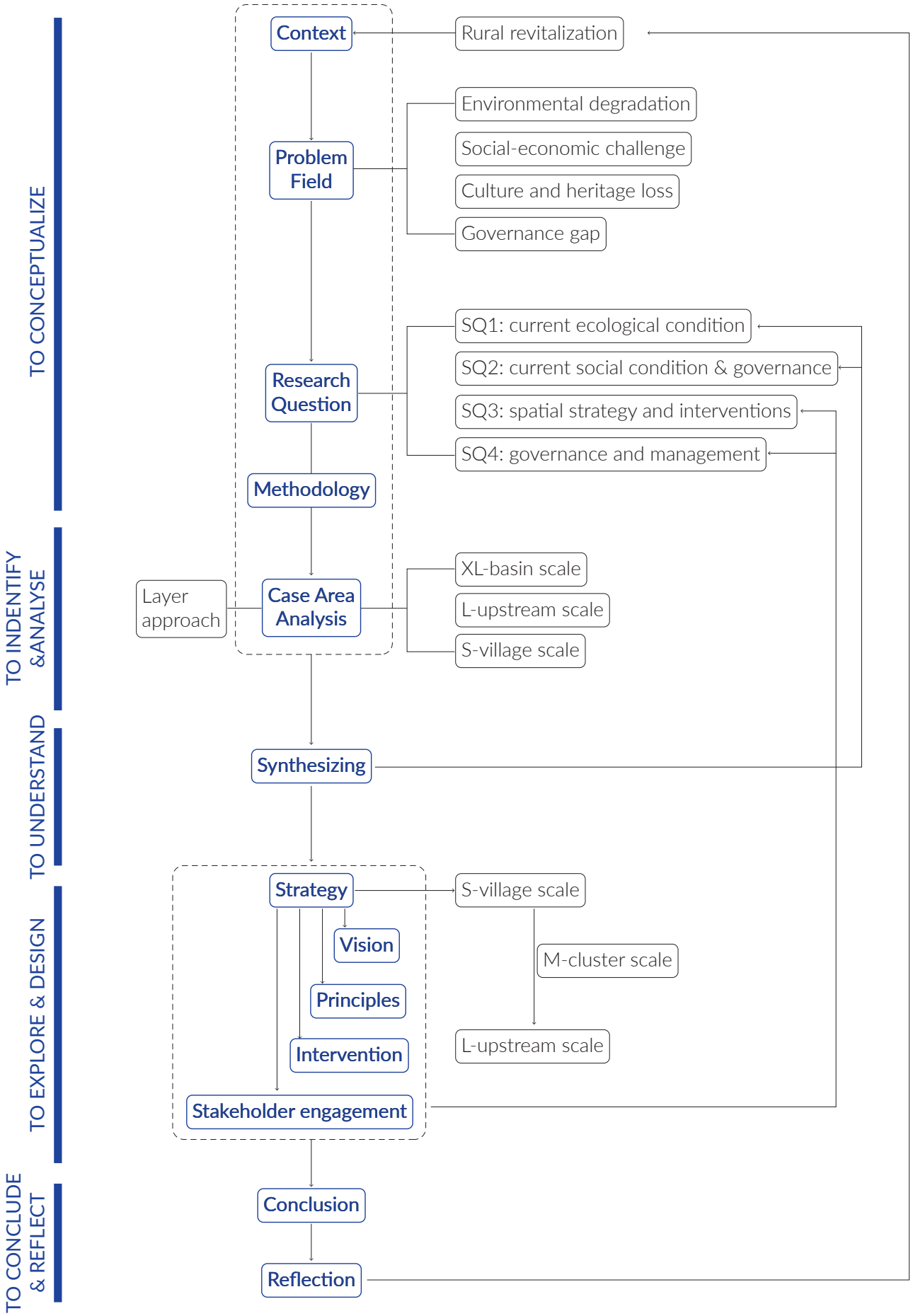
1. What is the current ecological status of the Jiulong River Upstream, and what are the primary environmental challenges and potentials for enhancing ecosystem services and biodiversity?

2. What is the current societal condition and governance and how do they influence both the ecological integrity of the river and the socio-economic resilience of the rural communities?

3. What river-centric spatial strategies and design principles can be implemented to promote ecological conservation and enhance local livelihoods?

4. What governance and management strategies can be applied to optimize the sustainable use and conservation of the Jiulong River's resources?

2.5 RESEARCH FRAMEWORK



2.6 RESEARCH METHODS & OUTCOMES

M1 Academic literature study

M2

M7

Research questions	M
1. What is the current ecological status of the Jiulong River Upstream, and what are the primary environmental challenges and potentials for enhancing ecosystem services and biodiversity?	M1 Academic literature study- Conduc and studies related to the Jiulong R M2 M7 Mapping and fieldwork- Utilize Ge maps of JBW. - Represent ecological features, po environmental data. M3 The layer approach- Apply a multi- (substratum), infrastructure and hu
2. What is the current societal condition and governance and how do they influence both the ecological integrity of the river and the socio-economic resilience of the rural communities?	M1 Academic literature study- Review communities along the Jiulong Rive M7 Interview/fieldwork- Conduct inter experts. Perform field observations M3 The layer approach- Apply the laye nomic conditions(occupation and c scales. M4 Stakeholder analysis- Identify and a management and communities' we M2 Utilize GIS mapping to visualize so features.
3. What river-centric spatial strategies and design principles can be implemented to promote ecological conservation and enhance local livelihoods?	M3 The layer approach- Use layers to scales in the strategy. M4 Stakeholder engagement strategy- participation in the planning proce M8 Vision making- To create a shared and more intuitive way M9 Strategy making- Develop the proc M10 Design- Develop detailed interven shared vision and address identifie
4. What governance and management strategies can be applied to optimize the sustainable use and conservation of the Jiulong River's resources?	M4 Stakeholder analysis- Identify and stakeholders who are directly affec M9 Strategy making

Mapping | M3 The layer approach | M4 Skakeholder analysis | M5 Case study

Interviews/fieldwok | M8 Vision making | M9 Strategy making | M10 Design

Methods	Outcomes
ct a comprehensive review of scholarly articles, reports, River's ecology.	Gain insights into historical and current ecological states, and identify primary environmental challenges.
ographic Information Systems (GIS) to create detailed llution sources, land use changes, and other relevant	Visual representation of ecological conditions and spatial distribution of environmental challenges.
layered analysis, encompassing physical geography man activity (networks)	Holistic understanding of the river's ecological system, interrelated factors affecting it, and implications for sustainable management.
existing research on socio-economic aspects of er.	A comprehensive understanding of the current knowledge and research gaps about socio-economic conditions.
rviews with local residents, community leaders, and s to gather first-hand data.	Qualitative insights into local perspectives, practices, and challenges.
r approach to analyze the interplay between socio-eco-culture layers) and the river's ecology across different	Holistic understanding of the complex interactions between human activities and the river ecosystem and selection of strategic locations.
analyze key stakeholders involved in the river's lfare.	Understanding of stakeholder interests, influence, and potential for collaboration.
cio-economic data in relation to the river's ecological	Spatial representation of the socio-economic factors in relation to the river's ecological state.
show the intra and intro relationship of elements and	A multi-dimensional understanding and demonstration of the basin to inform spatial strategy development.
Develop engagement strategies to ensure stakeholder ss.	A collaborative framework for spatial planning that includes diverse stakeholder perspectives and needs.
vision that could visualise the future of JRW in a clearer	A strategic vision that aligns with both ecological integrity and community well-being.
cess showing how to get to the vision.	Strategy framework
tion proposals and design solutions that embody the d challenges in zooming areas.	Design products that show the villages' future with even more detailed and intuitive way
engage with community groups, local NGOs, and other cted by or interested in the Jiulong River's management.	Identify and profile stakeholders
	Integrate stakeholder engagement with strategy framework

3 FROM WATERSHED TO UPSTREAM REGION TO RURALVILLAGES

3.1 FROM WATERSHED TO UPSTREAM

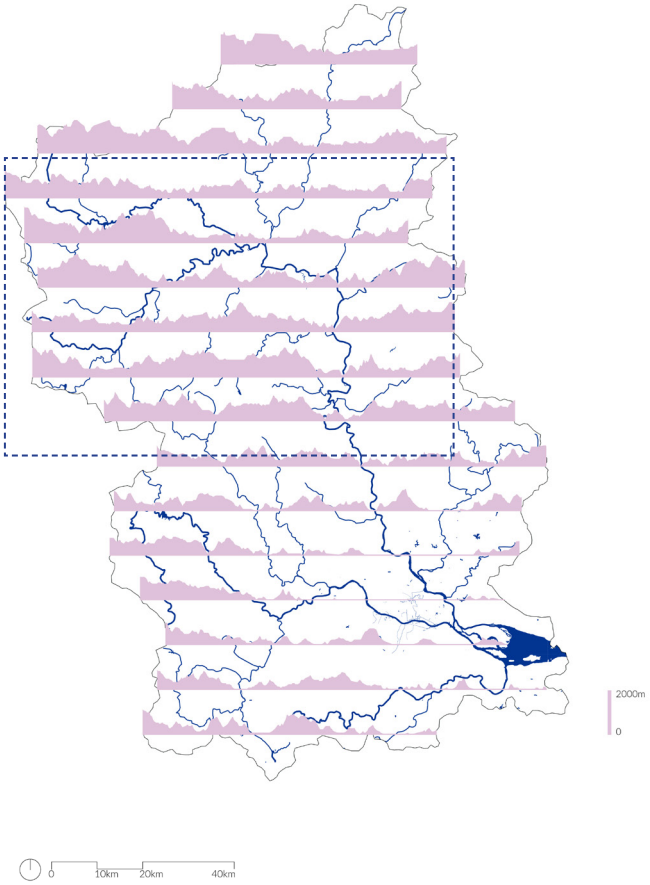
3.1.1 Upstream in the watershed

The whole watershed rises gradually from the southeast coast to the northwest mountainous areas, and the difference in terrain gradually increases. The upstream region shows varied elevations, including hills and valleys that could impact water flow and ecological dynamics.

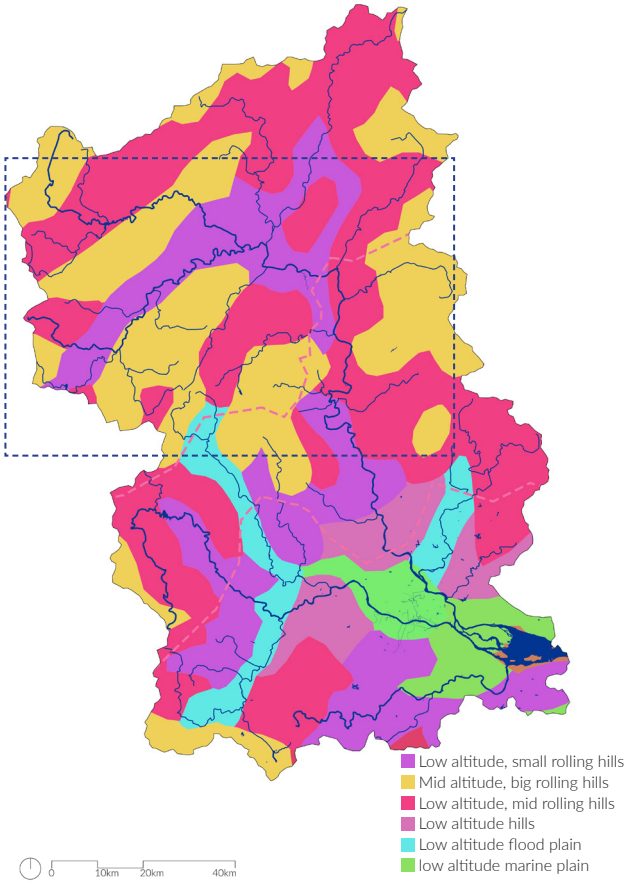
The geomorphology map shows different landforms within the basin and the upstream appears to encompass a variety of geomorphological features, including low-altitude hills and mid-range rolling hills. These features are critical as they affect soil erosion, river path dynamics, and habitat types.

The soil type map categorizes the area into several types based on soil composition, which includes red earths, yellow earths, water-logged soils, paddy soils, and dark brown forest soil. The upstream region exhibits a diversity of soil types, which is crucial for agricultural practices, forestry.

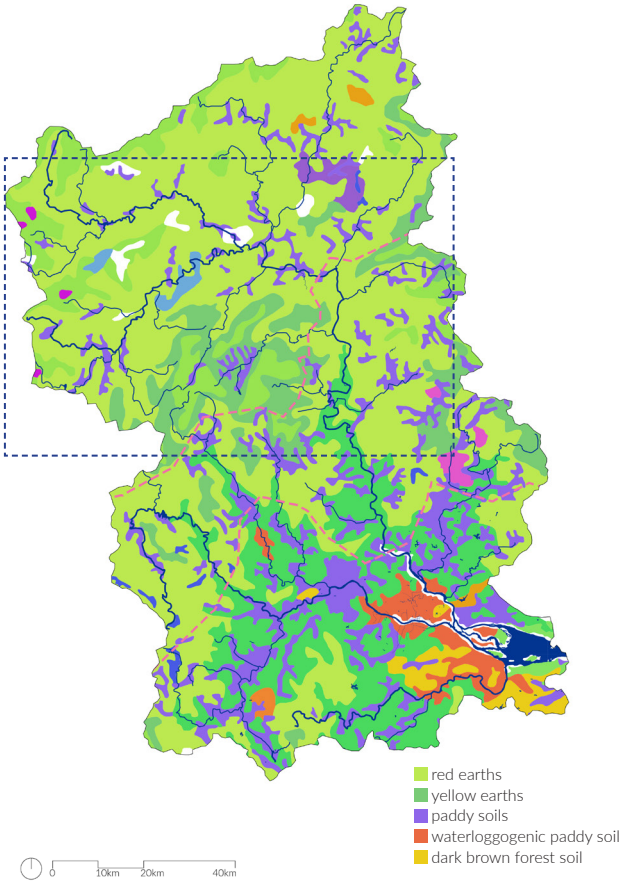
The geomorphology and soil types indicate potential challenges related to water management, including flood risks. This necessitates comprehensive water management strategies that consider the natural contours and hydrological behaviour of the land.



Elevation and sections *(resdc.cn, 2020)*

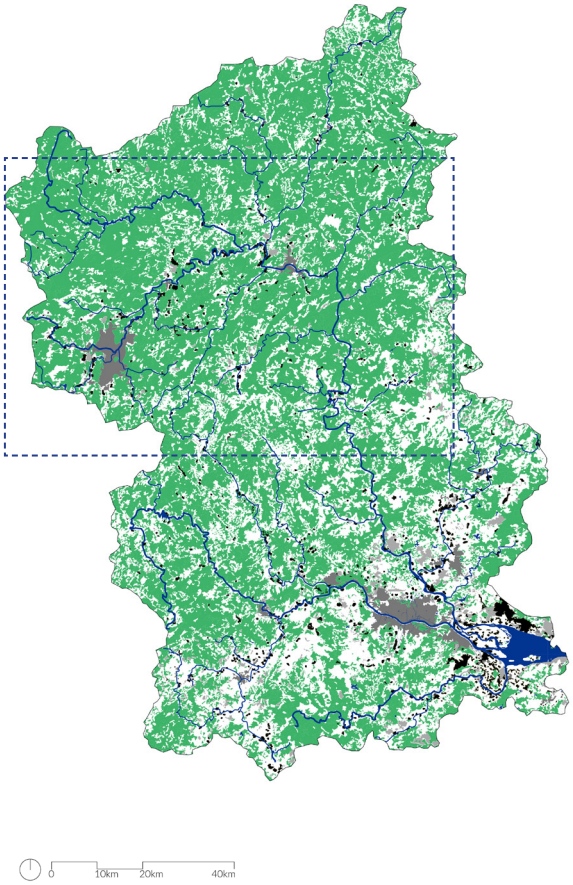


Geomorphology *(resdc.cn, 2022)*

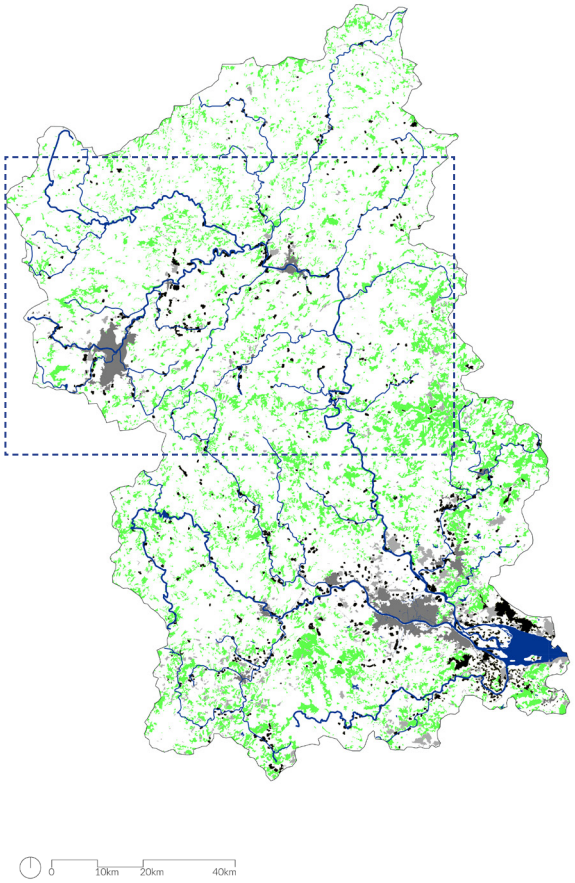


Soil type *(resdc.cn, 2022)*

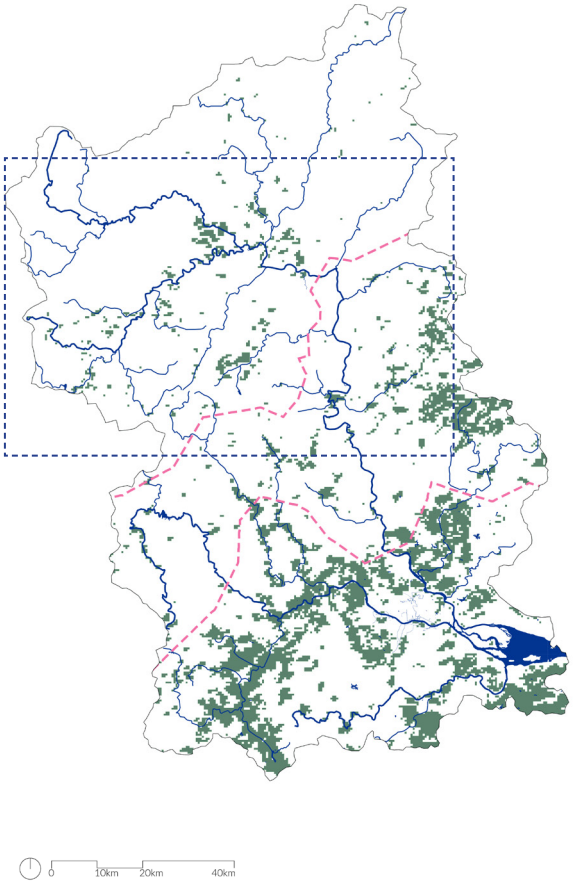
The maps provided depict the land use types across the Jiujiang River Basin, focusing on three main categories: woodland, grassland, and cropland. The woodland map shows extensive woodland coverage throughout the basin, with dense concentrations in the upstream region. Woodlands in this area provide critical ecosystem services, such as habitat for biodiversity, and erosion control. Grasslands are interspersed throughout the river basin but are less dominant in the upstream region as indicated. Grasslands are important for grazing and can also act as buffer zones that prevent sediment runoff into the river, maintaining water quality. The cropland map illustrates significant agricultural activity within the basin, with an insubstantial presence in the upstream area but concentrated in riverine areas. This indicates that agriculture is a major land use and an economic backbone for communities here, potentially influencing water usage and nutrient runoff patterns.



Woodland *(resdc.cn, 2020)*



Grassland *(resdc.cn, 2020)*



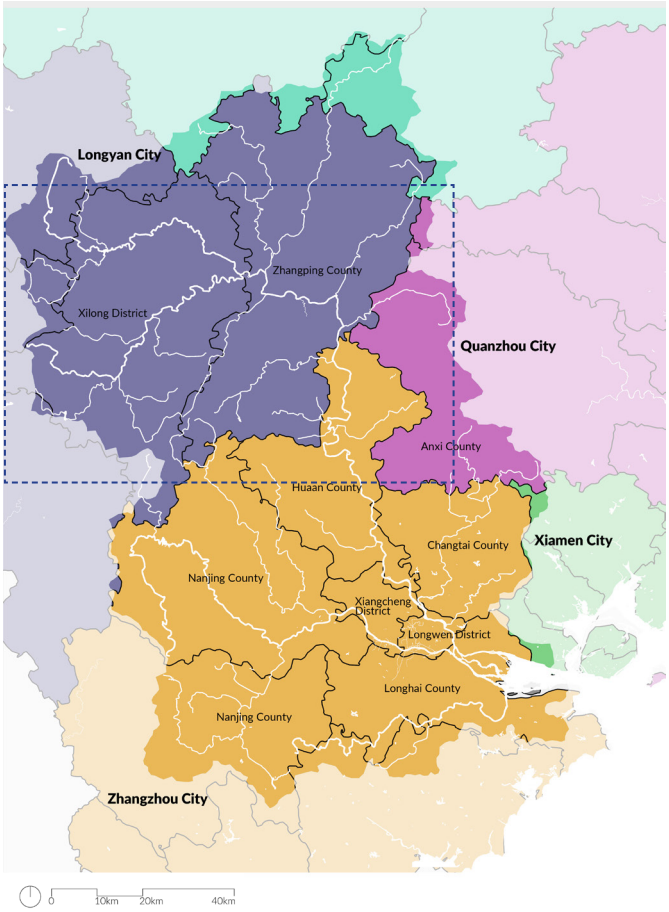
Cropland *(resdc.cn, 2020)*

3.1.1 Upstream in the watershed

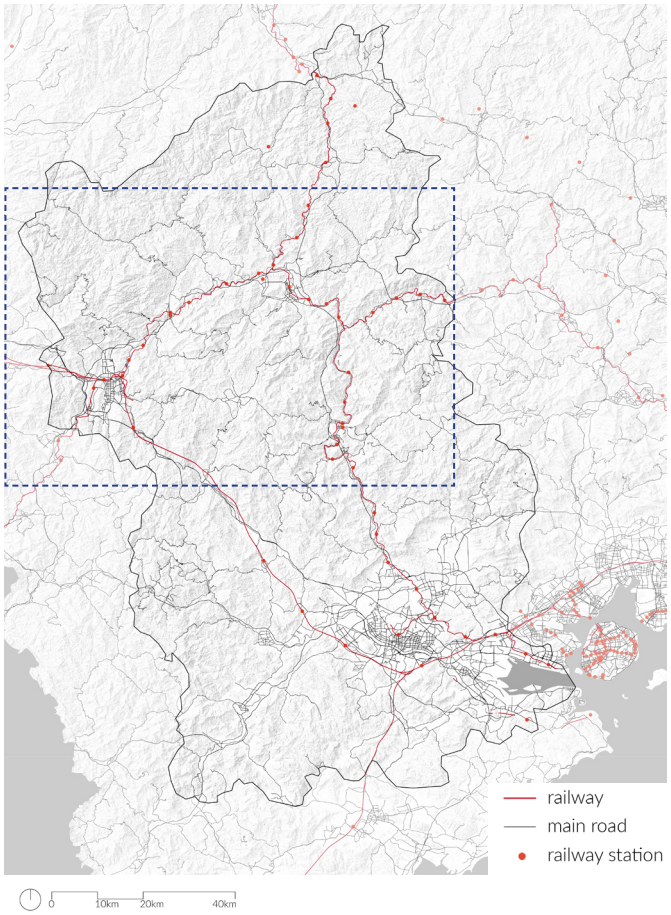
Administrative Division map displays the different administrative regions within the river basin, with the upstream area encompassing parts of Longyan City and neighboring counties. The varied administrative divisions within the upstream region necessitate coordinated policy efforts across multiple jurisdictions to manage resources effectively and implement sustainable development strategies.

The transportation map illustrates major roads and railway lines traversing the river basin. The upstream region shows fewer transportation networks compared to more urban areas, suggesting lower accessibility and potential challenges for economic development and mobility.

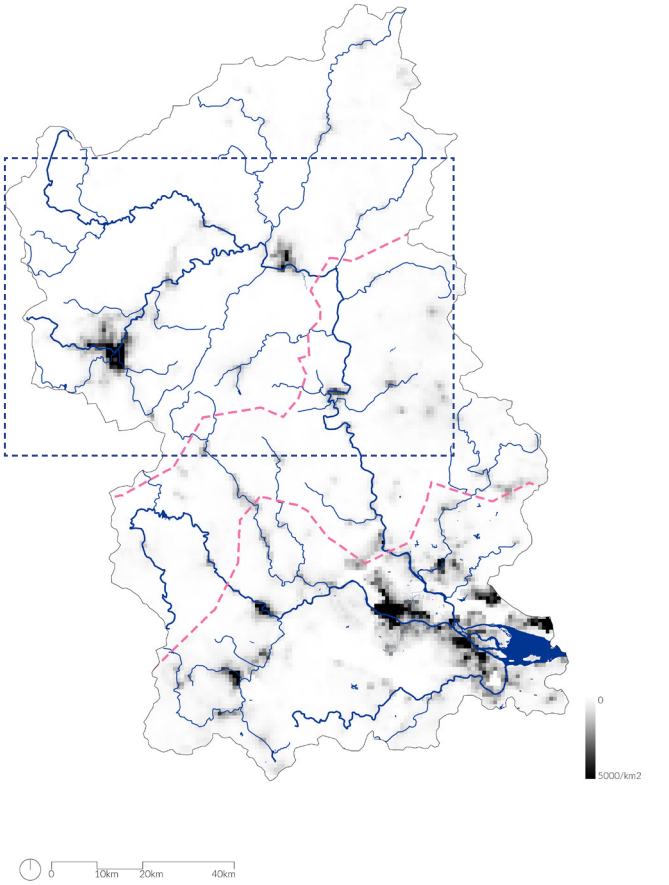
Population Density map visualizes population density across the basin and the upstream area appears less densely populated than downstream regions.Lower population density presents both challenges and opportunities. While it may complicate the economic viability of extensive public services and infrastructure, it also reduces pressure on the environment, allowing for more focused conservation efforts and the potential to develop eco-tourism or other sustainable industries that leverage the natural landscape.



Administrative division *(resdc.cn, 2023)*



Main transportation *(resdc.cn, 2022)*

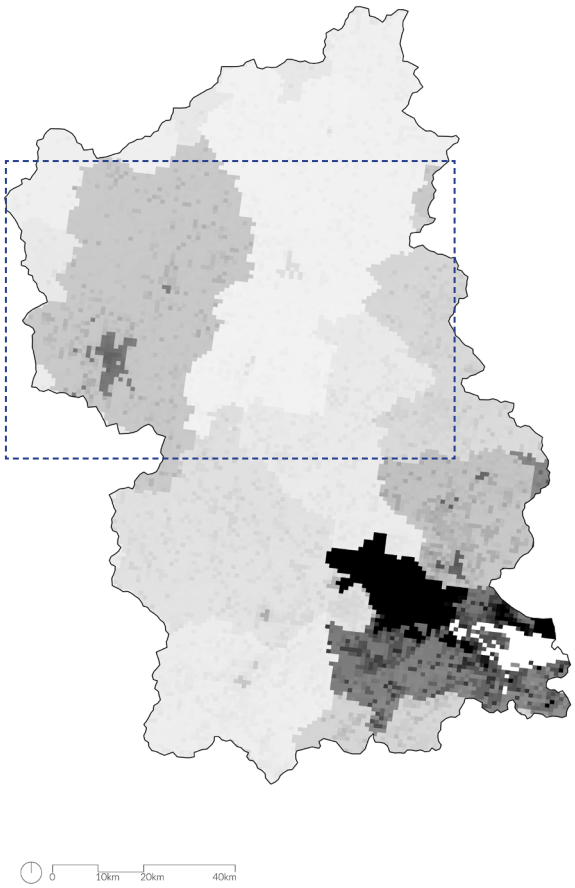


Population in 1km² *(resdc.cn, 2022)*

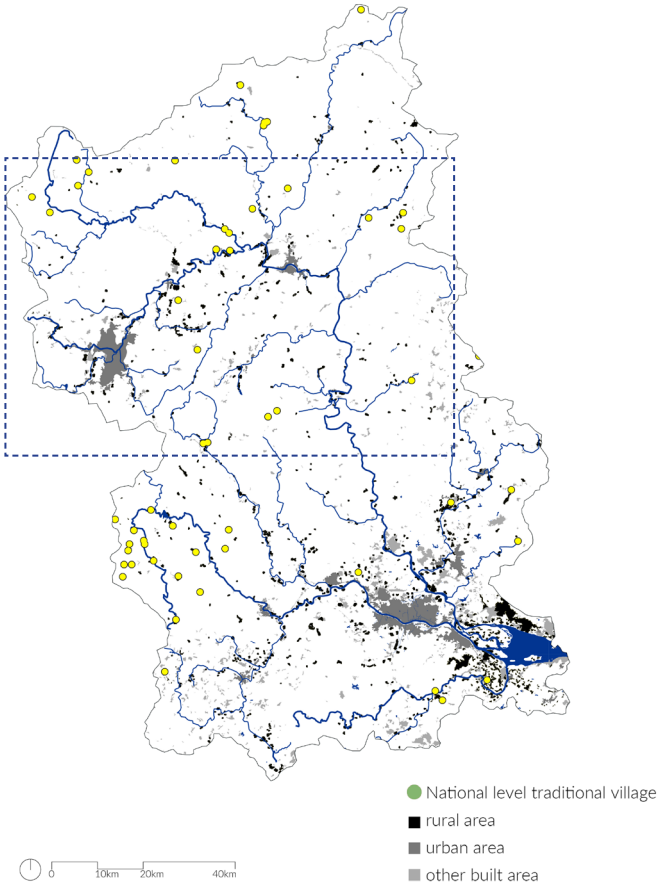
GDP map illustrates the spatial distribution of GDP across the river basin. The upstream area exhibits significantly lower GDP density compared to the downstream regions.

Traditional Village map shows the distribution of traditional villages classified by national level, rural area, urban area, and other areas. The upstream region appears to have a concentration of traditional villages, especially those classified under rural areas. This implies a rich cultural heritage and possibly a dependency on traditional livelihoods which may be influenced by the river's ecological health.

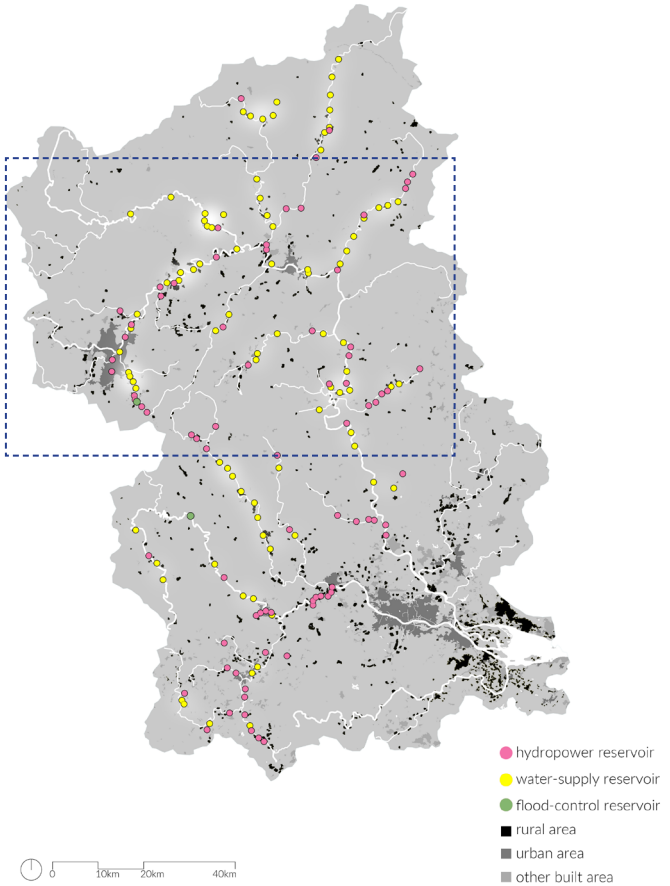
Reservoirs map indicates the locations of various types of reservoirs and the upstream region is dotted with a large number of reservoirs, which underlines the importance of comprehensive water resource management.



GDP in 1km² *(resdc.cn, 2023)*



Traditional village *(resdc.cn, 2023)*



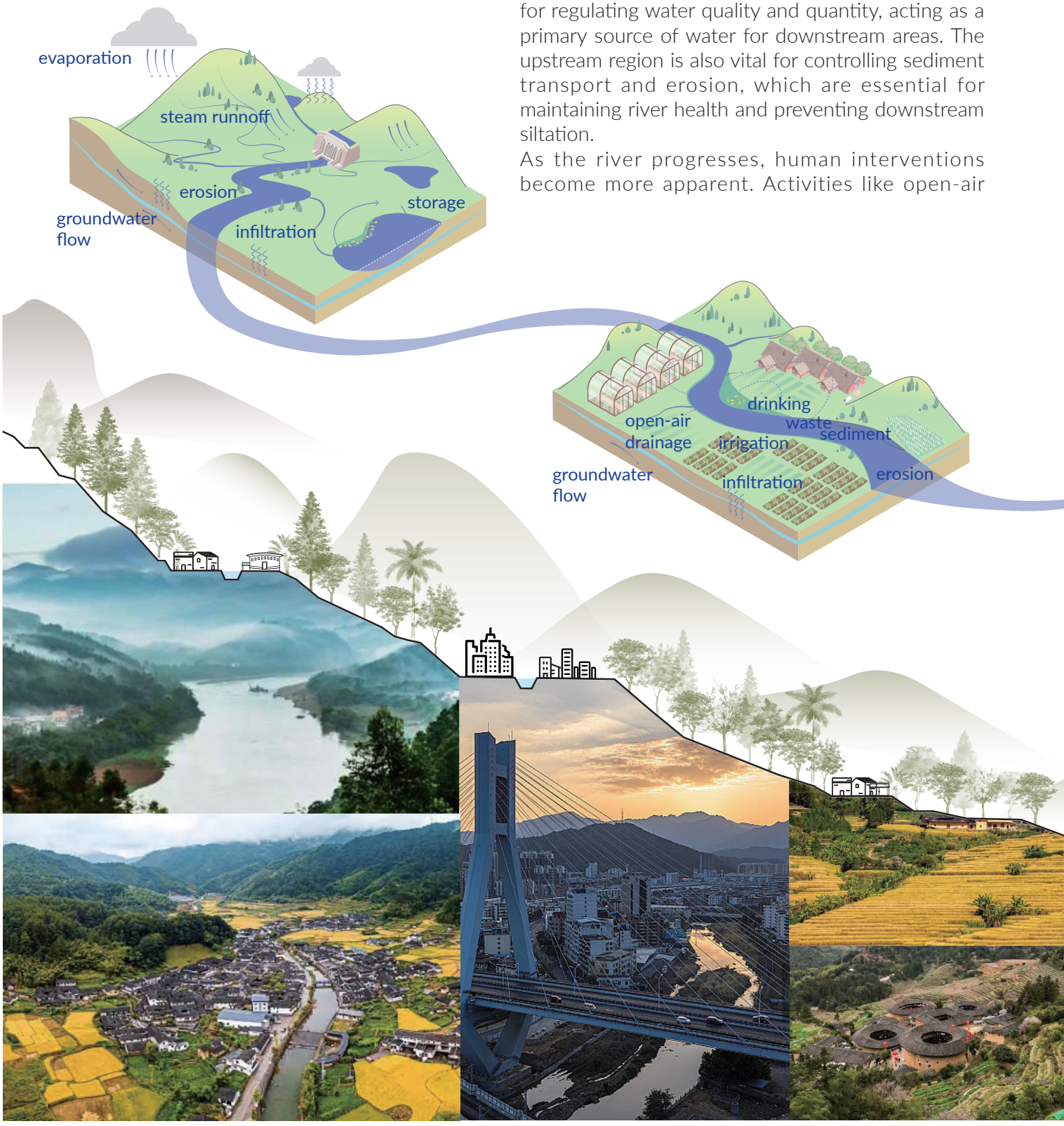
Reservoirs *(resdc.cn, 2022)*

3.1.2 The importance of upstream

The visual illustrates the progression from the upstream to the downstream sections of a river basin, depicting the complex interactions between natural processes and human activities.

The upstream areas, typically characterized by natural landscapes, are fundamental to the hydrological cycle. They facilitate key processes like evaporation, steam runoff, groundwater flow, and infiltration. These natural mechanisms are crucial for regulating water quality and quantity, acting as a primary source of water for downstream areas. The upstream region is also vital for controlling sediment transport and erosion, which are essential for maintaining river health and preventing downstream siltation.

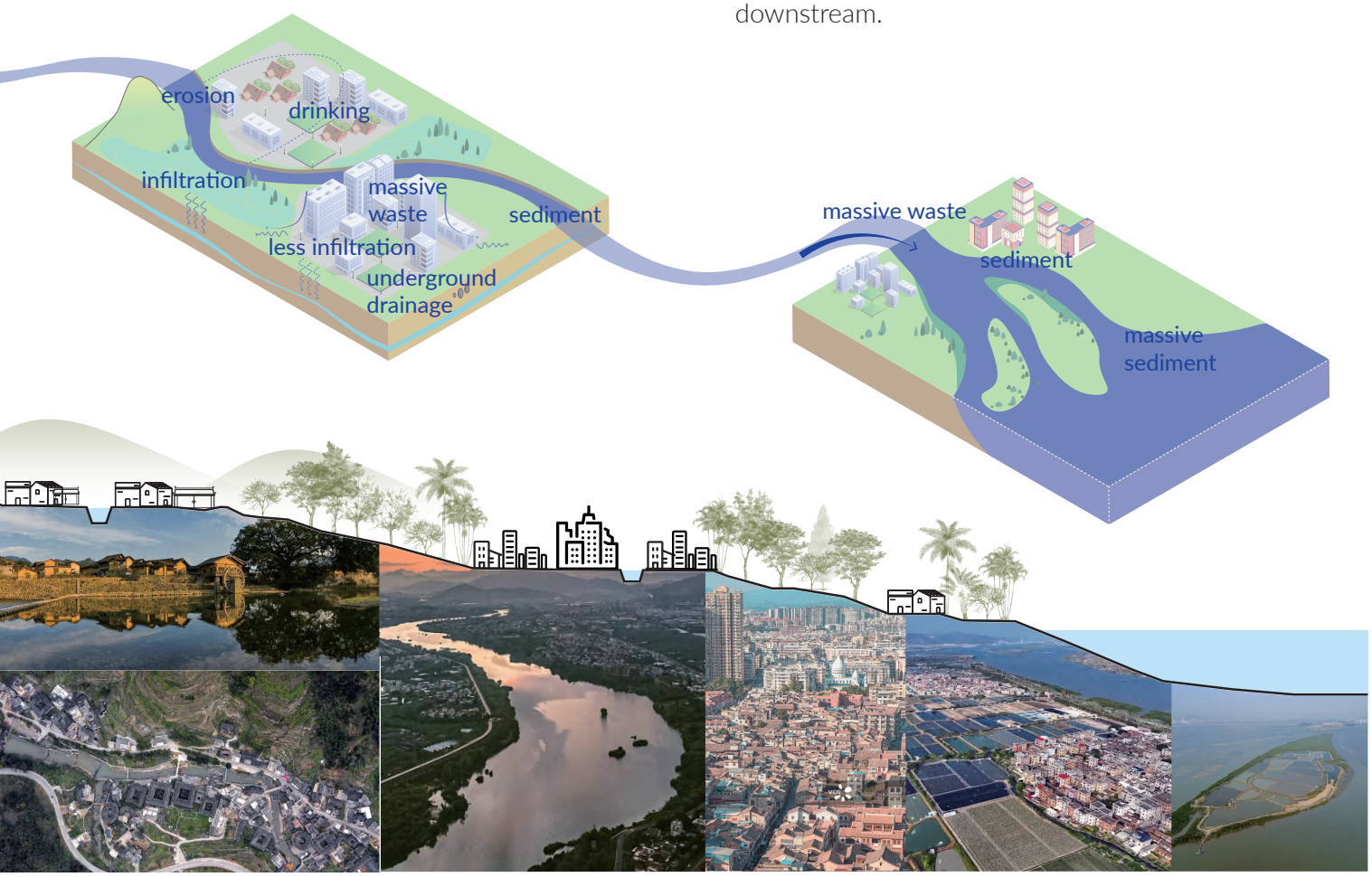
As the river progresses, human interventions become more apparent. Activities like open-air



drainage, drinking water processing, and agricultural irrigation start to dominate. These practices can introduce contaminants and alter natural water flows, impacting sediment patterns and erosion processes. However, midstream areas often serve as transitional zones where both natural and human elements interact intensely, necessitating integrated management to balance ecological health and human needs.

In the downstream areas, dense urbanization and industrial activities intensify environmental pressures. Massive waste generation, reduced infiltration due to impervious surfaces, and underground drainage systems characterize these regions. Such alterations can lead to increased pollution and sediment deposition, which may result in significant ecological and hydrological changes, affecting water quality and increasing the risk of flooding.

Several studies underline the importance of upstream areas in river basin management: Muhar et al. (2018) explore restoration practices in river basin management, stressing that upstream conservation efforts are crucial for maintaining the ecological health of entire basins. The study highlights that managing the river's upstream portion can mitigate adverse effects downstream, such as reduced water quality and altered flow regimes. Svendsen, Wester, & Molle (2005) discuss the role of information in managing river basins, indicating that effective upstream management relies on robust institutional frameworks and comprehensive data to inform decisions that affect water quality and availability across the basin.Munia et al. (2018) analyze how downstream sub-basins depend on upstream inflows to avoid scarcity, emphasizing that upstream water management is vital for preventing conflicts and ensuring sustainability in water resource allocation. Van den Brandeler, Gupta, & Hordijk (2019) address the scalar mismatches in river basin management, particularly how upstream management decisions impact downstream urban and agricultural areas, requiring coordinated management approaches across different scales and regions. The upstream region of a river basin is not only a source of water but also a key player in shaping the environmental and hydrological characteristics of the entire basin. Effective management of this region is crucial for maintaining water quality, ensuring adequate water supply, and protecting ecological health downstream.



(Photos are from VCG.com, 2023)

3.1 FROM WATERSHED TO UPSTREAM

3.1.3 Upstream analysis

Ecological challenge

Segmentation of river system

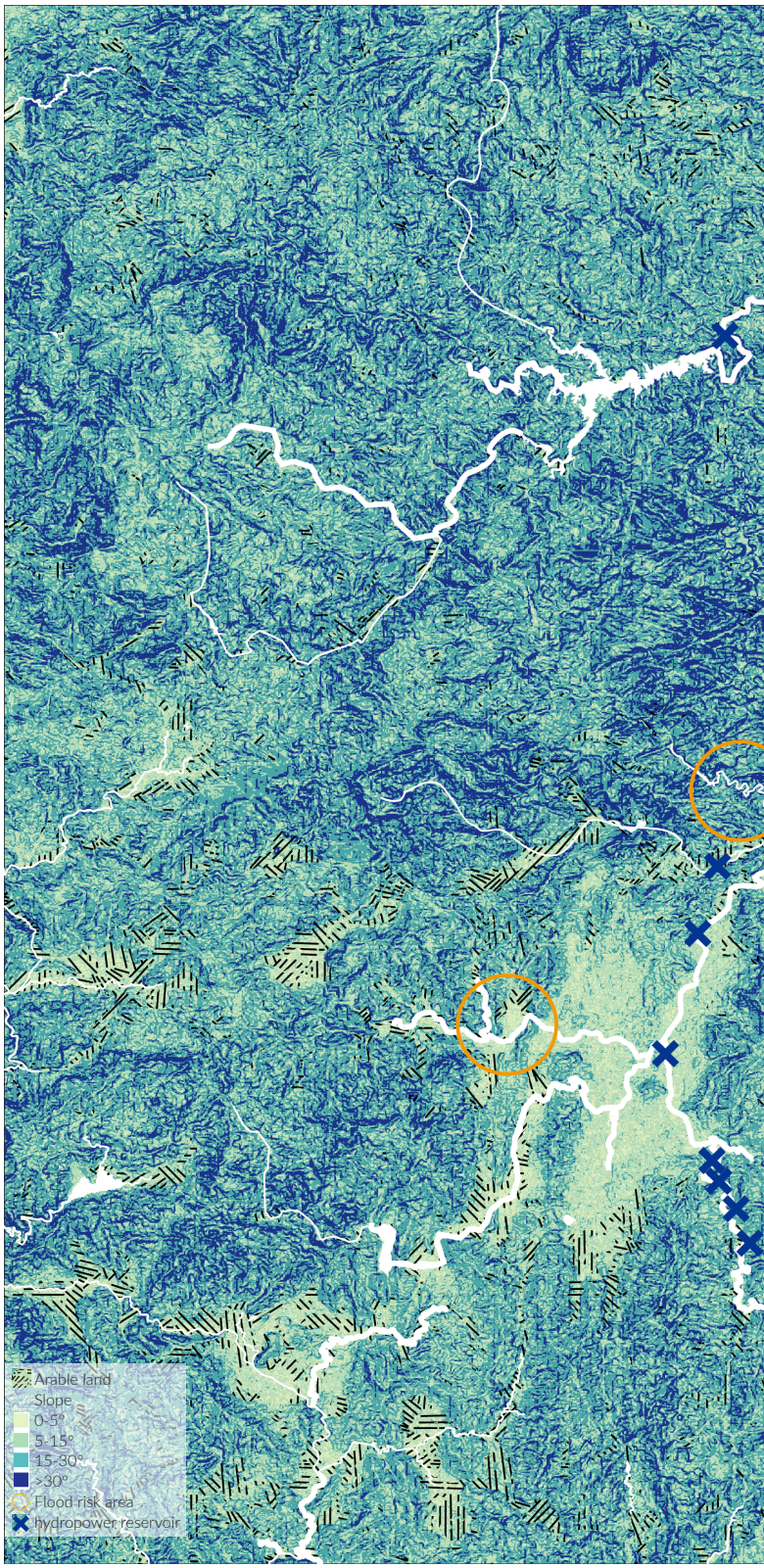
A large number of hydropower resevoirs are in the river system, which disturbs the ecological flow and causes segmentation of river system.

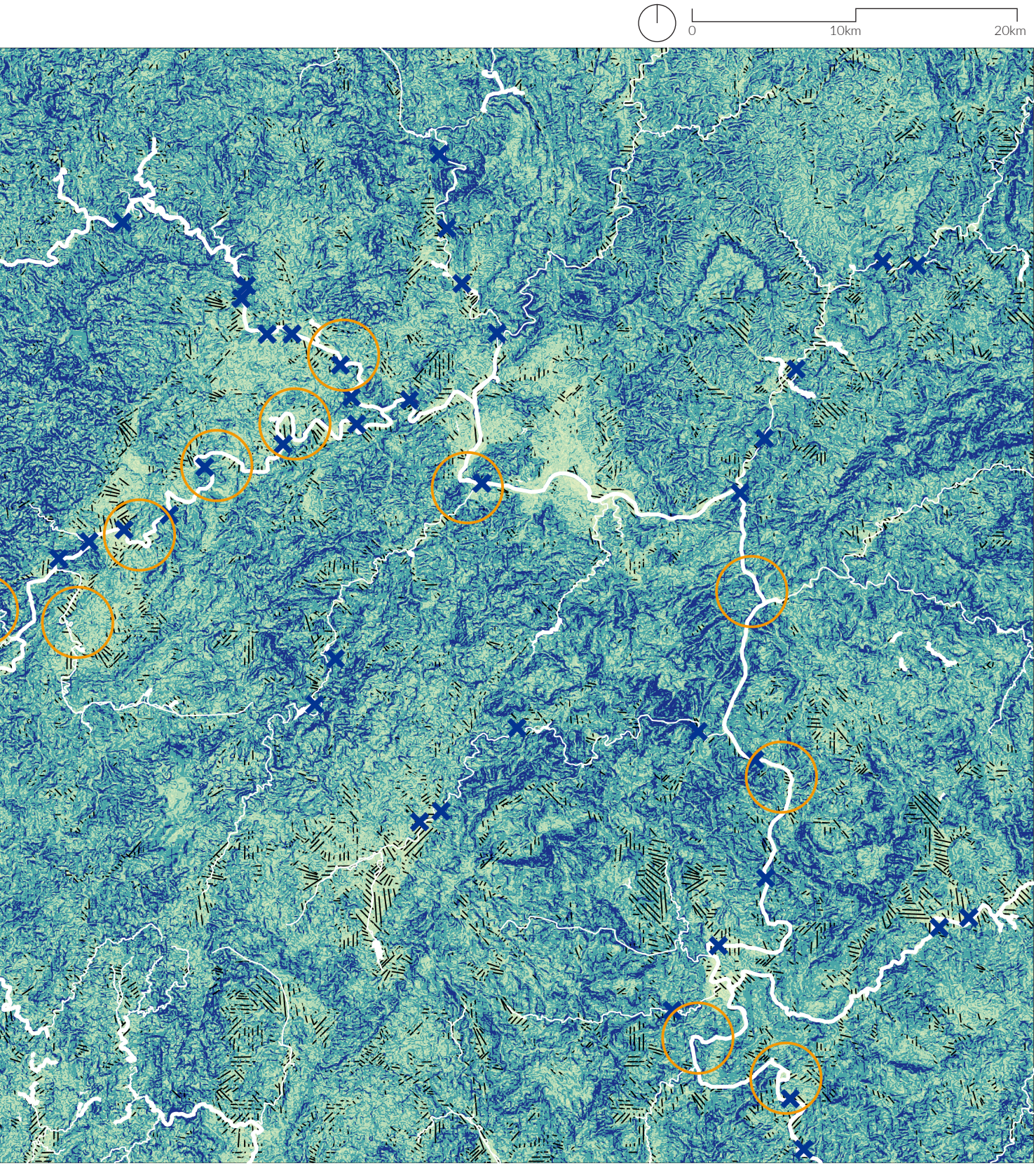
Soil erosion

Gentle Slopes (0-5 degrees): Low Risk: Soil erosion risk is relatively low on gentle slopes. With good vegetation cover, soil erosion can be negligible.
Moderate Slopes (5-15 degrees):Moderate Risk: Soil erosion risk increases on moderate slopes. Appropriate agricultural practices and vegetation cover can reduce erosion.
Steep Slopes (15-30 degrees):High Risk: Soil erosion risk is high on steep slopes. Soil conservation measures like terracing and vegetation cover are necessary(Kogo et al., 2020).

Flood risk

(sohu.com, 2019)





(data from resdc.cn, 2022)

3.1 FROM WATERSHED TO UPSTREAM

3.1.3 Upstream analysis

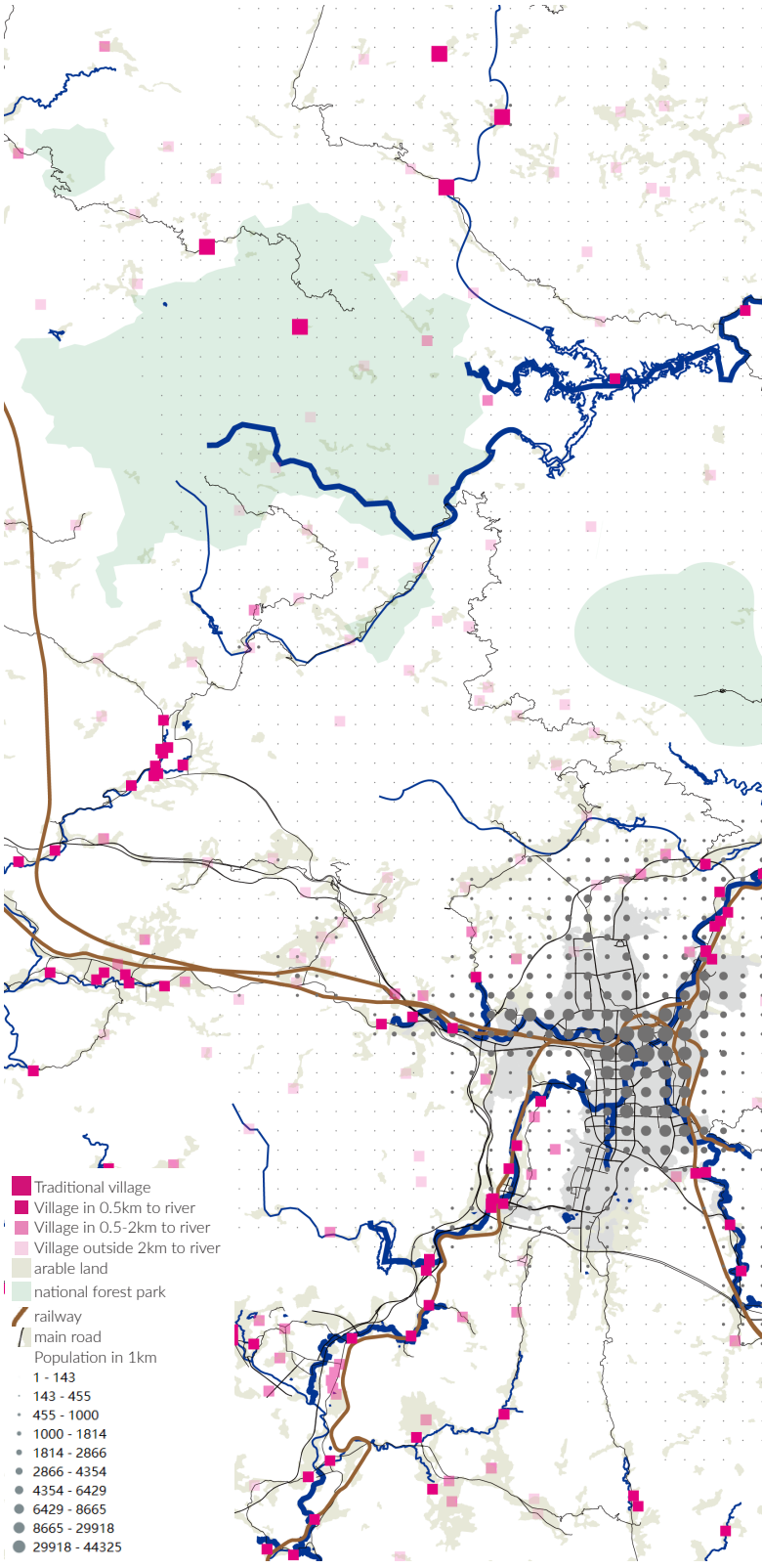
Societal challenge

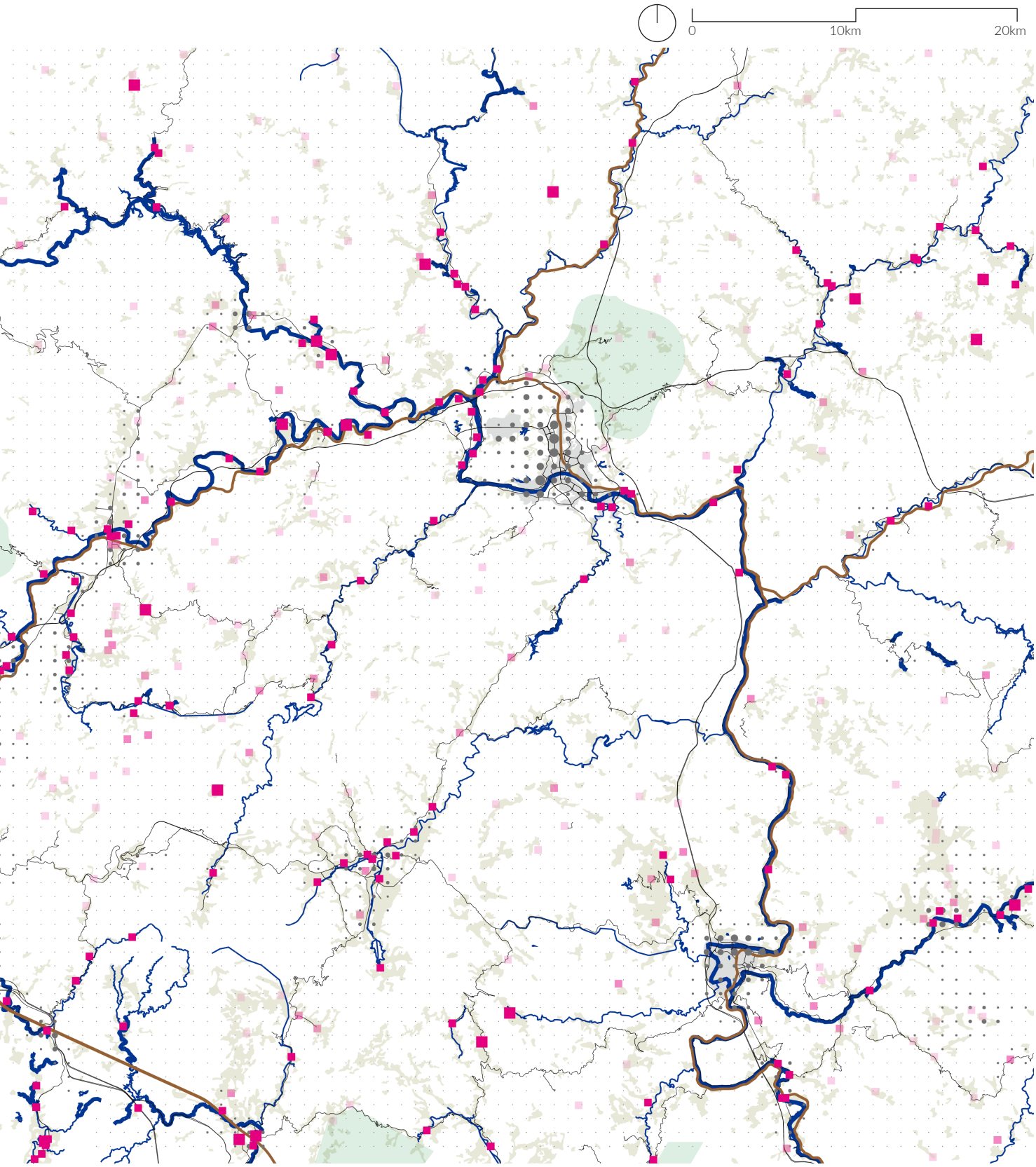
Underutilized economic opportunities

The potential for eco-tourism, local crafts, and other river-related activities remains largely untapped. Addressing this challenge involves developing a broader spectrum of sustainable economic opportunities that utilize the unique geographical and cultural landscape of the region, thereby revitalizing the local economy and providing new livelihoods for the residents.

Low awareness of the ecological and economic importance of the river

Local residents often view the river primarily through utilitarian or traditional agricultural lenses, largely overlooking its broader ecological functions and potential for economic development beyond agriculture. This limited perception hinders effective stewardship and underestimates the river's role in biodiversity, recreational opportunities, and eco-tourism, which could spearhead economic revitalization. Increasing this awareness is crucial for fostering a sense of responsibility and initiating community-driven conservation and sustainable economic practices.





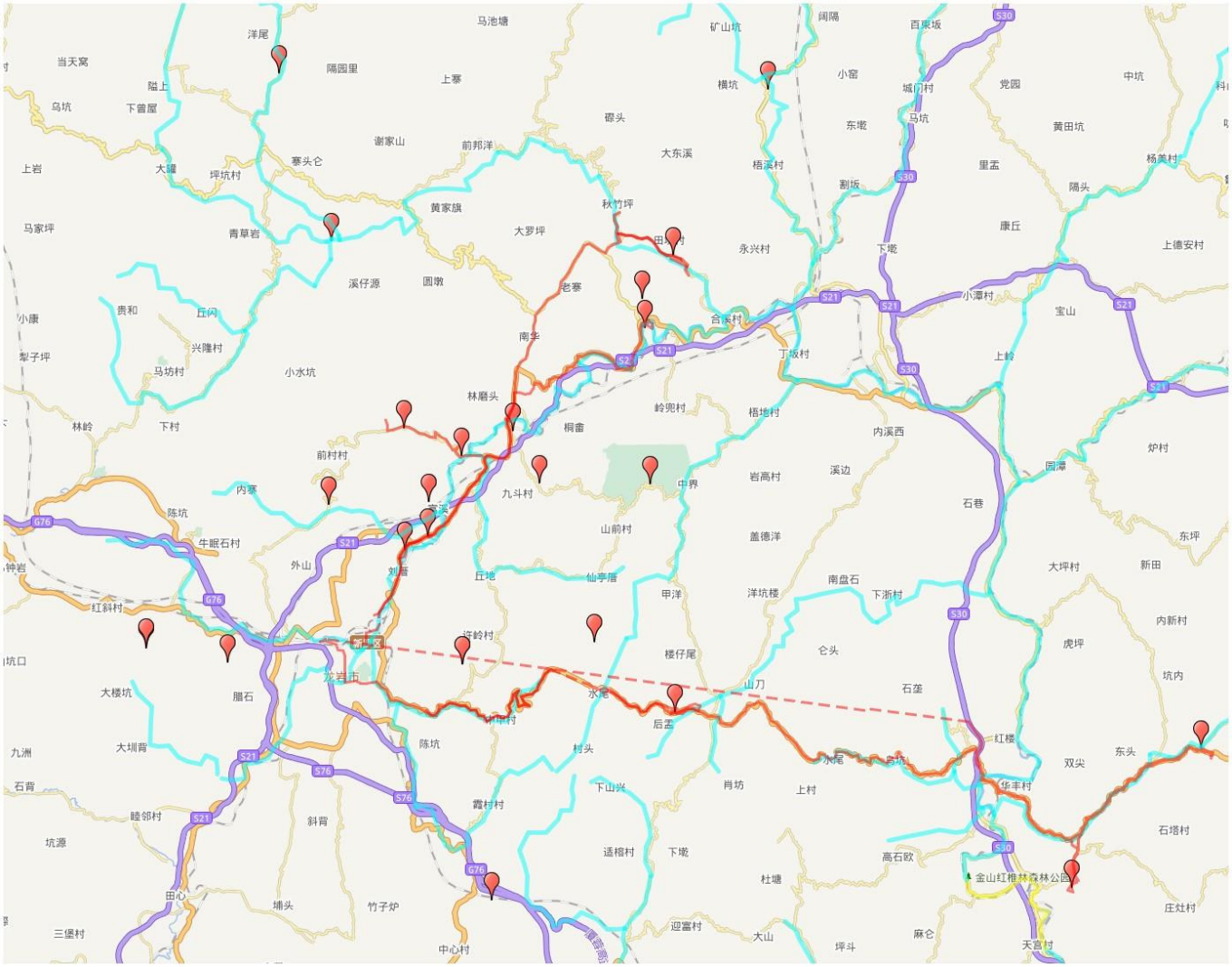
(data from resdc.cn, 2022)

3.2 FROM UPSTREAM TO RURAL VILLAGE

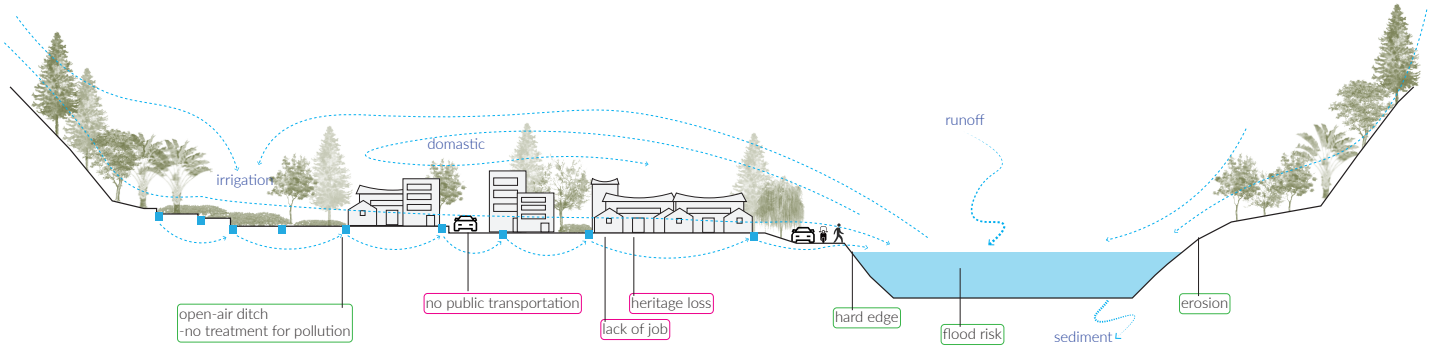
3.2.1 Villages within the excursion

In order to have a more vivid understanding of the rural areas in the upstream region, a two-week field study was carried out, mainly to 11 villages or townships as shown on the map, Gekou Village, Pinglin Village, Yanshi Town, Yongfu Township, Beihe Village, Dadi Tulou Cluster, Guanshe Village, Meishan Village, Baisha Town, Yingbian Village, Guanyang Village, which have certain similarities as well as their own characteristics, challenges and opportunities, the following sections as well as photographs are used to show the atmosphere and the basic situation of the rural areas in the upstream region.

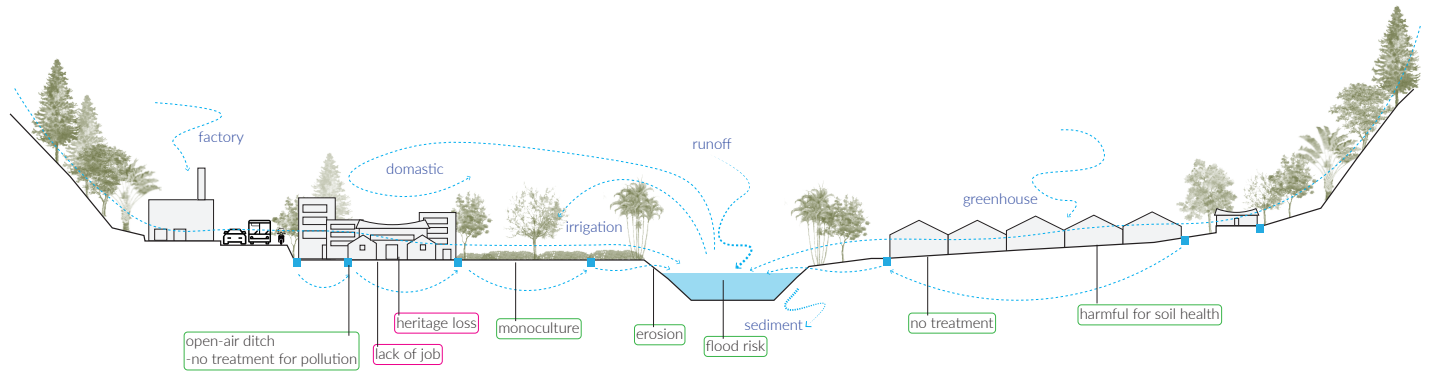
You can learn more about excursion and the area through this documentary I made:
Link:
https://vimeo.com/960716710?share=copy
QR code:

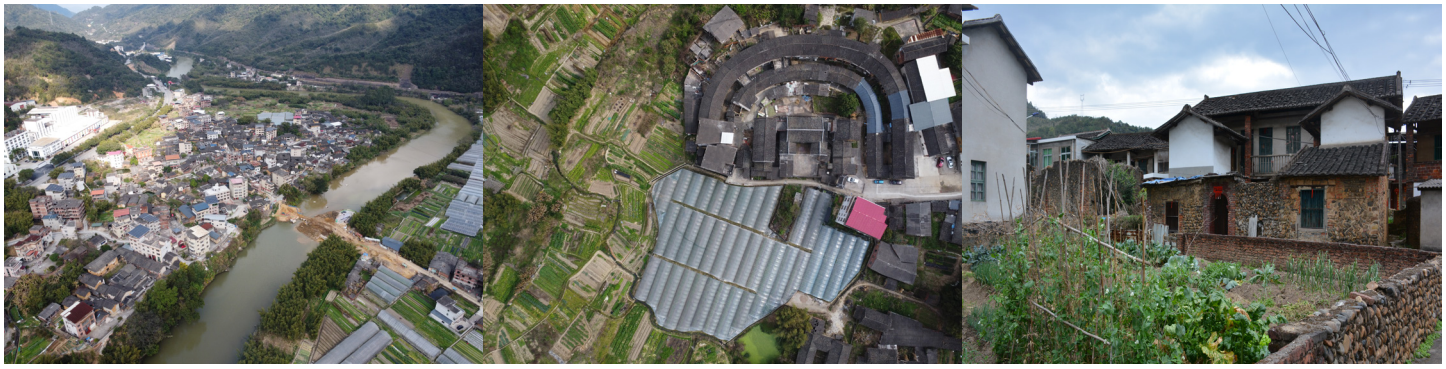


Meishan Village



Pinglin Village & Gekou Village

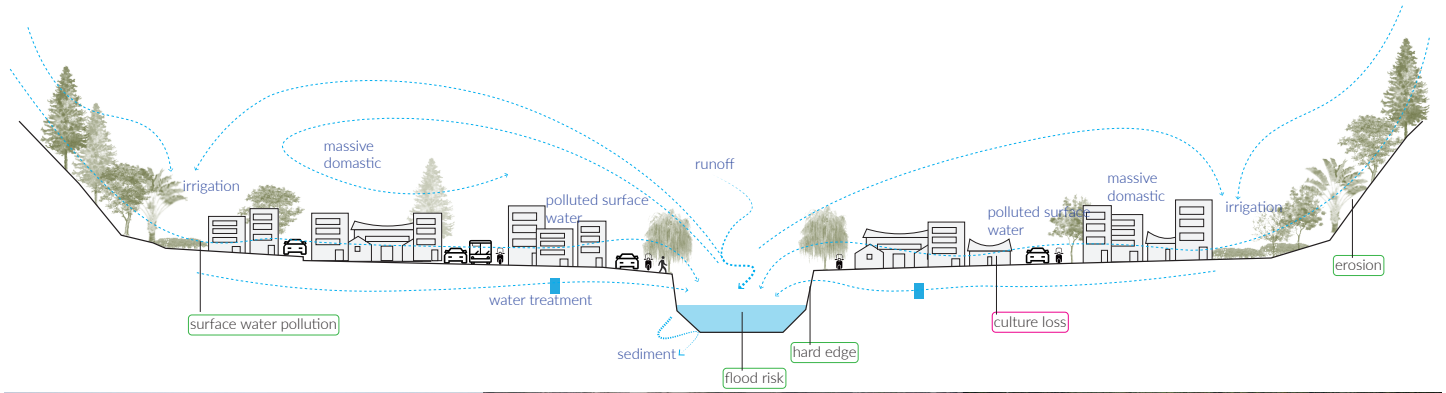




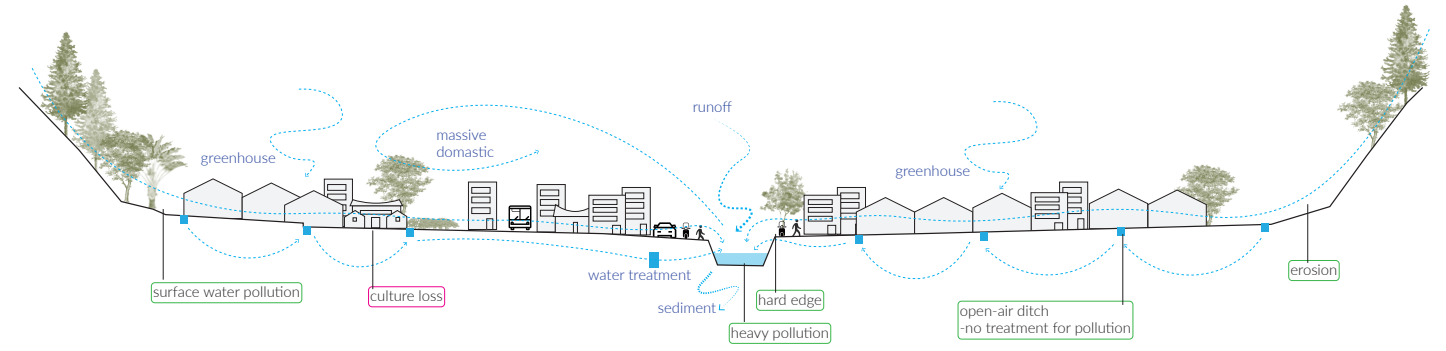
3.2 FROM UPSTREAM TO RURAL VILLAGE

3.2.1 Villages within the excursion

Yanshi Township



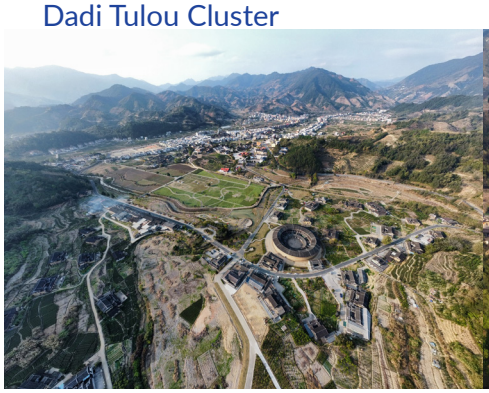
Yongfu township



Beihe Village



Dadi Tulou Cluster



Guanshe Village



Baisha Township



3.2 FROM UPSTREAM TO RURAL VILLAGE

3.2.1 Villages within the excursion

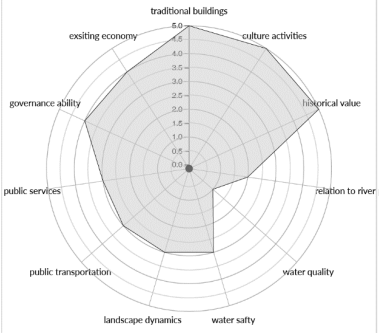
The provided table evaluates the villages in the excursion across multiple dimensions, including cultural values, ecological values, and social aspects. Each village is scored from 0 to 5 in categories such as traditional buildings, cultural activities, historical value, relationship to the river, water quality, water safety, landscape dynamics, public transportation, public services, governance ability, and existing economy.

The scores reveal diverse strengths and weaknesses across the villages. For instance, Guanyang Village and Meishan Village display strong cultural values and historical significance but have relatively low scores in water safety and public transportation. In contrast, Yongfu and Longkong show markedly lower cultural scores but vary in ecological and social metrics.

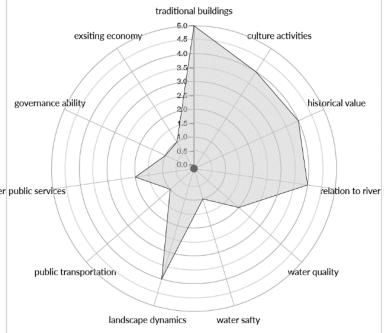
This comprehensive assessment helps identify specific areas needing improvement or potential for development, guiding targeted interventions for ecological restoration, socio-economic development, and cultural preservation within the river basin's broader revitalization strategy.

	culture values			ecology value				social aspects			
	traditional buildings	culture activities	historical value	relation to river	water quality	water safty	landscape dynamics	public transportation	public services	governance ability	exsiting economy
Guanyang village	5	4	5	4	2	2	3	0	1	0	2
Yingbian village	5	3	5	4	2	2	4	0	0	0	0
Meishan village	5	4	4	4	2	1	4	1	2	1	1
Tiangongshan	3	5	5	0	0	0	5	1	2	3	4
Yongfu	2	2	1	3	0	2	5	3	3	3	5
Yunshan village	3	2	2	4	1	1	4	1	0	1	1
Longkong	0	0	0	0	0	0	5	1	1	3	3
Lantian village	4	4	3	4	2	2	4	0	2	1	2
Gekou village	2	2	2	4	2	1	4	3	1	3	4
Pinglin village	3	2	2	4	2	1	3	3	0	2	2
Dadi toulou	5	5	5	2	1	3	3	3	3	4	4
Guanshe	3	4	4	0	0	0	4	4	3	3	4

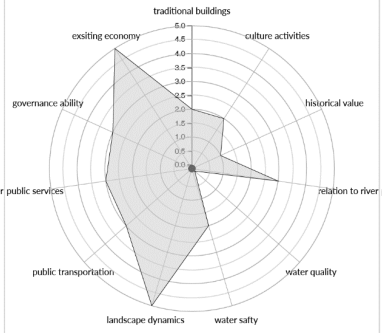
Dadi toulou



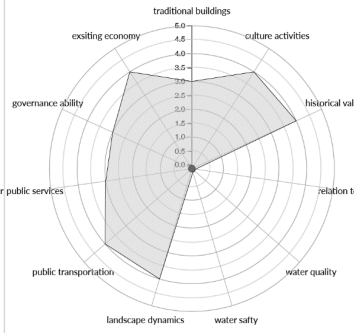
Meishan village



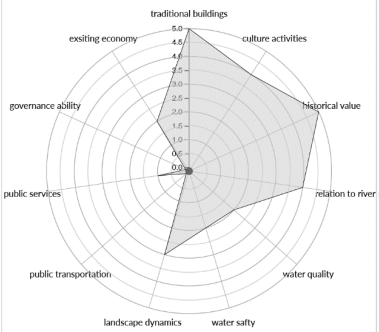
Yongfu



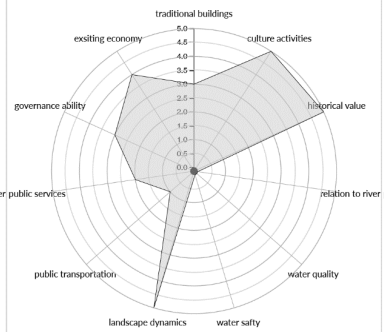
Guanshe



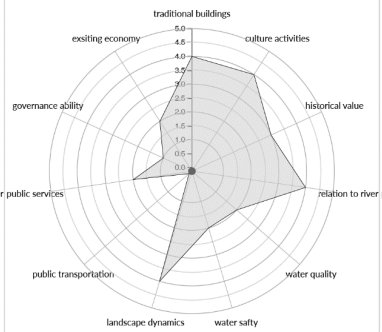
Guanyang village



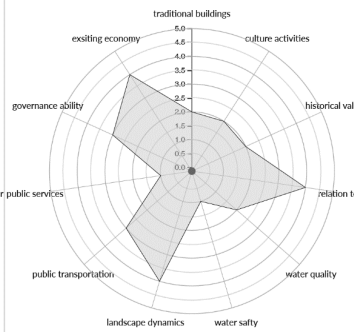
Tiangongshan

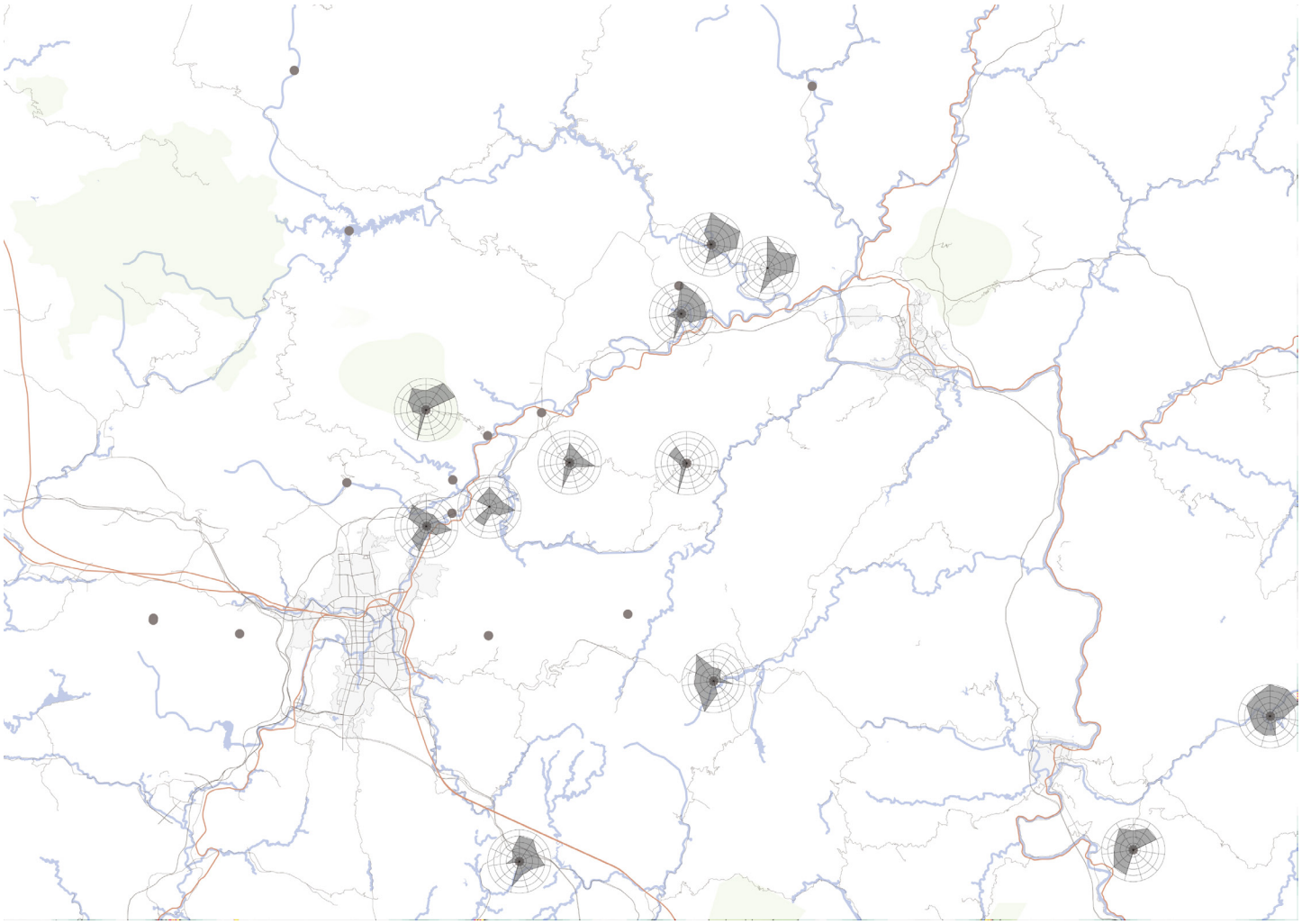


Lantian village

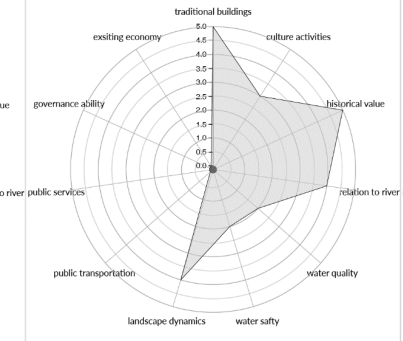


Gekou village

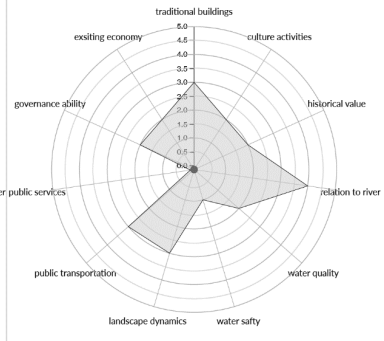




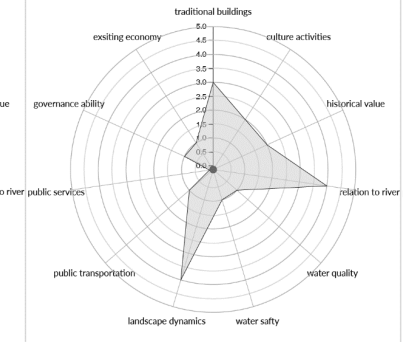
Yingbian village



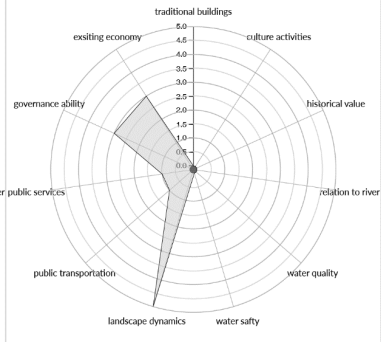
Pinglin village



Yunshan village

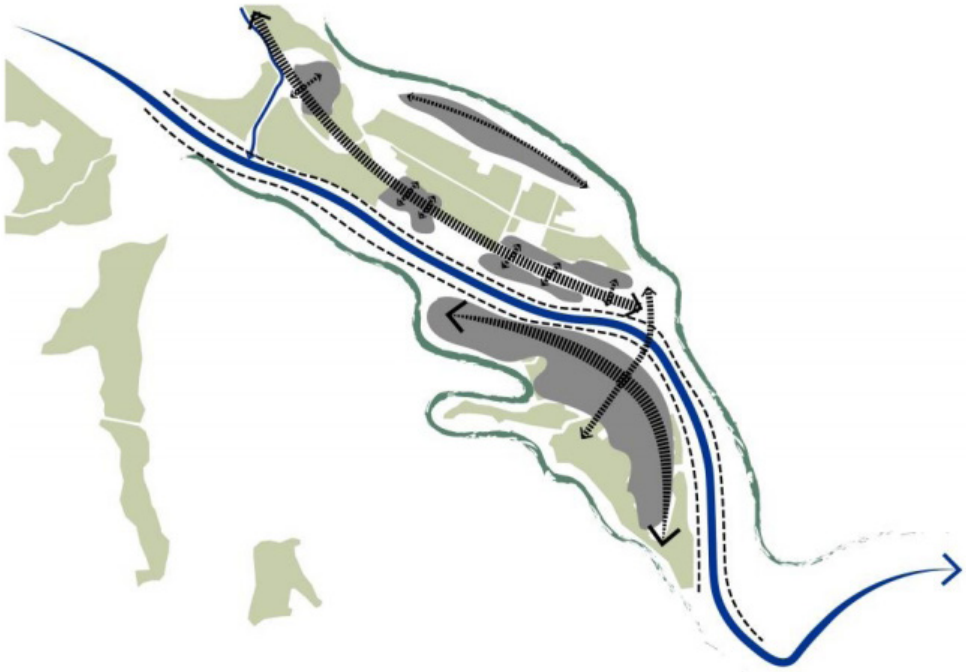


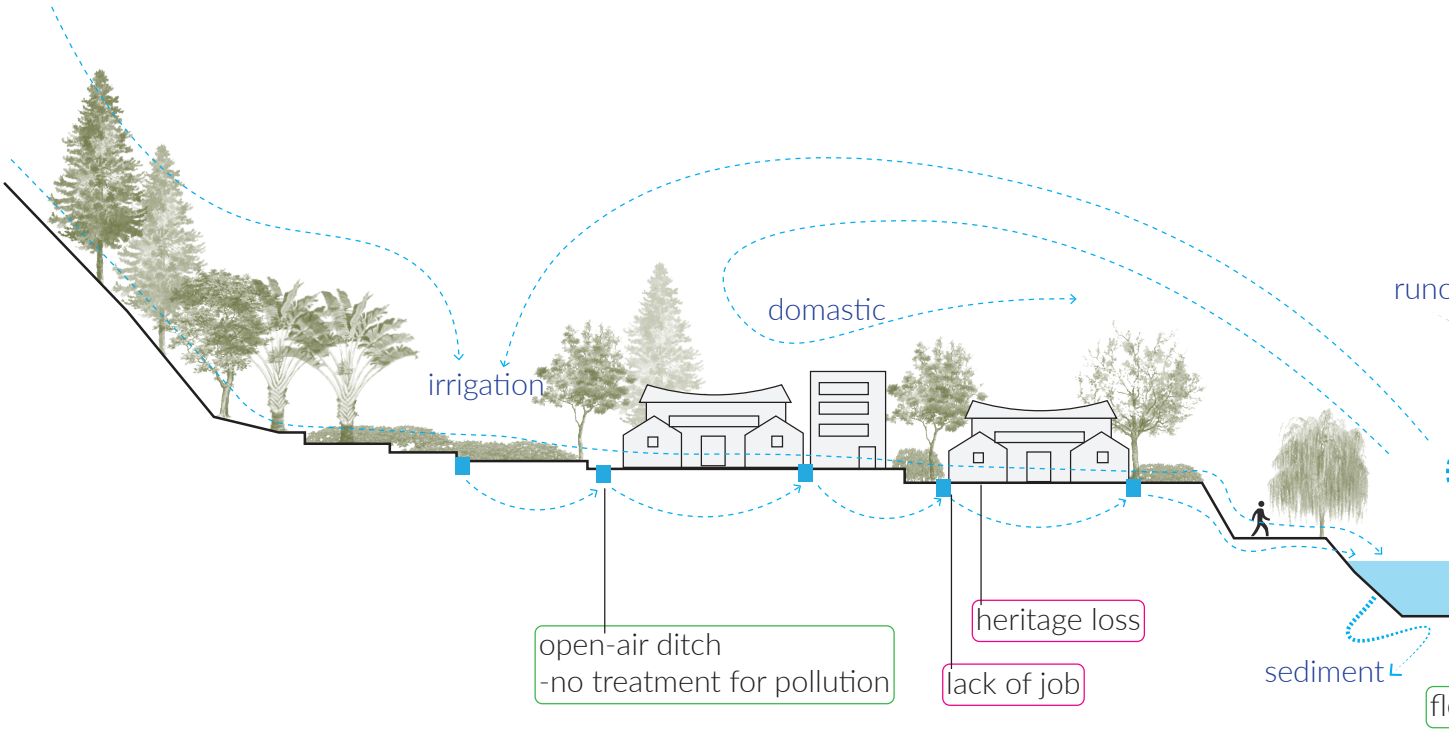
Longkong

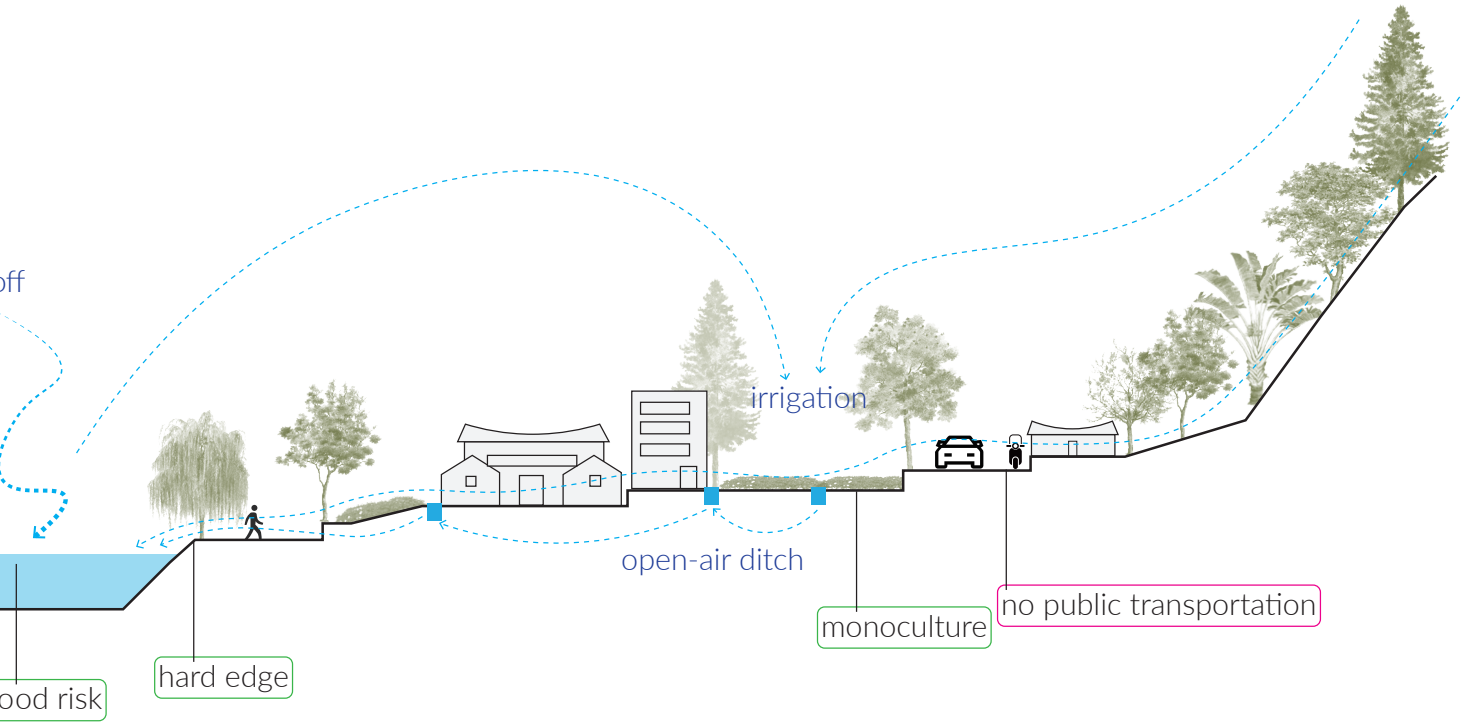


3.2.2 Jiebu Village

Jiebu Village contains two significant hamlets: Yingbian Village and Guanyang Village. From the structure map, it is evident that Yingbian Village and Guanyang Village are located between mountains, with the Huo Creek, a tributary of the Jiulong River, flowing through them. Yingbian Village is primarily clustered around a central point and spreads out along major roads and the river, whereas Guanyang Village is mainly linear, stretching along the river. Notably, due to its close connection to the river and its expansive natural setting, Jiebu Village was a major waterway in the Jiulong River basin during the Republican era, enjoying a period of prosperity. However, as more dams were built, disrupting the waterways, this distinctive industry gradually vanished. Guanyang Village and Yingbian Village have managed to develop some tourism infrastructure as national traditional villages and with good landscapes. Regrettably, this has not been enough to maintain their prosperity. Most of the younger generation have moved to Longyan city center or other cities for work, leaving the villages lacking vitality.

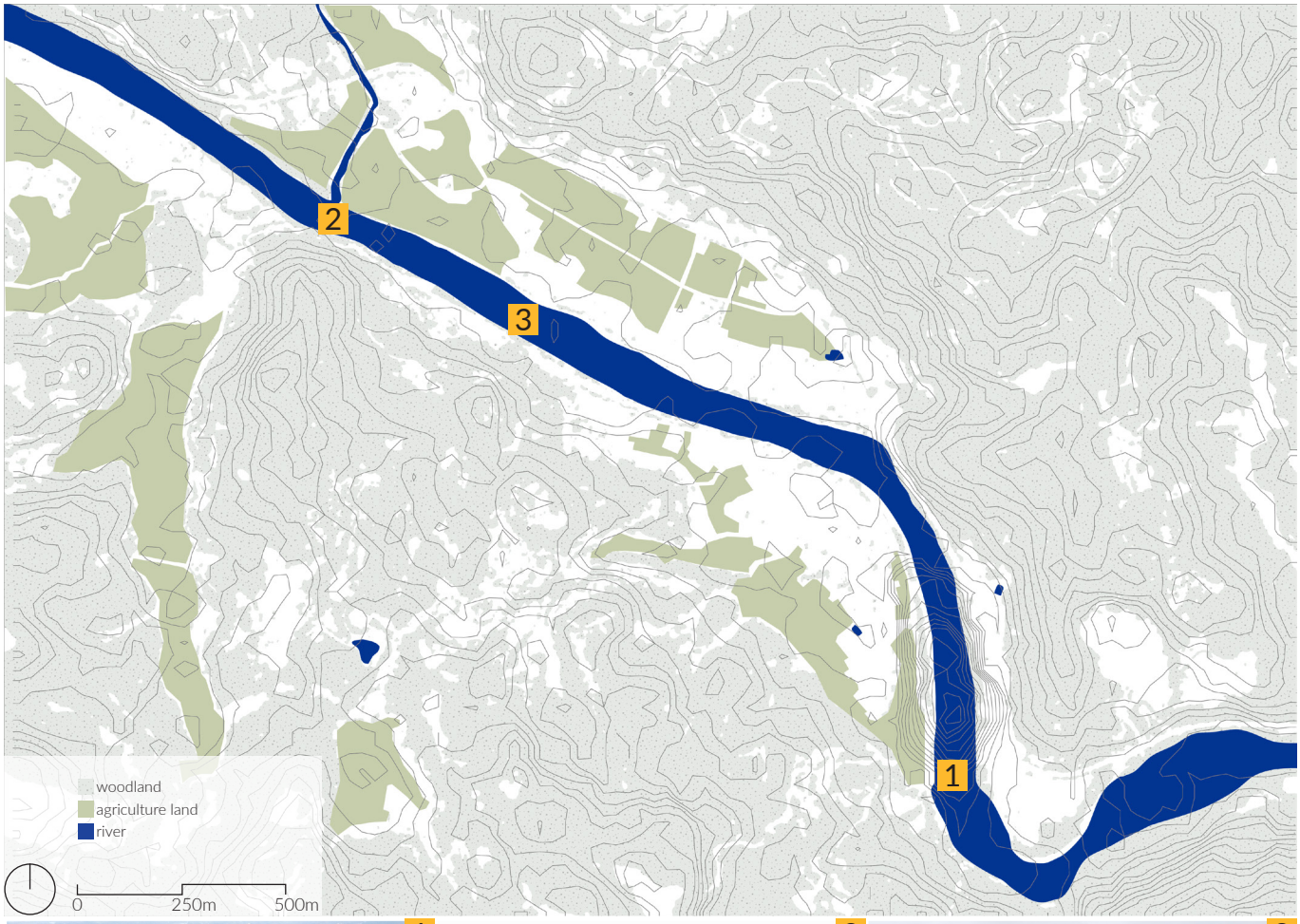




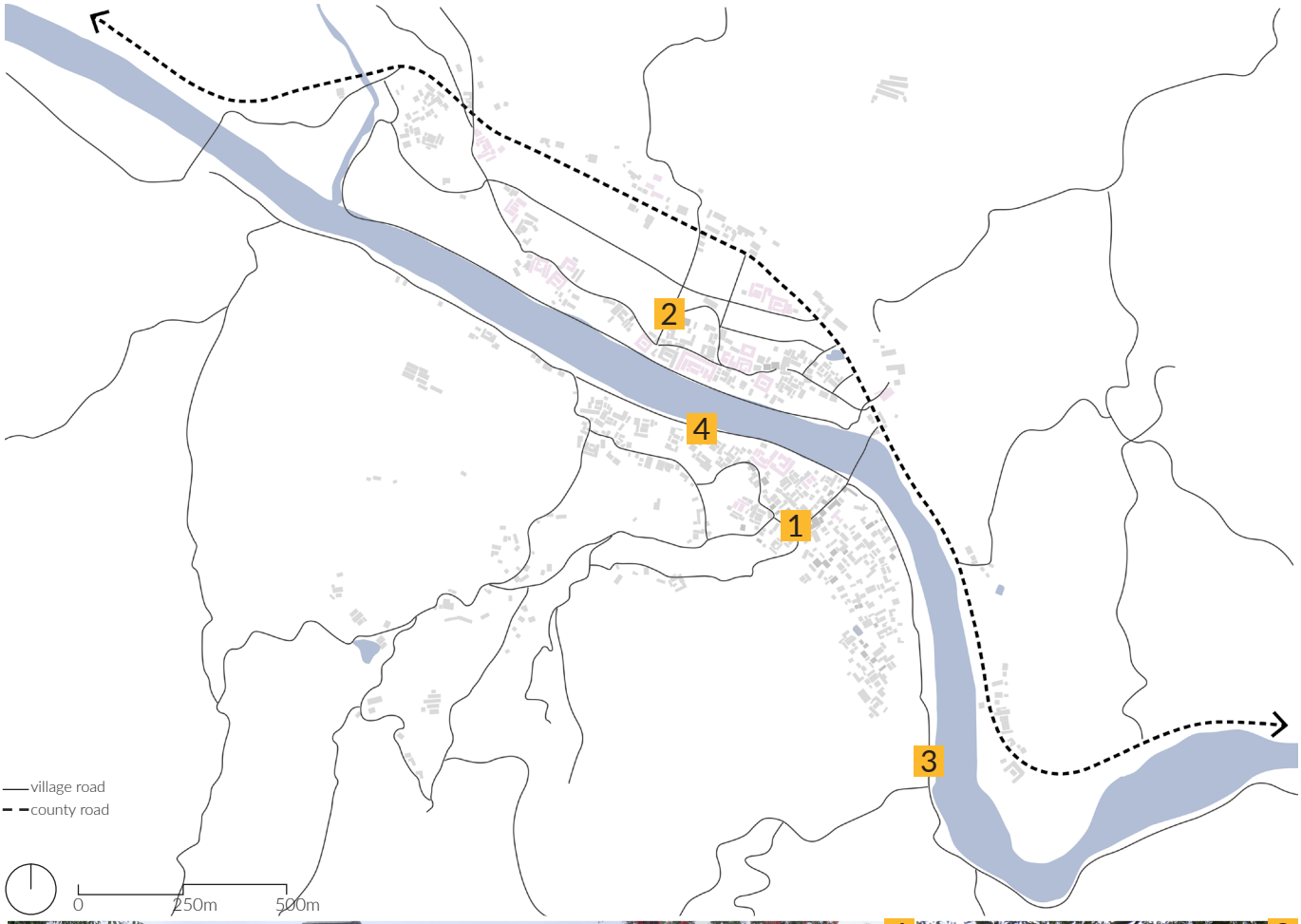

off
irrigation
open-air ditch
monoculture
no public transportation
hard edge
ood risk

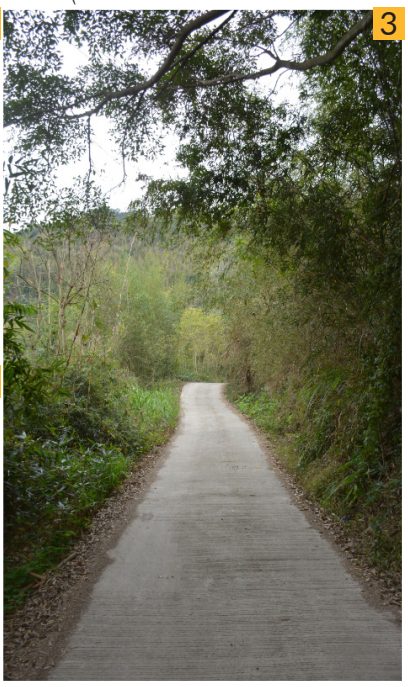
3.2.2 Jiebu Village

The river has sculpted a small plain nestled between the mountains, where two natural villages are situated. This geomorphological feature offers a unique setting for the villages, providing a relatively flat and fertile area for settlement and agriculture in contrast to the surrounding rugged terrain. The presence of the river has likely been pivotal in shaping the land and sustaining these communities, who benefited from the accessibility and resources it provides.



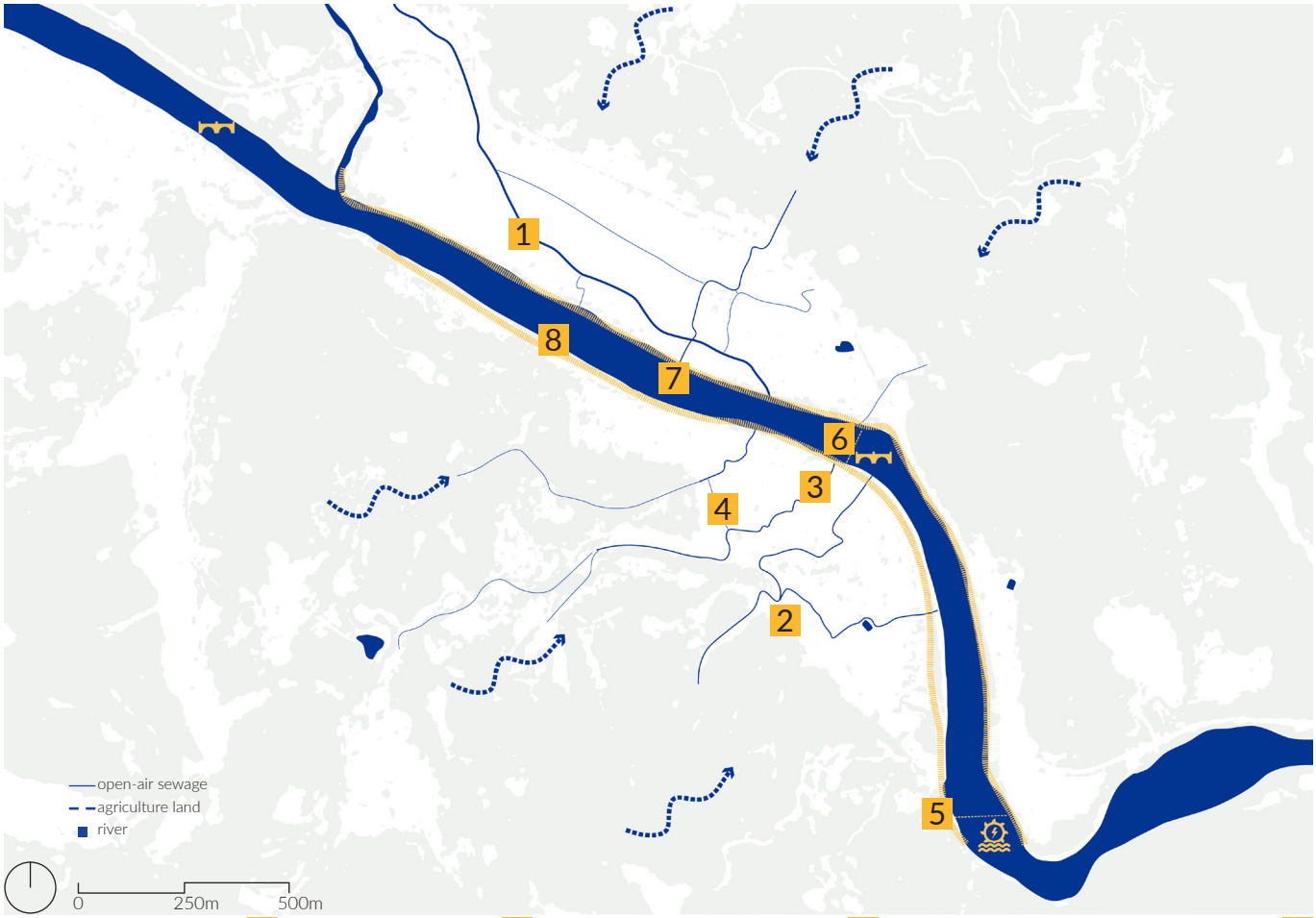
For transportation infrastructure, Guanyang village is situated near a county road to the north, although there is no public transportation directly servicing the village. Within the village, there are several small concrete roads that facilitate access through residential areas and extend into the surrounding hills. Additionally, pedestrian paths run alongside the river, providing scenic routes for walking and possibly other non-motorized forms of travel.



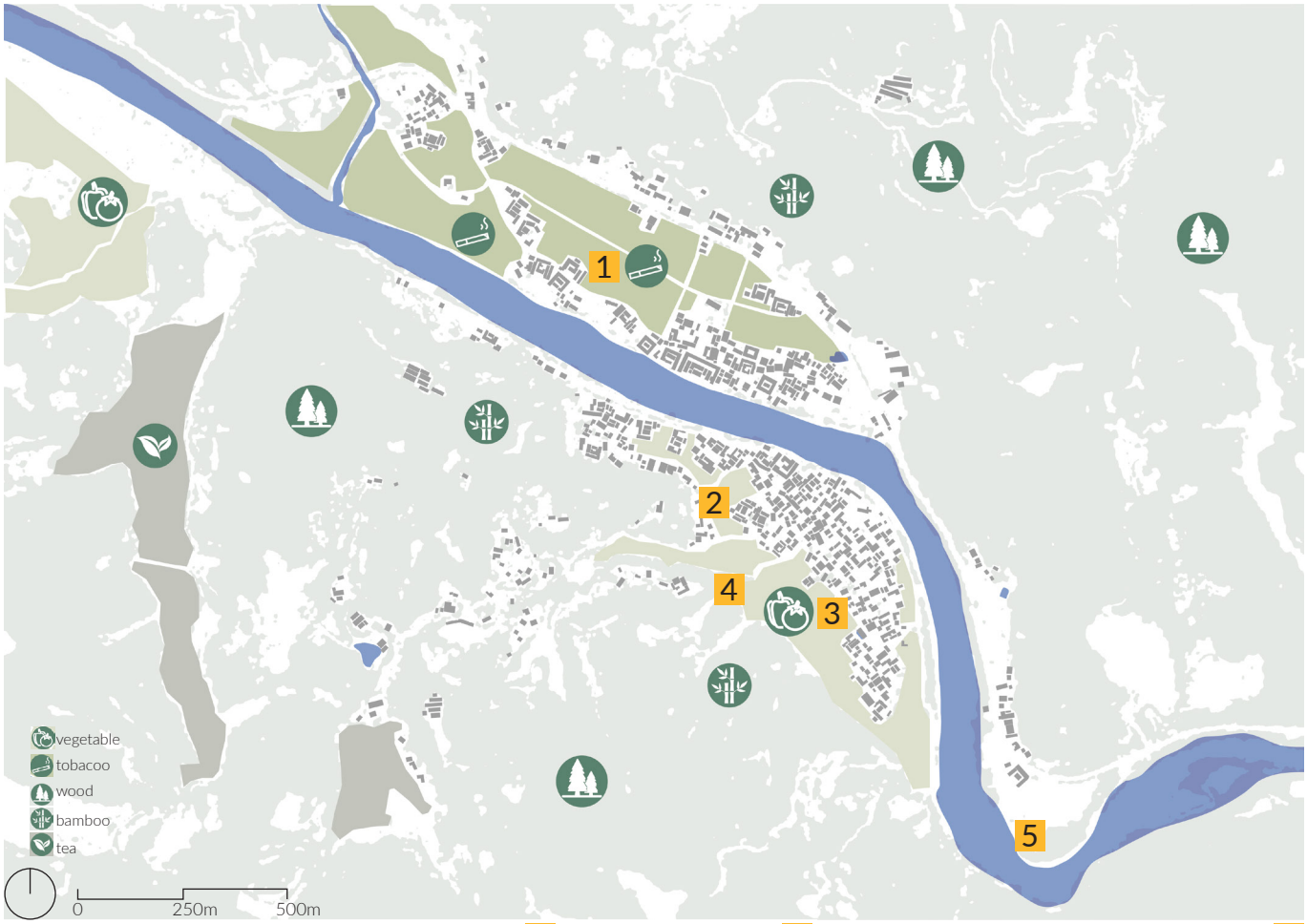


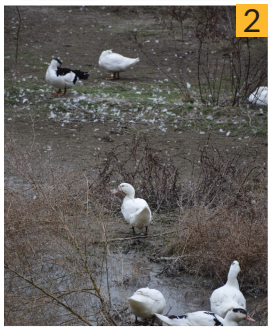
3.2.2 Jiebu Village

In the water system layer, the primary water resources for the village originate from the mountains, flowing downstream through this branch of the stream and the Huo River. Within the village, the drainage and sewage systems are exposed, visibly displaying pollution as waste and water are channeled directly into the river without treatment. This practice not only degrades the water quality but also poses significant environmental and health risks. At the downstream end of this water system, there is a hydropower station, which was developed as a private investment by three villagers. This station primarily serves profit motives rather than sustainable energy practices or communal benefits, adding to the complexity of local water resource management.



The agricultural practices in the area predominantly revolve around three main types: tobacco, tea leaves, and vegetables, each tailored to the climatic and soil conditions of the region. Additionally, the local forestry primarily comprises bamboo and pine trees. This combination of agriculture and forestry not only reflects the traditional land use patterns but also highlights the potential for diversification and sustainable management practices. Bamboo and pine, in particular, provide essential ecological services such as soil stabilization and carbon sequestration, while also offering economic opportunities in timber and non-timber products.

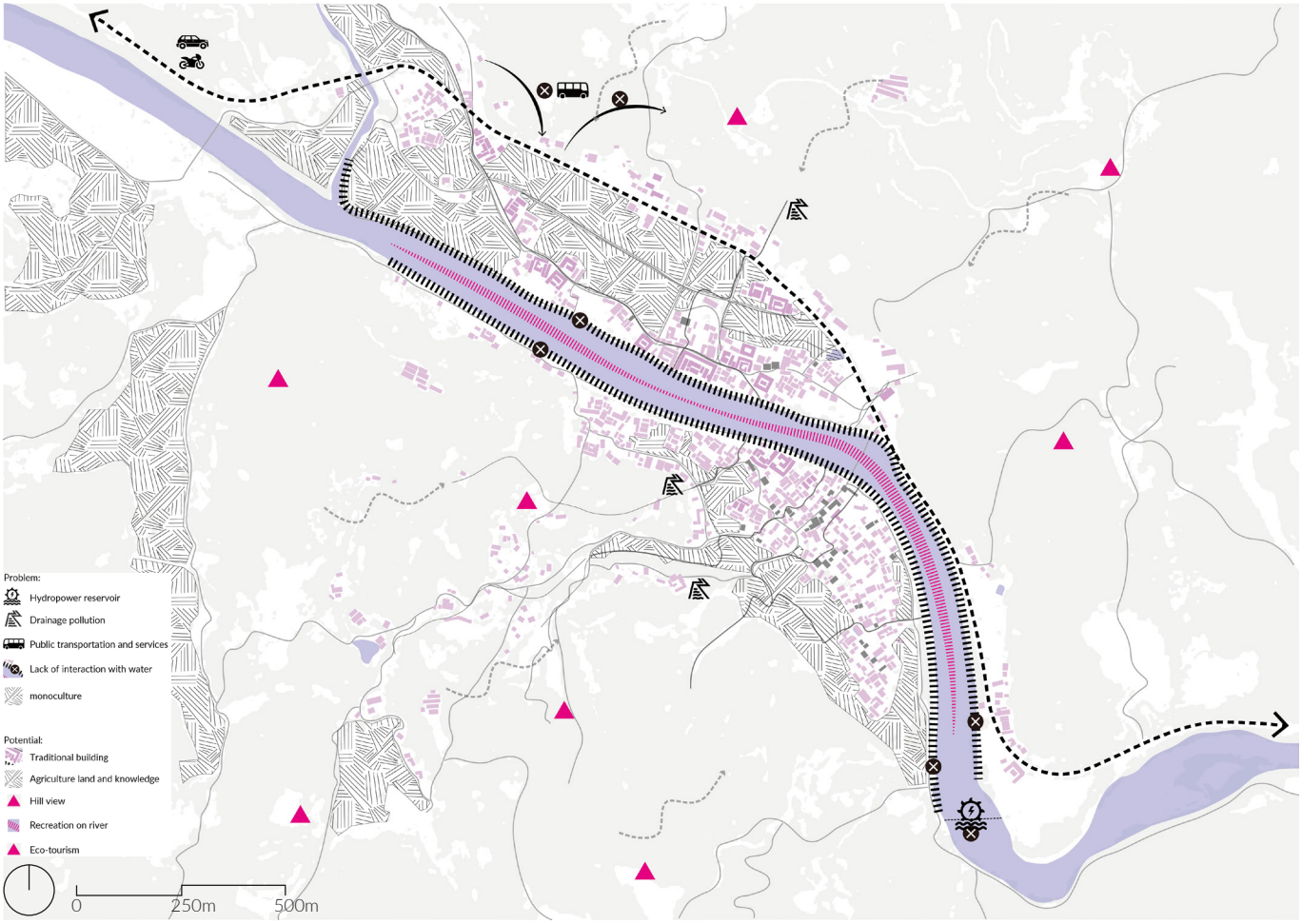




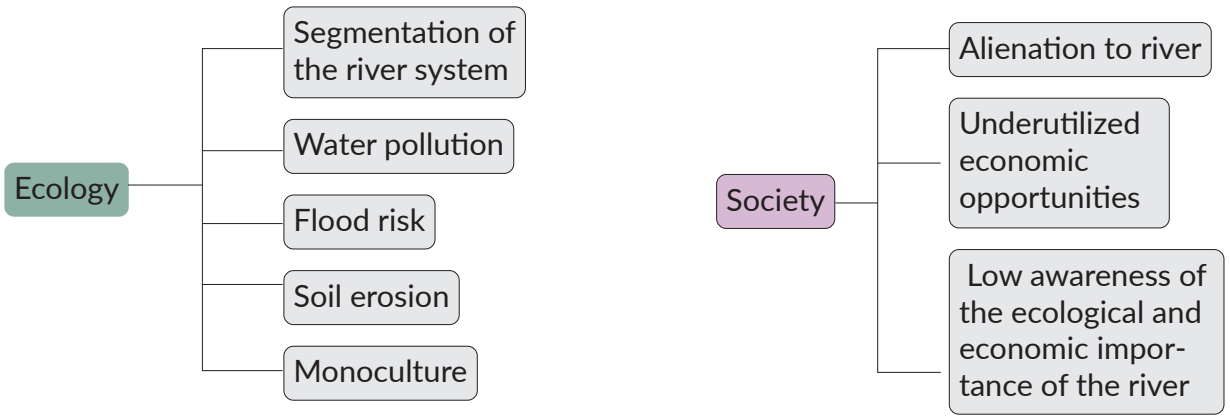
3.2.2 Jiebu Village

In the village, most of the buildings retain their traditional architectural style, lining the main street and contributing to the area's cultural heritage and aesthetic. However, alongside these traditional structures, some buildings have been renovated or reconstructed using modern concrete materials.

Problem and potential map



SUMMERY: RIVER RELATED CHALLENGE

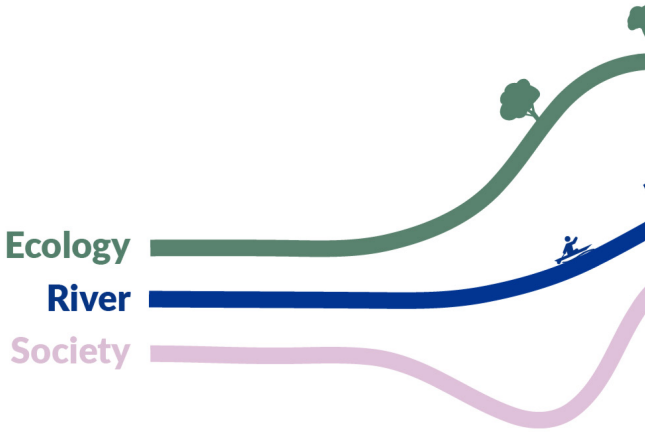


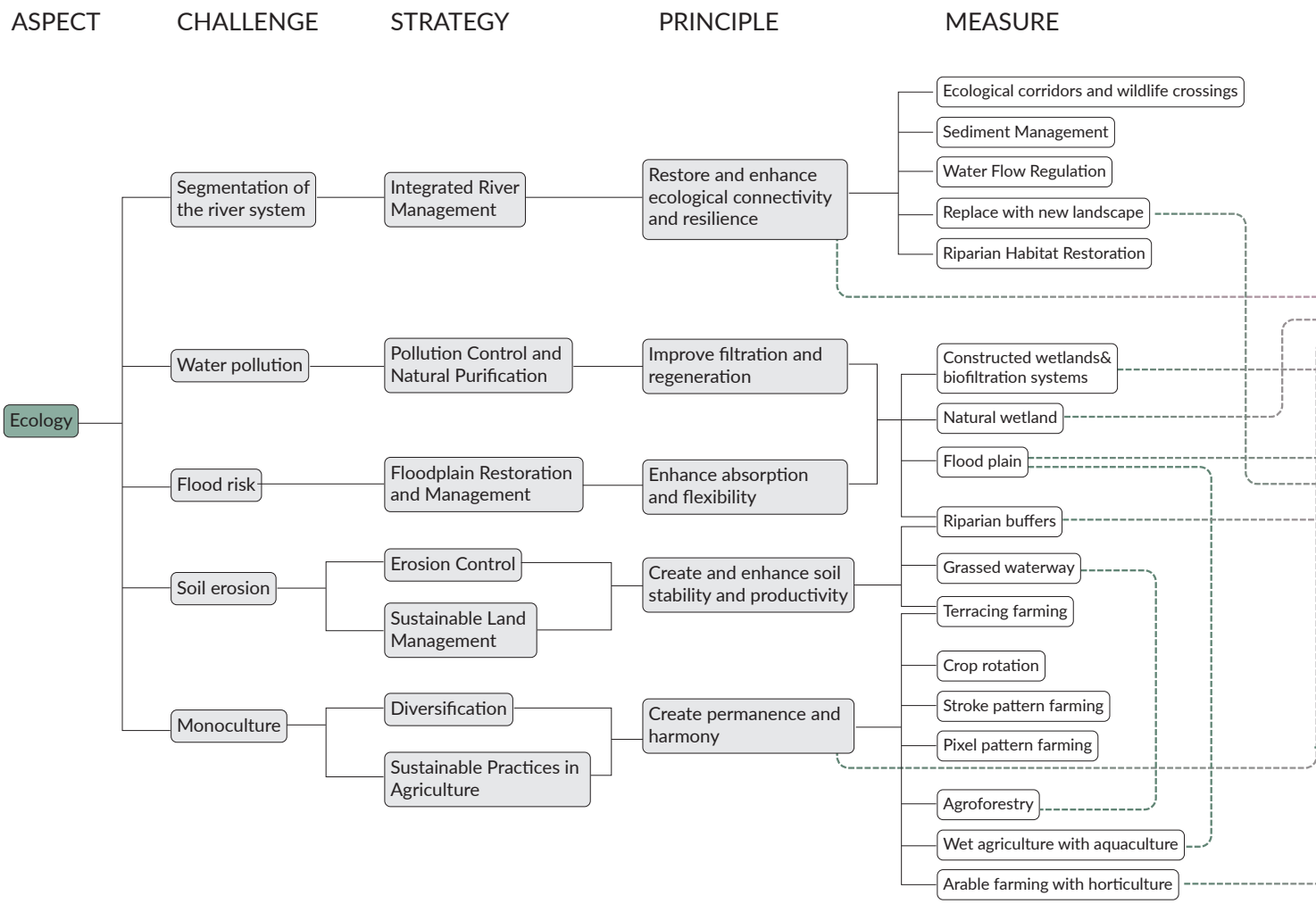
4 DESIGN EXPLORATION

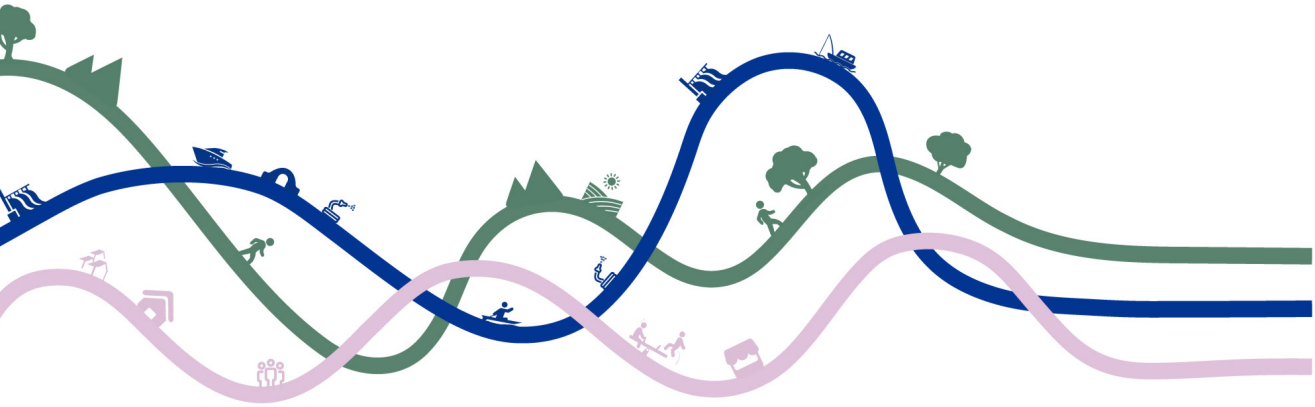
4.1 STRATEGY FRAMEWORK

4.1.1 Overall framework

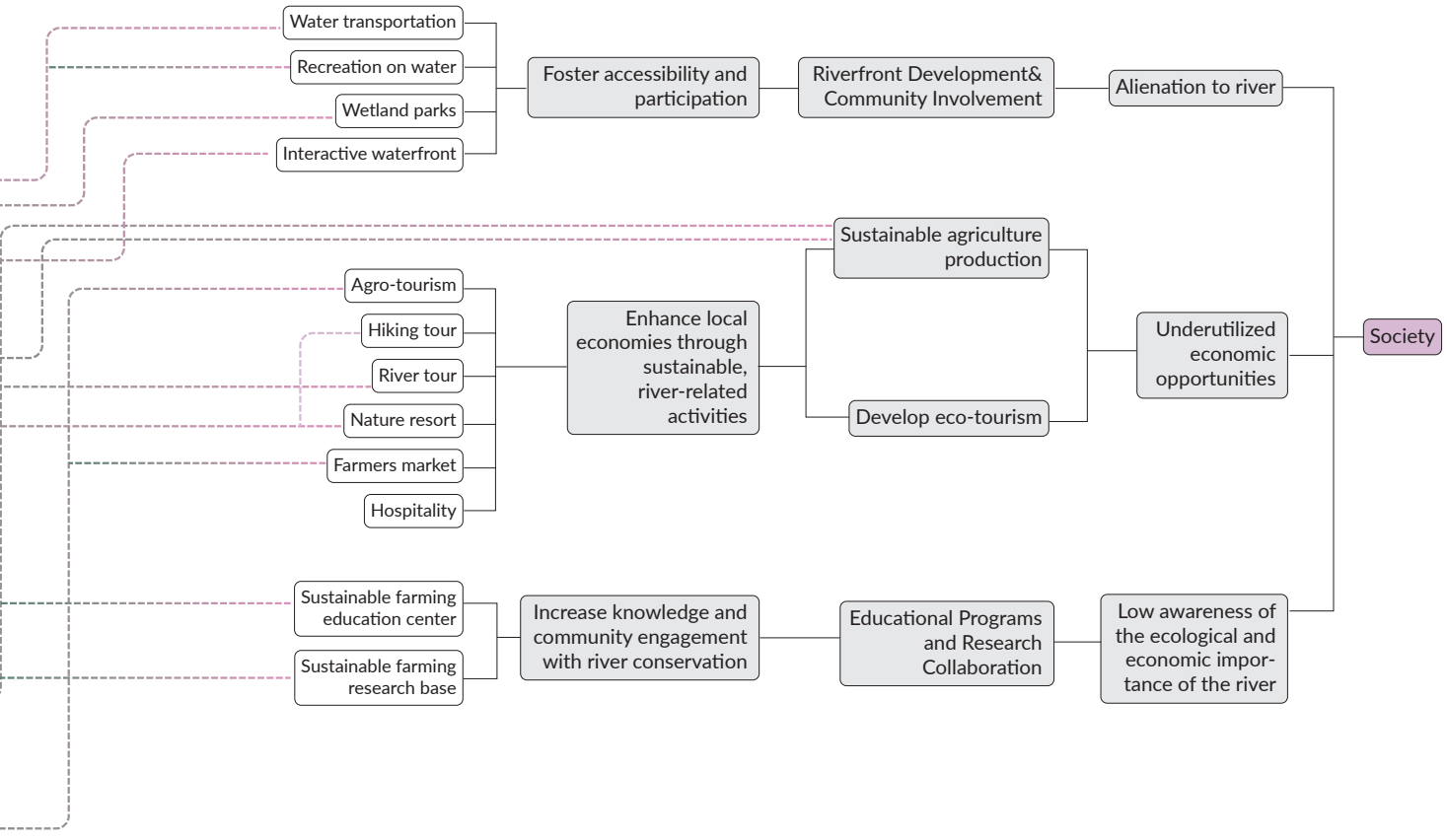
The strategic framework developed from the analysis of river-related issues proposes strategies, principles, and corresponding measures from both ecological and social perspectives, with the two meeting in the middle. Dashed lines represent the interactions between them through the measures or strategies implemented. As depicted in the diagram above, while ecology and society have their own lines, they both meet and intertwine with the river's line. This represents the strategic framework that integrates social and ecological aspects around the river as a central axis.







MEASURE PRINCIPLE STRATEGY CHALLENGE ASPECT

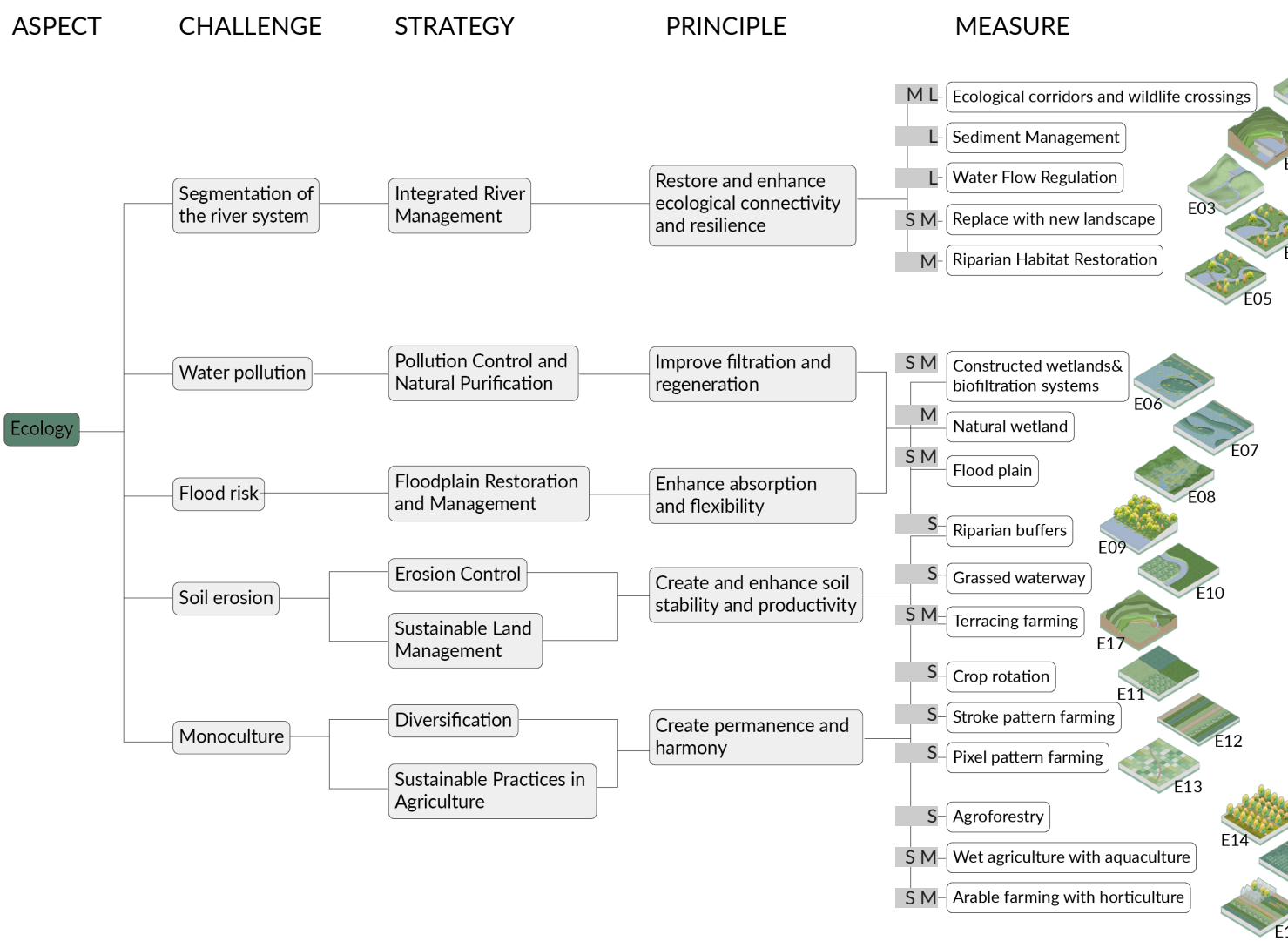


4.1 STRATEGY FRAMEWORK

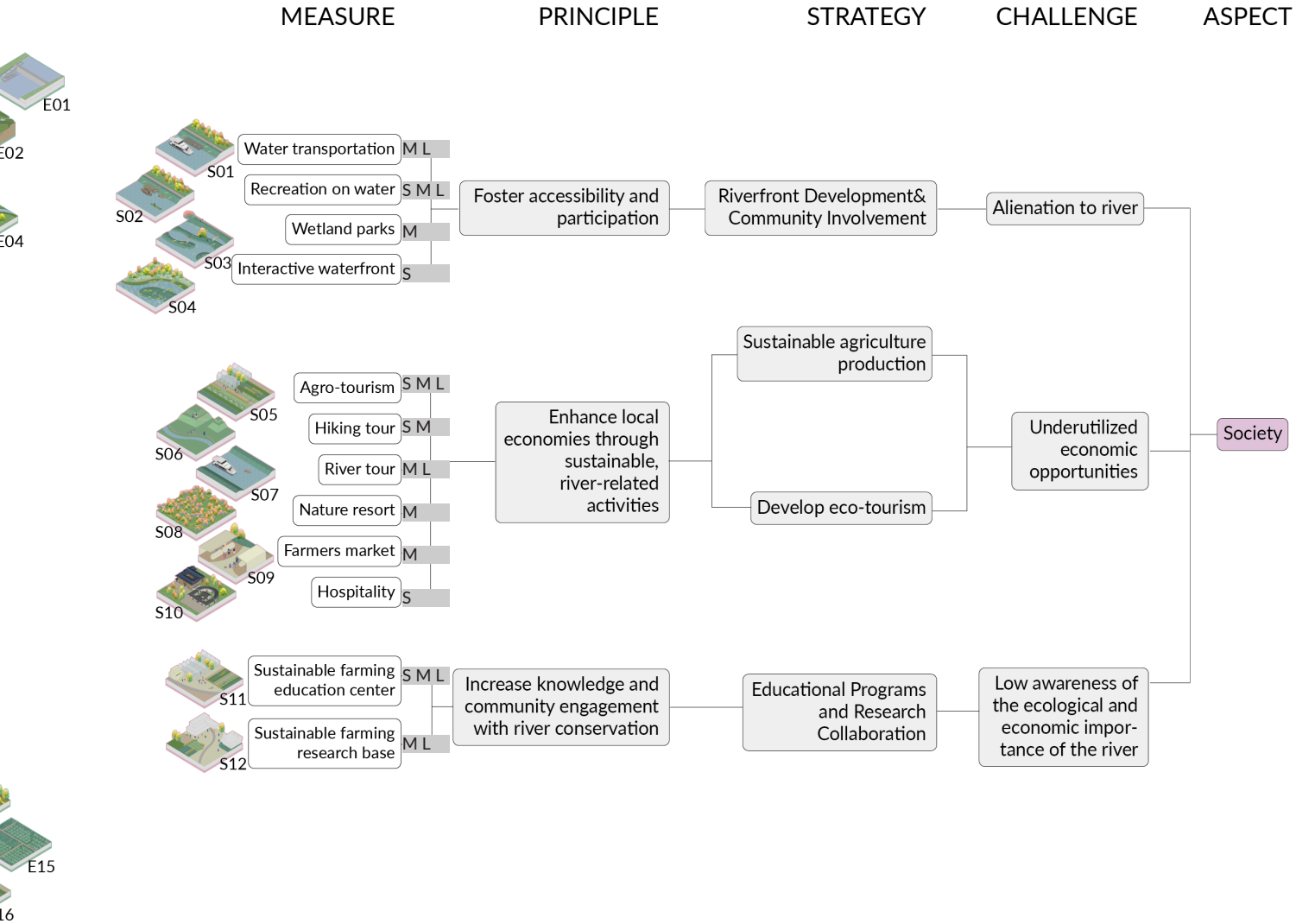
4.1.1 Overall framework

Each measure corresponds to a number as well as an axonometric pattern to be referred to later in the mapping and design. The scale of what each measure involves and requires co-operation is also indicated.

S-Village scale M-Cluster



scale L- Region scale

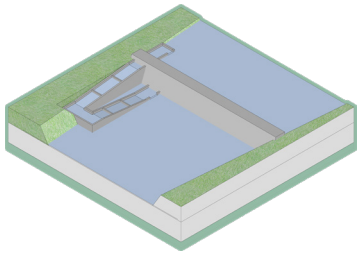


4.1 STRATEGY FRAMEWORK

4.1.2 Measures explanation

E01 Ecological corridors and wildlife crossings

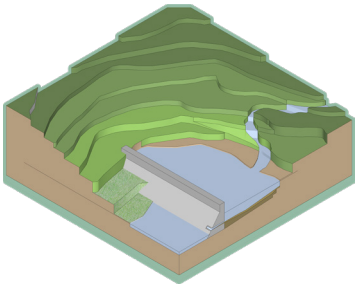
Ecological corridors and wildlife crossings, including fishways, are vital for preserving biodiversity and facilitating natural migration disrupted by human-made barriers. A relevant study by Towler et al. (2015) on the Murray River in Australia demonstrates the success of a vertical-slot fishway designed for nonsalmonid fishes. This research optimized water velocities to match the swimming capabilities of native fish, successfully reconnecting fragmented habitats. The findings emphasize the need for species-specific adaptations to enhance ecological connectivity in river systems.
Applying these insights to the Jiulong River region, similar strategies could be adapted to cater to local biodiversity. Designing fishways and ecological corridors should consider the specific behaviors and requirements of regional fish species to ensure the preservation of indigenous aquatic life. This approach not only maintains ecological balance but also serves as a sustainable model for river management practices that could be replicated in similar ecosystems, enhancing biodiversity conservation effectively.

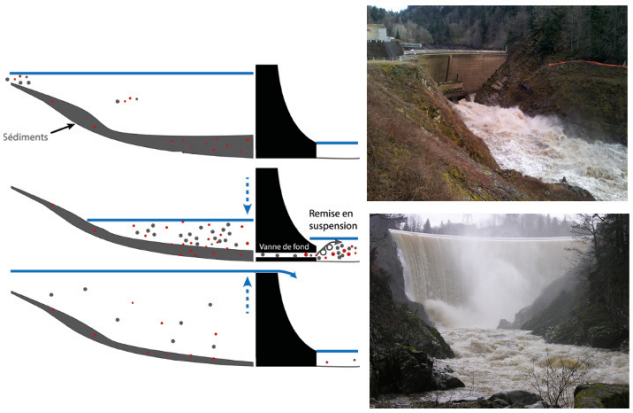


Fishway on the Barwon River *(Australian Governent, n.d.)*

E02 Sediment Management

Sediment management is essential for preserving the ecological and functional integrity of river systems. A notable example is the strategy used in the Missouri River system, where sediment buildup had historically altered water flow and ecosystem dynamics. The Missouri River Recovery Program implemented a comprehensive sediment management plan that included the mechanical removal of sediment and the restructuring of flow to redistribute sediment deposition effectively (Coker, Hotchkiss, & Duffy, 2009). This approach was designed to restore and maintain the navigability of the river and improve habitat for aquatic life, balancing ecological needs with human uses of river systems.
Transferring these principles to the Jiulong River region involves adapting similar sediment management strategies to address local conditions. Implementing mechanical sediment removal and flow restructuring could help manage sediment buildup that affects water flow and habitat quality. This would enhance river navigability and ecological health, serving as a sustainable practice to maintain the river's integrity and support biodiversity in the region.

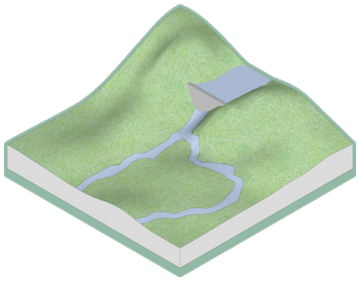




(Some Examples of Sediment Management - Encyclopedia of the Environment, 2019))

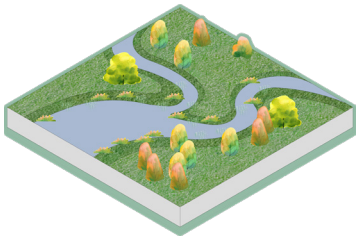
E03 Water Flow Regulation

Water flow regulation in river systems is crucial for balancing ecological needs with human demands. A notable example of effective flow regulation is the study by Boulton, Sheldon, and Thoms (2000), which explored managing rivers with variable flow regimes. The study emphasized the need for maintaining ecological integrity while regulating water flow, particularly in systems like the Murray-Darling Basin in Australia. By implementing flow regulation measures, managers were able to improve water allocation for agriculture without significantly disrupting the natural riverine habitats. This approach has helped maintain biodiversity and ecological services, illustrating a sustainable model for other river systems facing similar challenges.



E04 Replace reservoirs with new landscape

In the case of Shimen Reservoir in Taiwan, the transformation exemplifies repurposing landscapes linked to large-scale water facilities. Originally, construction led to significant ecological and cultural shifts, necessitating indigenous community relocations. This spurred new community dynamics and cultural landscapes, integrating displaced populations into a cohesive social framework that promoted tourism and ecological awareness. This demonstrates how reservoir sites can transcend traditional utility roles, merging with recreational and cultural functions to redefine the landscape into a multifunctional asset that benefits both the community and environment (Chen et al., 2021).
Applying these insights to the Jiulong River area could transform water infrastructure, enhancing ecological integrity and socio-economic vitality. Creating eco-friendly recreational areas that celebrate local heritage and biodiversity could turn the river landscape into a vibrant community hub, preserving ecological features while boosting local livelihoods through tourism and recreation.



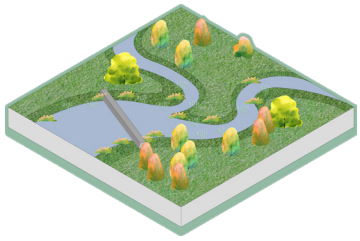
(Shihmen Reservoir, n.d.)

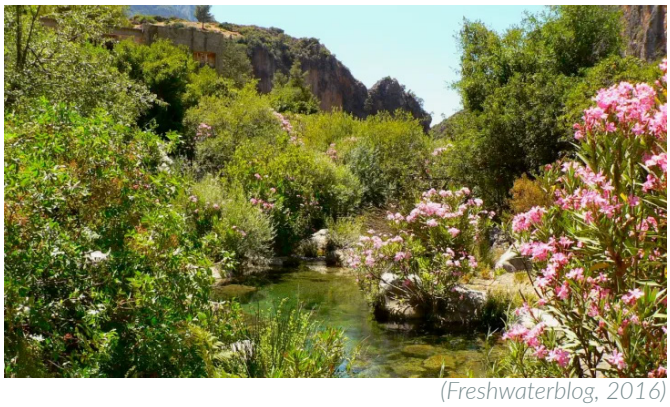
Measures explanation

E05 Riparian Habitat Restoration

Riparian habitat restoration is crucial for maintaining the ecological balance of riverine environments, especially in areas impacted by human activity and climate change. A U.S. Geological Survey (USGS) study presents various strategies from the southwestern United States, highlighting projects from localized revegetation to watershed-scale initiatives aimed at enhancing ecosystem resilience (Ralston & Sarr, 2017). A key method involves using biophysical templates for revegetation, tailored to the unique hydrological and ecological characteristics of each site, as seen along the Colorado River where projects have bolstered riparian vegetation and wildlife habitats.

Applying this method to the Jiulong River could similarly enhance local biodiversity and ecosystem health. Strategic revegetation efforts, considering the river's specific environmental conditions, could restore natural functions vital for biodiversity, water quality, and flood management. Such targeted initiatives would not only rehabilitate the riparian zones but also strengthen the river's resilience to environmental stressors, benefiting the entire watershed community.



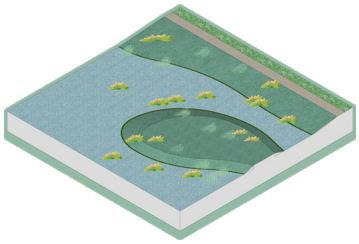


(Freshwaterblog, 2016)

E06 Constructed wetlands&biofltration systems

Constructed wetlands and biofiltration systems represent innovative approaches to wastewater treatment and ecological restoration, providing sustainable alternatives to conventional methods. A notable implementation is the constructed wetland system by the Clayton County Water Authority in Georgia, which serves over a quarter million people and produces up to 42 million gallons of potable water daily. This system not only minimizes land and energy use compared to traditional spray irrigation but also significantly reduces maintenance costs. The transition to wetlands has led to a 75% reduction in land usage per million gallons treated, underscoring the economic and environmental benefits (Clayton County Water Authority, n.d.).

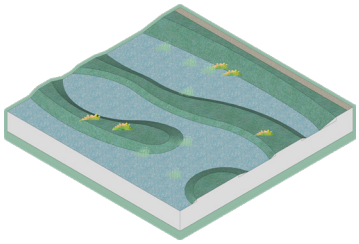
Applying this technology in the Jiulong River region could similarly transform water management practices. The region's specific challenges, such as rapid urbanization and agricultural runoff, make it an ideal candidate for such systems. Constructed wetlands could efficiently treat wastewater while enhancing local biodiversity, providing a dual benefit of clean water and habitat restoration.



The Huie Constructed Wetlands in Clayton County, GA
(American Academy of Environmental Engineers & Scientists., n,d,)

E07 Natural wetland

In rural areas, natural wetlands near rivers can serve as crucial elements in both ecological and community design. These wetlands can be strategically developed or restored to improve water quality by filtering pollutants, enhance biodiversity by providing habitat for various species, and help manage water flow to reduce the risk of flooding. Moreover, they can also be used to bolster local economies through eco-tourism and recreational activities, providing both environmental and social benefits to rural communities. A notable example is Erhai Lake Ecological Restoration Project by Arcplus, which has capitalized on its natural wetland near the lake to enhance biodiversity and attract tourism. This project demonstrates how natural wetlands can be integrated into rural development to support wildlife and provide recreational opportunities, thereby contributing to local economies and enhancing the quality of life for residents(Erhai Lake Ecological Restoration Project by ArcPlus, n.d.).

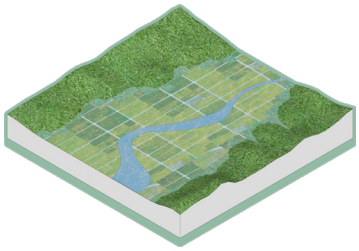


(Yang Jipei, n,d,)

E08 Flood plain

Flood plains are essential in managing flood risks. Hu et al. (2017) used numerical models to predict future flood severity in river network regions, focusing on rain-runoff processes near the Yangtze River. Their research underscores the importance of flood plain management in reducing flood impacts with infrastructure designed around historical flood data and hydrodynamic models. This method protects vulnerable rural landscapes and preserves natural hydrological processes.

Applying these principles to the Jiulong River region can enhance flood management strategies. By integrating similar modeling techniques and infrastructure designs that consider local historical data and ecological characteristics, the region can effectively mitigate flood risks. This proactive approach not only safeguards the community and its agricultural lands but also supports biodiversity and ecological health, making it a comprehensive strategy for sustainable river basin management.

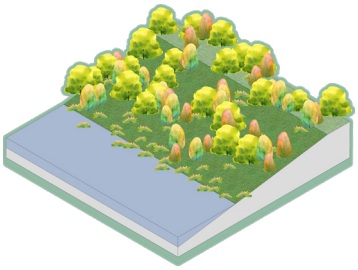


(Getty Images, n.d.)

Measures explanation

E09 Riparian Buffer

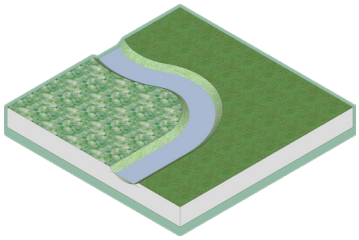
Riparian buffers are crucial in landscape design near rural rivers, offering significant ecological benefits like erosion control, water quality improvement, and habitat connectivity. Fischer Jr and Fischenich (2000) provide detailed recommendations for designing riparian corridors and vegetated buffer strips, underscoring their role in protecting riverbanks and enhancing the water quality of adjacent water bodies, especially in regions with substantial agricultural runoff. Their research suggests optimal buffer widths and plant species to maximize ecological functions in rural settings.
Incorporating these strategies into the Jiulong River region could effectively address similar environmental challenges. By adapting the recommended buffer widths and selecting appropriate local plant species, these buffers can serve as effective natural barriers against erosion, improve water quality, and provide critical wildlife corridors. Implementing such targeted riparian buffer strategies would not only enhance the ecological integrity of the Jiulong River but also contribute to the overall health of the river system and the communities that depend on it.



(Riparian Buffers – 2030 Palette, n.d.)

E10 Grassed waterway

Grassed waterways are effective natural infrastructures designed to manage agricultural runoff, directing excess water flow to reduce erosion and enhance water quality in rural river environments. A notable application in the Avon River Basin by Graham and Knight (1982) showcases the successful implementation of these systems. Their case study highlights the strategic design and construction of grassed waterways that efficiently handle surface water runoff in agricultural landscapes. By stabilizing soil and minimizing sediment transport, grassed waterways preserve the ecological integrity of rural river systems.
Applying this approach to the Jiulong River region could mitigate similar environmental challenges. By integrating grassed waterways into the agricultural areas surrounding the Jiulong River, these systems could effectively manage runoff, prevent soil erosion, and reduce nutrient loading into the river. This would not only improve water quality but also support the river's overall ecological health, demonstrating a practical and sustainable method for safeguarding rural river environments against the impacts of intensive farming practices.

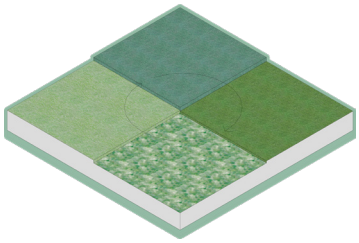


(Seebecker, 2023)

E11 Crop Rotation

Crop rotation is a sustainable agriculture practice that enhances soil health and reduces pollution runoff into nearby waterways. Yin et al. (2016) employed the HYPE model to analyze the effects of crop rotation on water quality in the Hong Ru River Basin in China. Their study showed that crop rotation significantly improves water quality by reducing nutrient runoff and increasing water use efficiency. This practice not only boosts agricultural productivity but is also essential for maintaining the ecological balance of rural river systems.

Implementing similar crop rotation strategies in the Jiulong River region could effectively enhance local water quality and soil health. By adopting diverse crop cycles, farmers can minimize the buildup of pests and diseases, reduce dependency on chemical inputs, and improve soil fertility. This would lead to healthier crops and less agricultural runoff, thereby protecting the river ecosystem. Adopting crop rotation would thus support both agricultural sustainability and the ecological health of the Jiulong River, demonstrating a practical approach to integrating agricultural productivity with environmental stewardship.

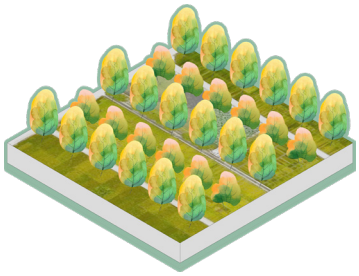


(Wikipedia contributors, 2024)

E12 Agroforestry

Agroforestry practices provide substantial ecological and economic advantages, as demonstrated along the Lilagar River in Central Chhattisgarh, India. Shukla et al. (2021) conducted a case study that shows the benefits of integrating tree farming with traditional agricultural operations. This combination delivers critical ecosystem services such as enhanced biodiversity, improved soil stabilization, and better water quality. Additionally, agroforestry systems offer a sustainable source of fuelwood, which is essential for rural livelihoods.

Implementing agroforestry in the Jiulong River region could similarly transform local agriculture and environmental management. By incorporating trees into farming landscapes, the region can strengthen the resilience of its agricultural systems against climate variability, improve carbon sequestration, and reduce erosion. Furthermore, agroforestry can provide diversified income sources for farmers through the sale of timber, fruits, and other non-timber forest products, enriching the local economy.

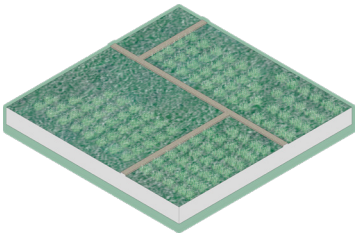


(Sayner, 2022)

Measures explanation

E15 Wet agriculture with aquaculture

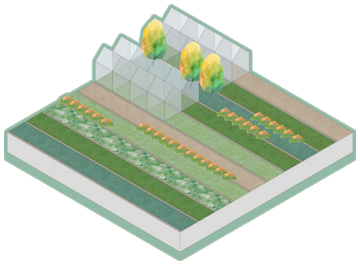
Wet agriculture combined with aquaculture near rural rivers, as practiced in some villages of the Jiulong River region, exemplifies a sustainable model that enhances food production while maintaining ecological balance. Pueppke, Nurtazin, and Ou (2020) explore this integrated approach in Asia, where simultaneous utilization of agriculture and aquaculture along rivers optimizes both water and land resources. This synergy yields numerous benefits, including efficient water management, enhanced crop yields, and sustainable fish production, making it highly suitable for the humid and moist areas of the continent.
Incorporating this model more extensively in the Jiulong River region can further boost productivity and support biodiversity and water quality. This system, already familiar to local farmers, can be scaled up to maximize agricultural output and improve livelihoods without compromising the health of the river ecosystem.



(Fish & Rice Farming: Changing Time With Changing Methodology, in Pakistan, 2021)

E16 Arable farming with horticulture

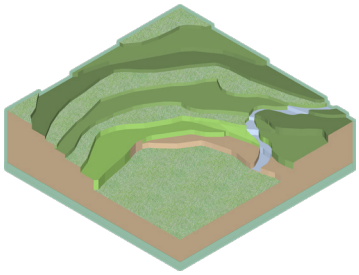
Arable farming combined with horticulture provides a nuanced approach to maximizing agricultural productivity while maintaining ecological balance. A detailed analysis by Zasada et al. (2013) explores the dynamics of farming systems in European rural-urban regions, highlighting the integration of horticulture with traditional arable farming. The study emphasizes how proximity to urban areas and rivers influences agricultural practices, leading to diversified farming strategies that include horticulture. This integration enhances land use efficiency and crop diversity, benefiting local economies and improving the sustainability of agricultural practices near water bodies.



(Shutterstock, n.d.)

E11 Terracing Farming

Terracing farming, already practiced in some villages of the Jiulong River region for tea cultivation, is a proven agricultural design tool that effectively controls erosion, enhances water absorption, and manages runoff. Wei et al. (2016) provide a global synthesis on the benefits of terracing, including its successful application in the Yangtze River Basin. This study underlines terracing's capacity to improve water retention and stabilize soil on sloped agricultural lands, which is vital for sustainable farming practices near waterways.
Expanding terracing farming in the Jiulong River region could further enhance these benefits, especially in areas with similar geographical features. By structuring the landscape into graduated terrace steps, local farmers can significantly reduce the risk of soil loss while increasing agricultural productivity. This approach not only supports the existing tea cultivation but can also be adapted for other crops suited to terraced agriculture.

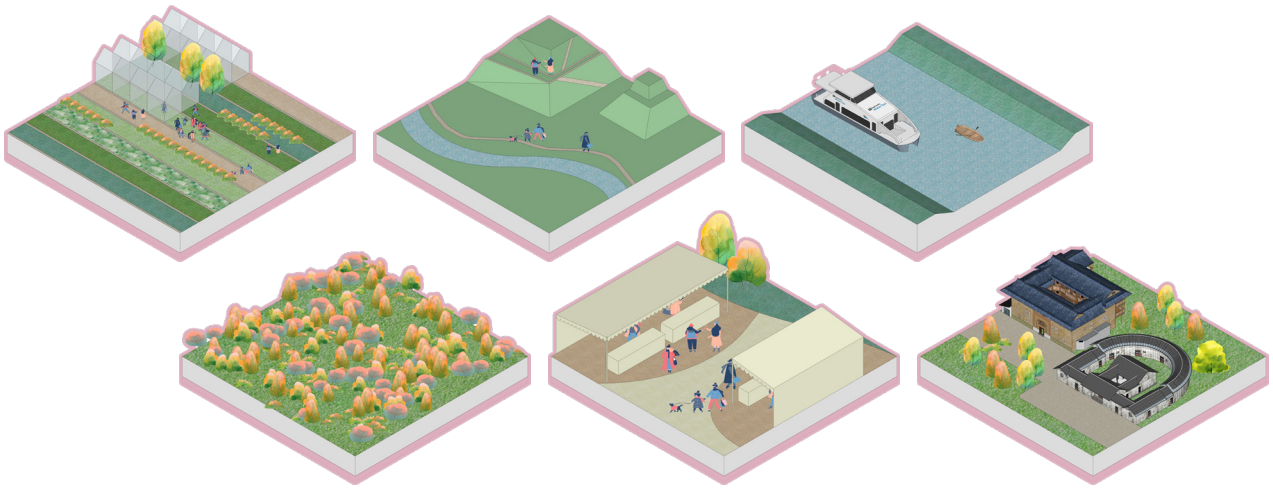


(Terracing – Greener Land, n.d.)

S5-10 Eco-tourism

Eco-tourism is an innovative approach to conservation and community engagement. A pertinent case study is the development along the Karaj River, explored by Goharipour and Hajiluie (2016). This study assesses the potential for eco-tourism along the river, considering both the natural environment and cultural heritage. The authors emphasize sustainable practices that minimize environmental impact while enhancing visitor experiences. Eco-tourism in this context not only helps preserve the natural and scenic beauty of the riverine landscape but also supports local economies through tourism-related activities.

(Best Hotel in Tapola, Tapola Mini Kashmir Resort, Family Hotel in Tapola Mahabaleshwar, n.d.)

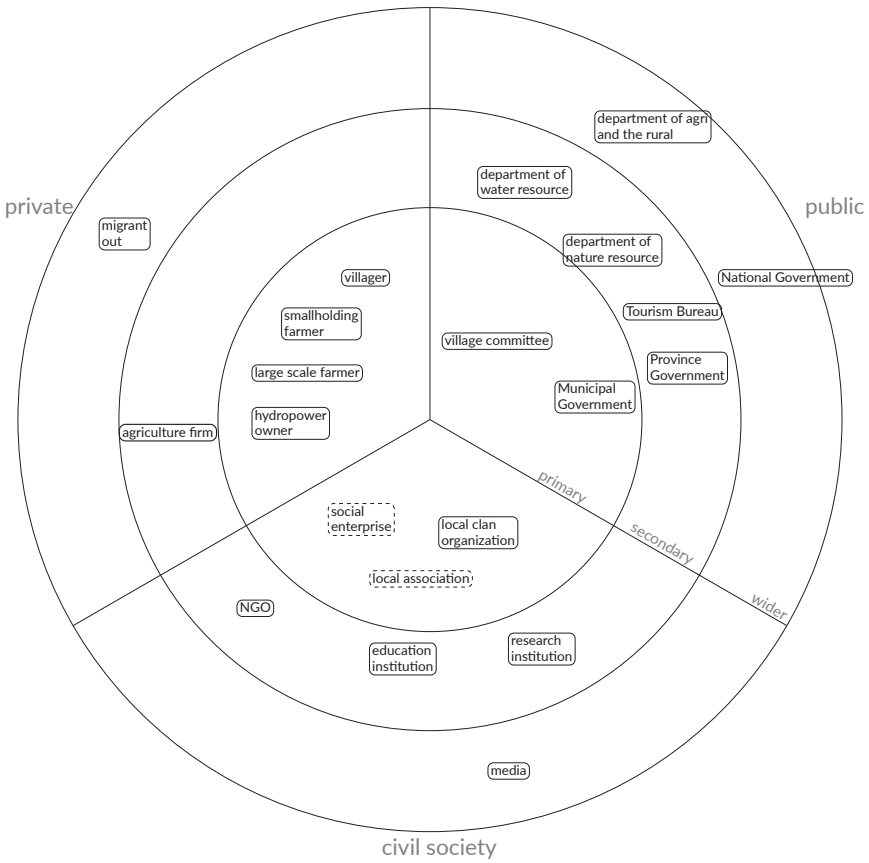


4.2 STAKEHOLDER ENGAGEMENT

4.2.1 Stakeholder analysis

The diagrams identify the hierarchy of stakeholders and the sector to which they belong, and profiles each stakeholder in terms of interests, problem perception, goals, and resources.

Stakeholder	Interests	Probl
Village committee	Enhancing the rural environment and society development	Lack o Inabil
Villager	Enhancement of well-being	Lack o Unan Mistr
smallholding farmers	new livelihood	Lack o
large scale farmers	more support from the government	unwill
migrants to the cities	chance back to hometown	no job
hydropower owners	new ways to make profit	lose p
Ministry of water resources	more sustainable water management	lack o
ministry of agriculture and the rural	chance to revitalize the rural	lack o
Ministry of Natural Resources	chance to optimize eco-system	public
Tourism Bureau	chance for eco-tourism	lack o
Agriculture firm	Increase profits	Policie Decre
NGO	Enhancing social service capacity	Accep
Social enterprise	New types of business, tapping into local and endogenous development	Risk o Level
Media	Creating discourse, monitoring	Undes
Research institution	A deeper understanding of the countryside chance for sustainablity research	lack o

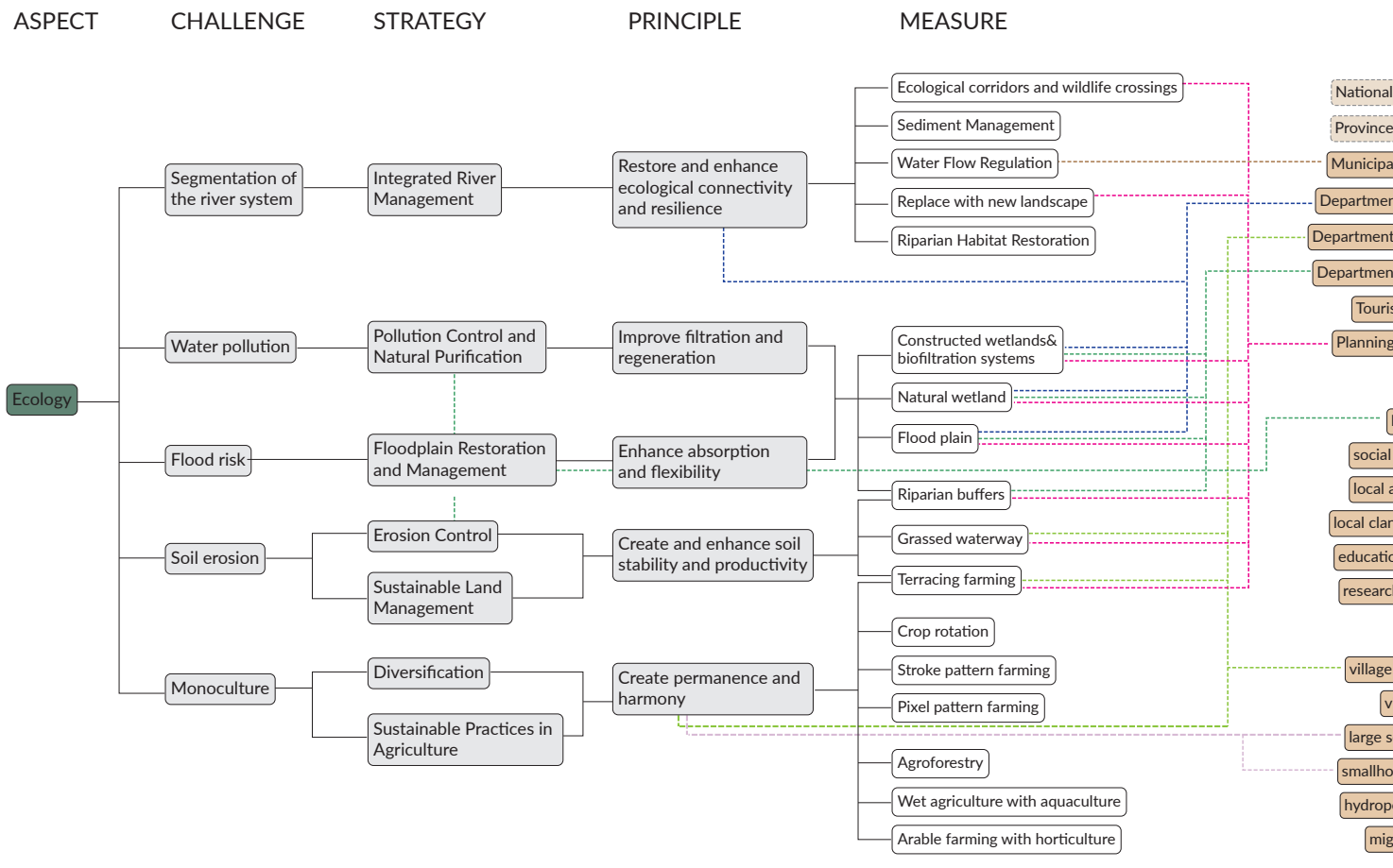


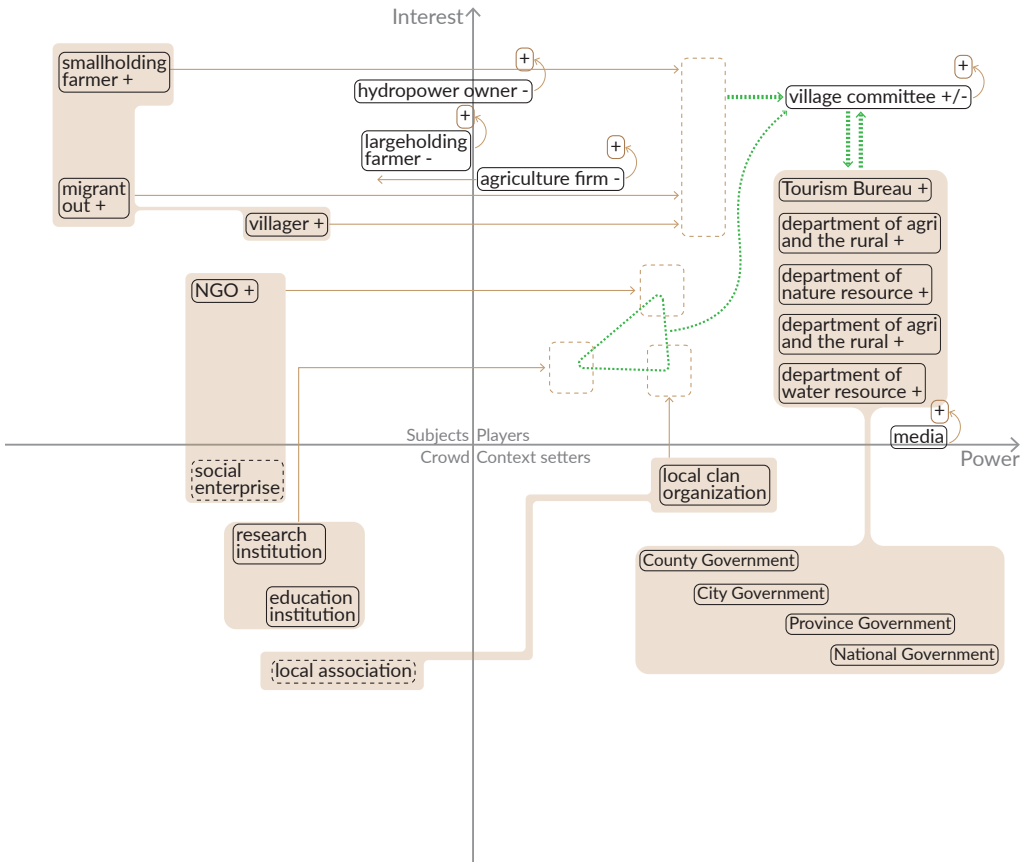
em perception	Goals	Resources
of funds, knowledge ity to meet the needs of villagers	Comprehensively reflect the voice of villagers Match with the broader policy Better approach to development	Organisation, social network
of autonomy swered demands ust of government	To have better living conditions based on solving the most basic subsistence problems Generating empowerment	Participation in governance, use of the environment Ownership of land
of resource and knowledge	fitting with the market better living conditions Profit is proportional to labour	human resource good understanding of village
ing to change the production	reshape the production more sustainable	human resource facilities
s and income in the rural	privide job opportunities	human resource knowledge for media
rofits	exchange with new ways to make profits	
f large scale planning	better charge of water management	policy making power knowledge
f chance to develop the rural	reshape rural landscape and industries	policy making power
unwareness of eco-system	rise public awareness get more support from the government	power and knowledge for eco-system
f large scale planning	combine eco-tourism with existing tourism form more comprehensive network	power and knowledge for tourism
es can harm profits ease in cheap labour	Equal co-operation with villagers Sustainable business practices Compatible with the social environment	Constructing projects
tance by villagers	Community building improves cohesion Ancient buildings and villages are protected	Provision of advisory services Field upgrading of the environment
f loss of acceptance by villagers	Respect local culture Eliminate conflicts of interest Protect the ecological environment	Construction Funding Technical Knowledge Operational Knowledge
sirable or inaccurate publicity	Positive publicity impact on the countryside Change people's prejudices about the countryside Fact-based	Massive social impact
f chance to look deeply into the rural	Provide more ideas and discussions for rural revitalisation Have more empathy	Contacts and networks with professors as well as NGOs Provide direct knowledge Participate in practical planning

4.2 STAKEHOLDER ENGAGEMENT

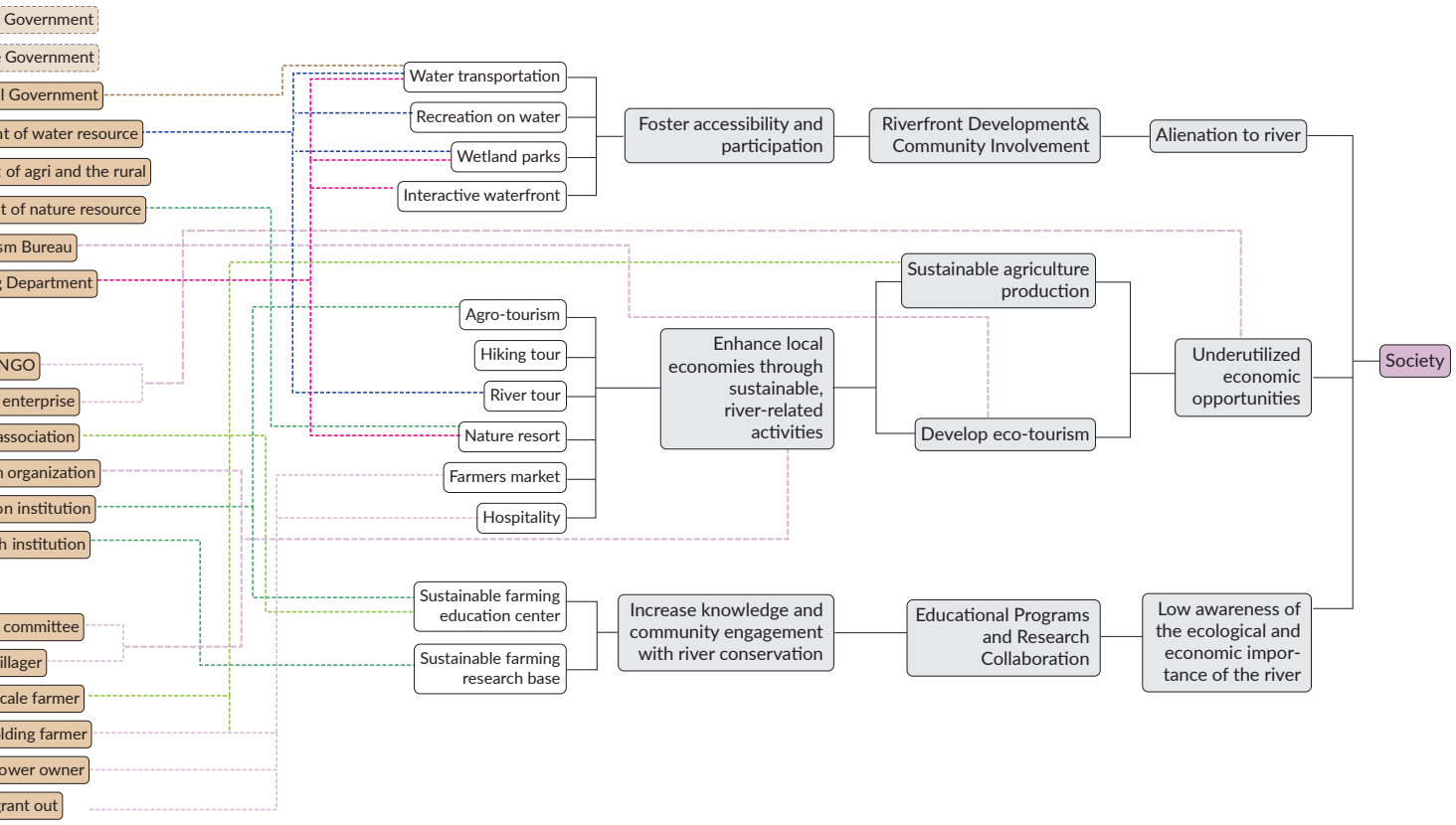
4.2.2 Engagement strategy

To use a power-interest matrix for stakeholder analysis, stakeholders like villagers and smallholders, who have high positive interest but lack power, should be turned into "players." This transformation would allow them to participate in the decision-making process and collaborate with village committees. On the other hand, stakeholders categorized as "crowds," such as social enterprises, educational research institutions, and local associations, need to have their interest elevated and be granted some power to enable them to cooperate with village committees. They possess valuable knowledge and resources, which can play a crucial role in bridging gaps as mentioned in the context. Lastly, stakeholders like large holding farmers and agricultural companies, who have significant power but negative interests, need their interests realigned positively. This realignment would ensure that their benefits are not compromised but are gained in a more sustainable manner.
The main stakeholders are placed in the previous strategy framework and the dotted lines represent the stakeholders involved in a particular measure or strategy, indicating which stakeholders need to co-operate in the implementation of the measures.





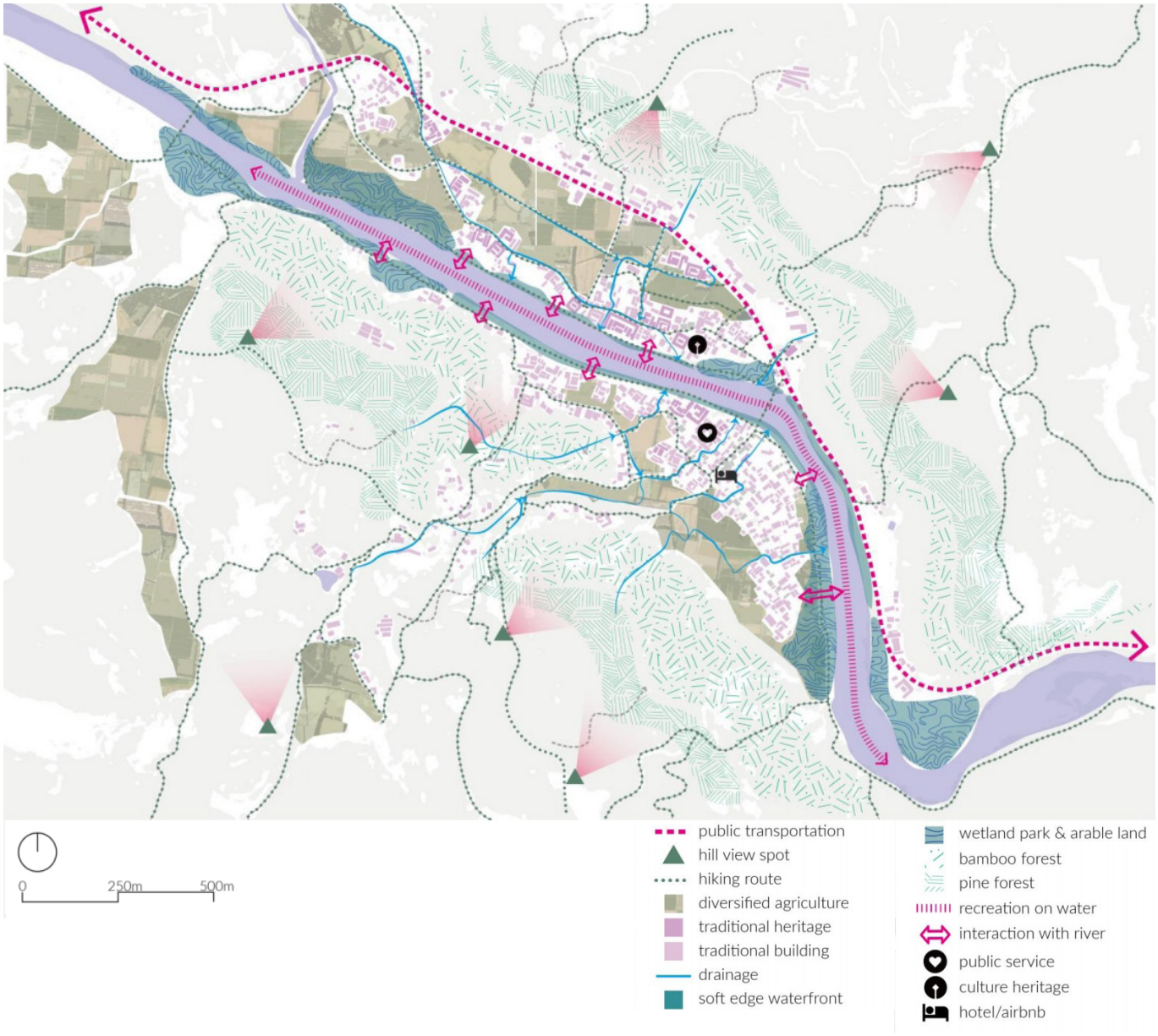
MEASURE PRINCIPLE STRATEGY CHALLENGE ASPECT

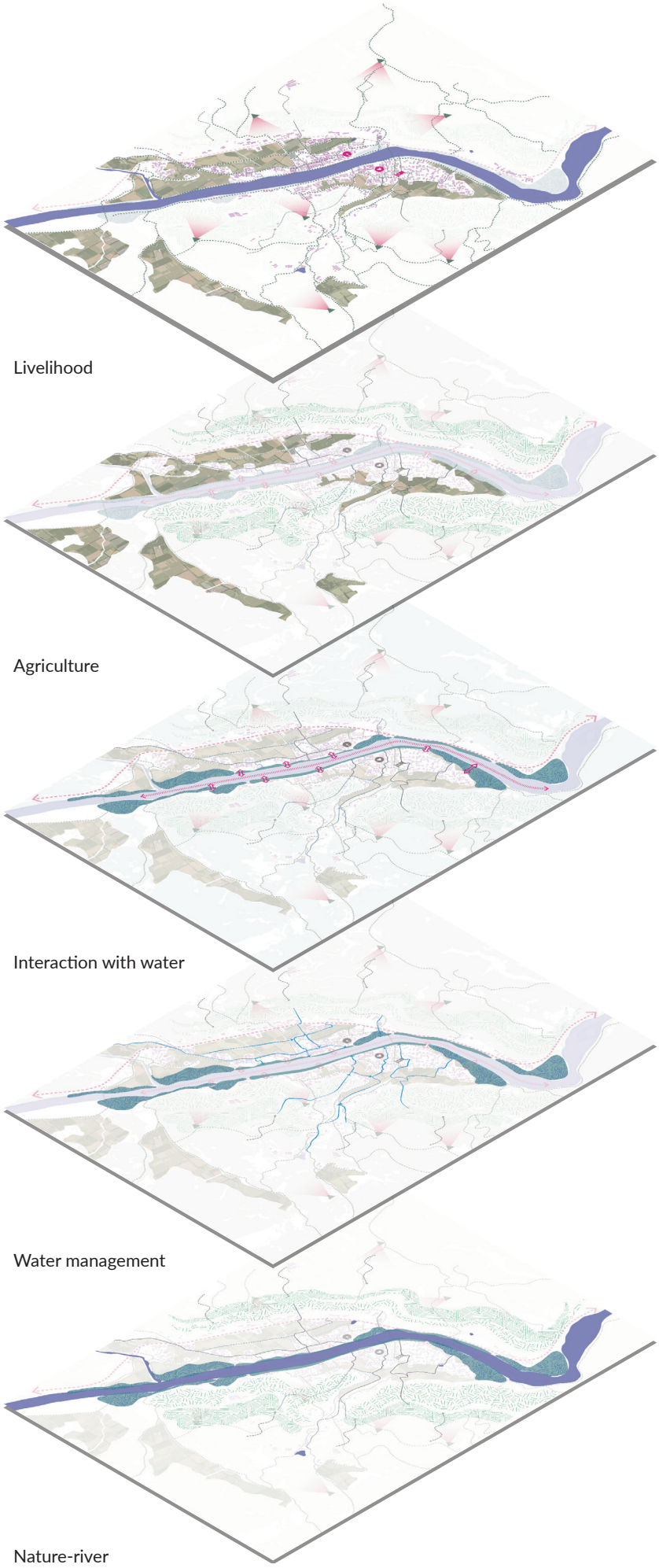


4.3 JIEBU VILLAGE REVITALISATION

4.3.1 Vision

Based on the previous analysis of Jiebu Village and the overall strategy framework, a vision is presented, which is then divided into five layers: nature, water management, interaction with river, agriculture, and livelihood, to explain the spatial implementation of the strategy and the form of governance.

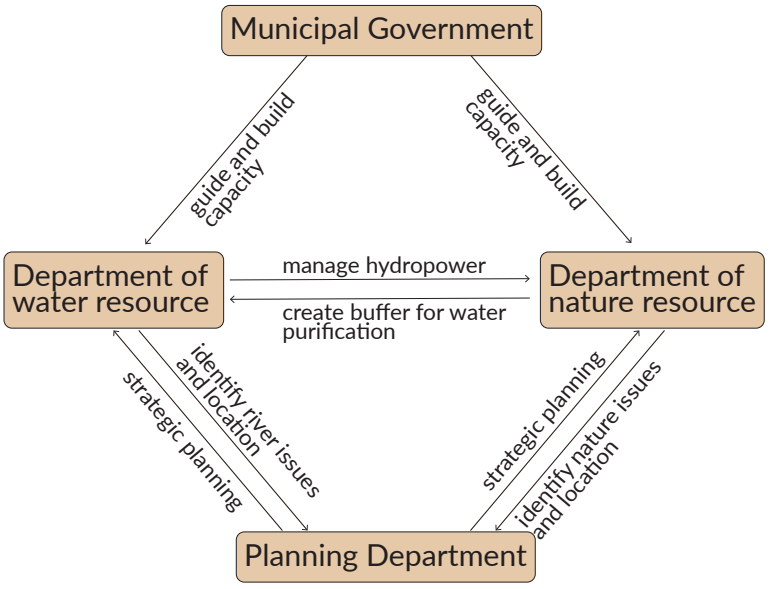


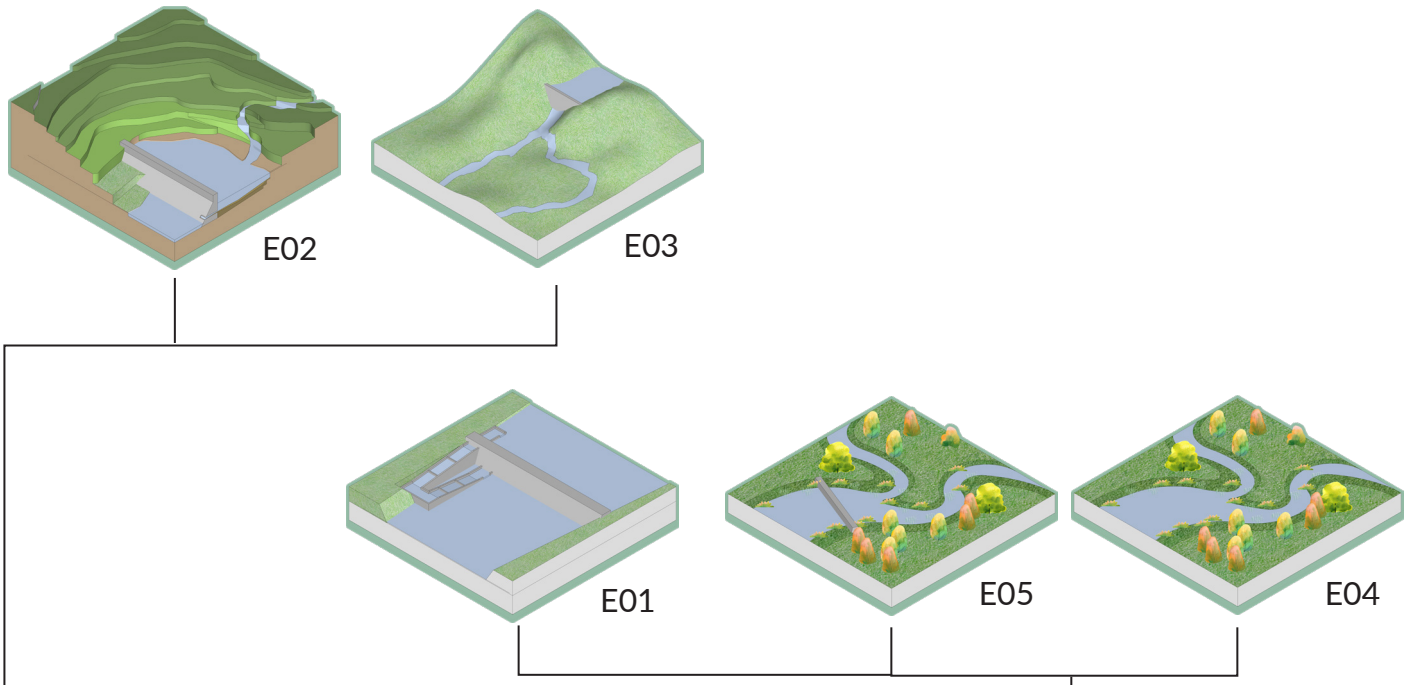

Livelihood
Agriculture
Interaction with water
Water management
Nature-river

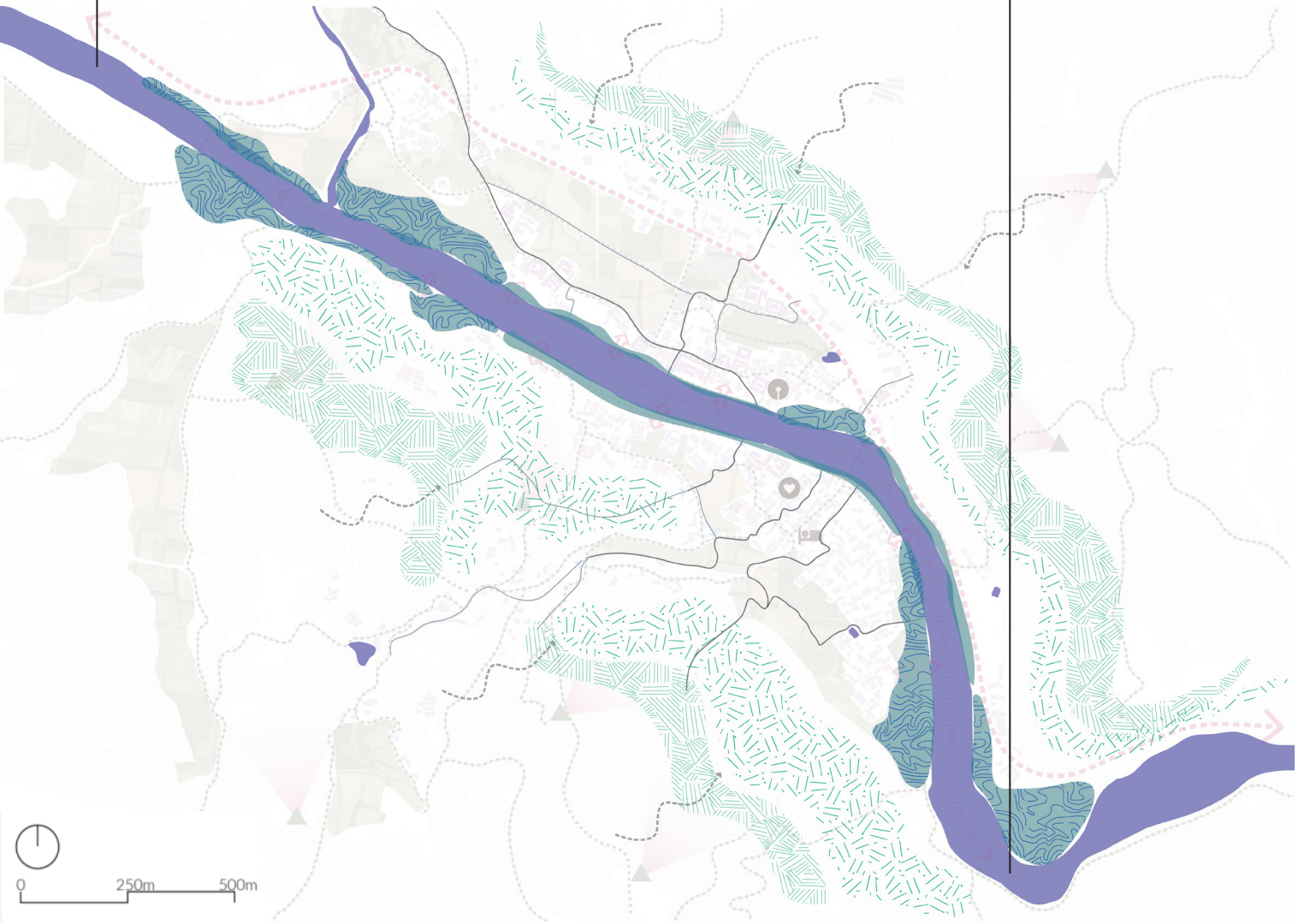
4.3.1 Vision

Nature-river

This layer primarily focuses on the river itself and the hydropower stations on it. For the river, possible measures include E02 Sediment Management and E03 Water Flow Regulation. For the hydropower stations, options include E01 Fishway, E04 Replace with new landscape, and E05 Riparian Habitat Restoration. These measures mainly involve government-level stakeholders and require the collaboration of the Department of Water Resources, the Department of Natural Resources, and the Planning Department under the guidance and support of the government to develop Integrated River Management. The Department of Water Resources would primarily coordinate the planning of hydropower stations from a broader watershed perspective, while the Department of Natural Resources would guide the protection and enhancement of natural resources along the hydropower stations. The Planning Department would then translate the information from them into spatial design.




E02
E03
E01
E05
E04

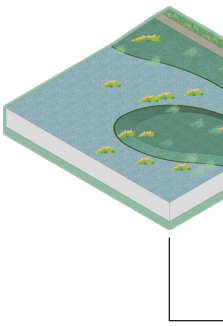

0
250m
500m

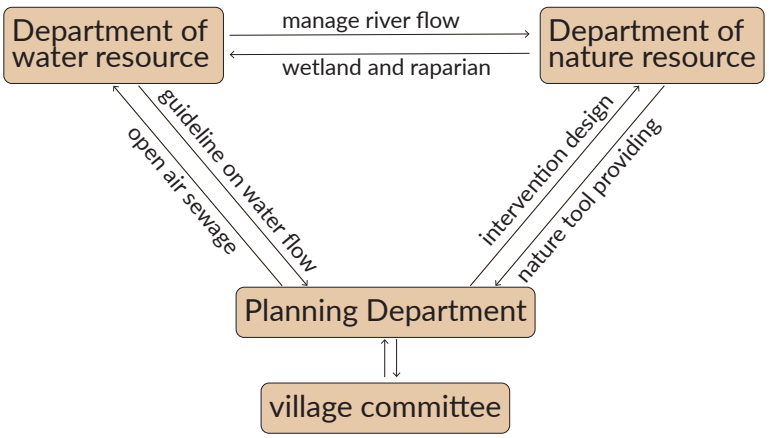
4.3.1 Vision

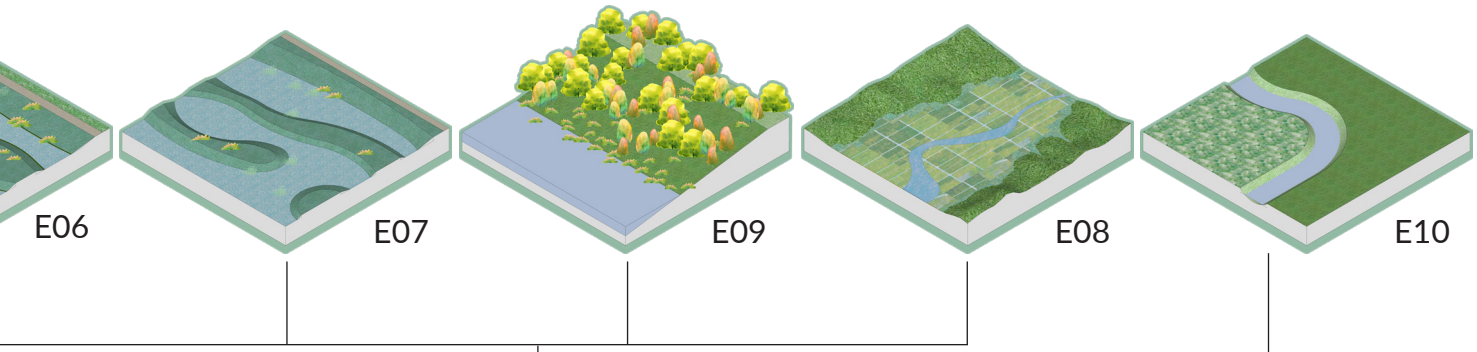
Water system

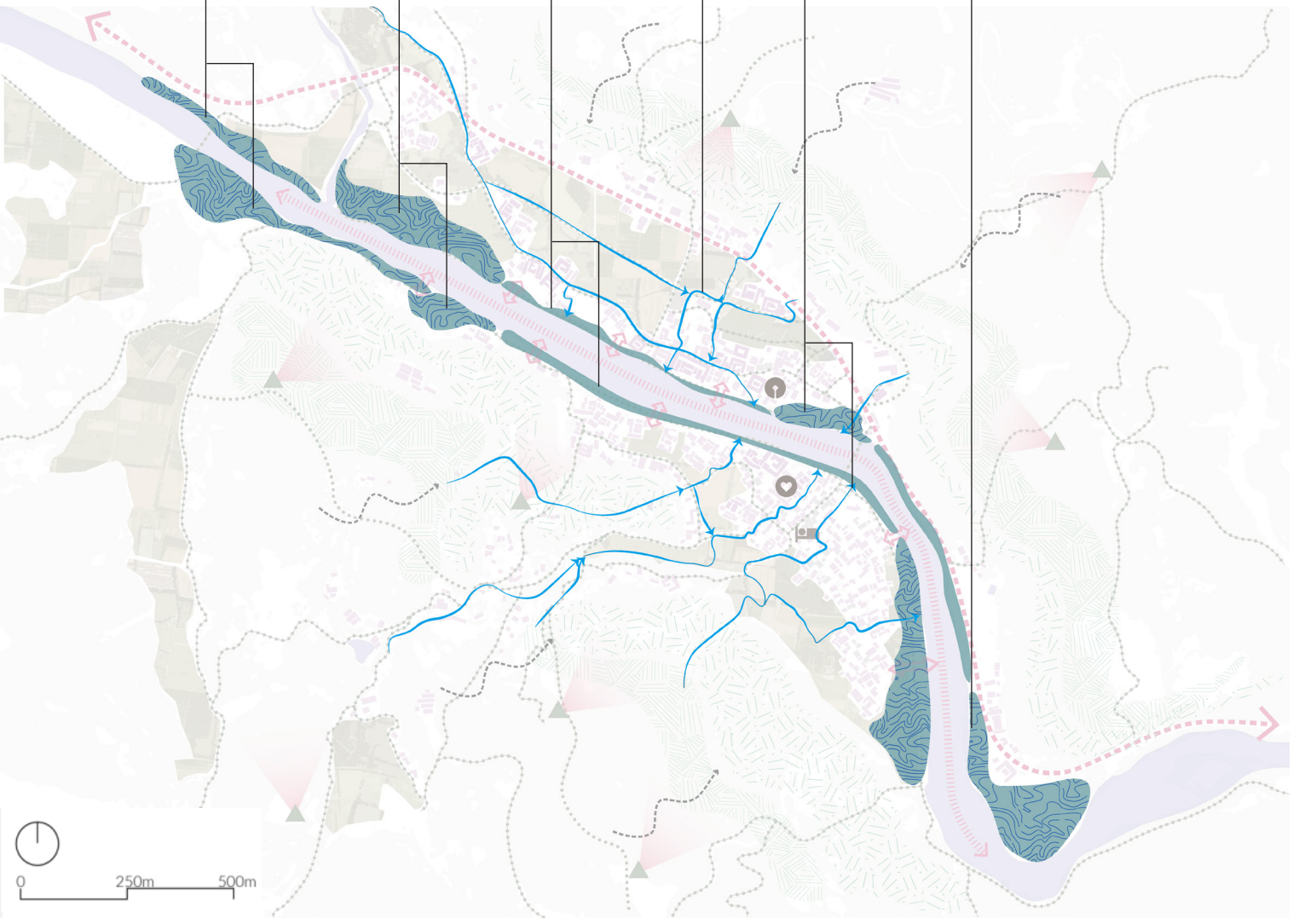
This layer focuses on the water system, including open water channels that run through residential areas and farmlands as well as riverbanks. For the water channels, a possible measure is E10 Grassed waterway. For the riverbanks, potential measures include E06 Constructed wetlands & biofiltration systems, E07 Natural wetland, E08 Flood plain, and E09 Riparian buffers. These measures aim to enhance natural purification capabilities, resilience to flooding, and reduce soil erosion.

The stakeholders involved with this layer mainly include the Department of Water Resources, the Department of Natural Resources, the Planning Department, and the village committee. The Department of Water Resources provides guidance on water management, the Department of Natural Resources offers guidance on using natural resources as tools, the village committee selects measures based on the actual conditions of the village, and the Planning Department carries out planning and design.






E06
E07
E09
E08
E10


0
250m
500m

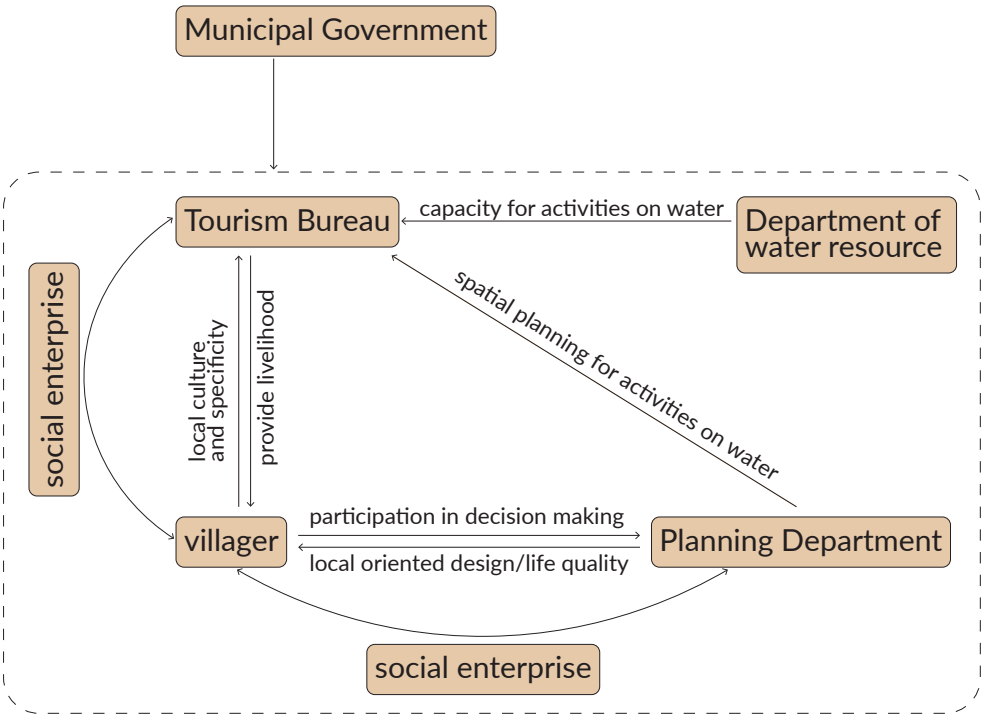
4.3.1 Vision

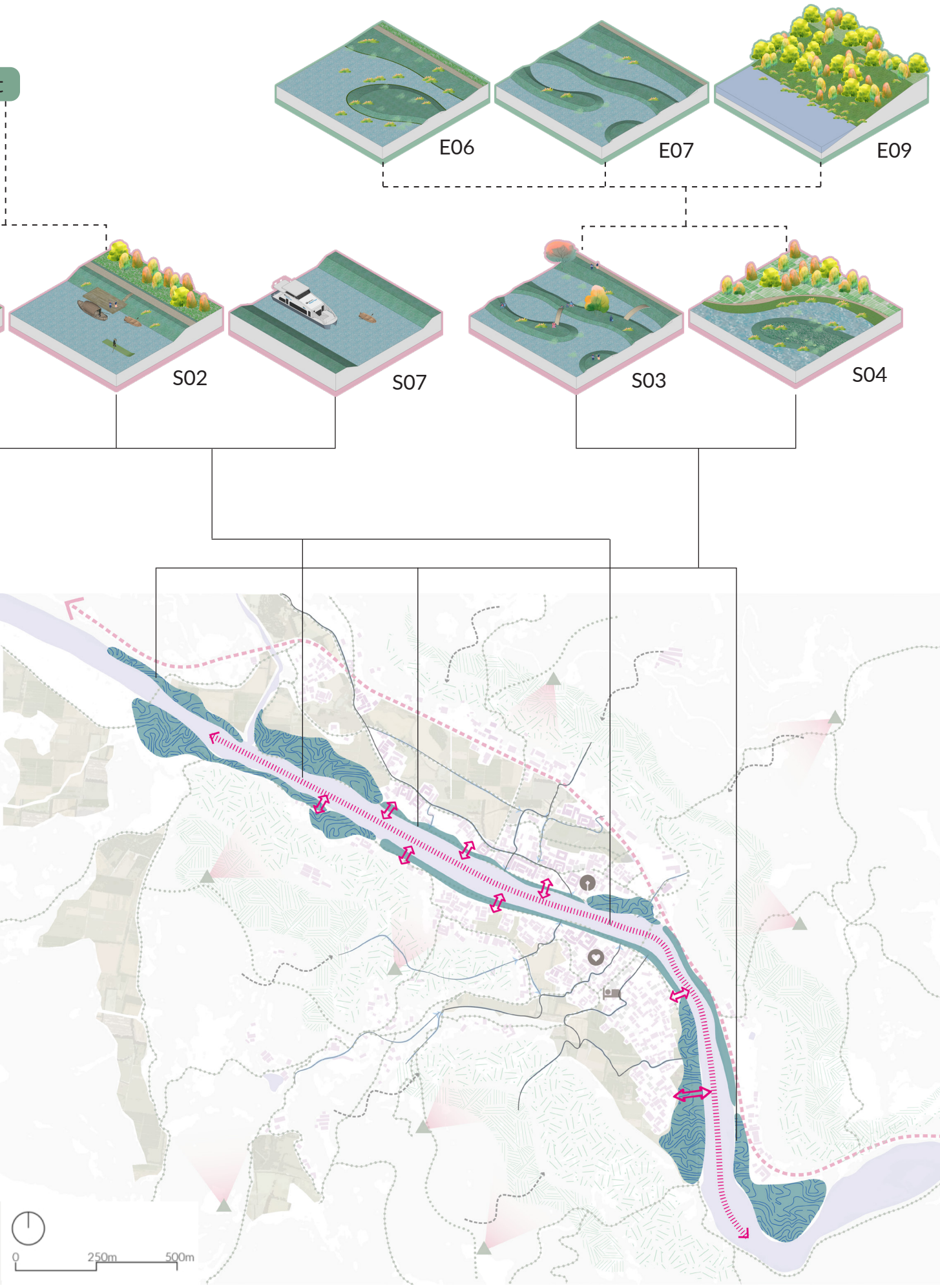
Interaction with river

This layer primarily aims to enhance interaction with the river by increasing water-based activities. Available measures include S01 Water transportation, S02 Recreation on water, S07 River tour for activities on the water, and S03 Wetland parks, S04 Interactive waterfront for riverbank-related improvements. Additionally, it is important to highlight the intertwining of ecological and social aspects within the strategic framework. For example, wetland parks and interactive waterfronts can be combined with E06, E07, E09 to not only enhance accessibility and participation from a social perspective but also increase riverbank infiltration and purification capacities.

As for governance and stakeholders, it is worth noting that social enterprises play a key role as intermediaries between villagers, the tourism bureau, and the planning department. They leverage their knowledge and resources to bridge gaps, contributing not merely through capital injection but through resources that originate from the village itself.

Integrated River Management

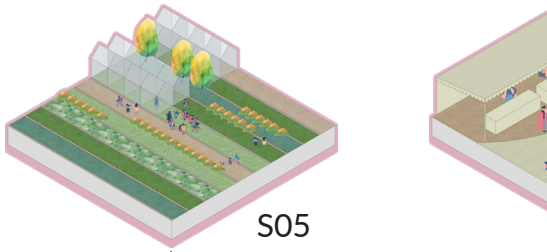


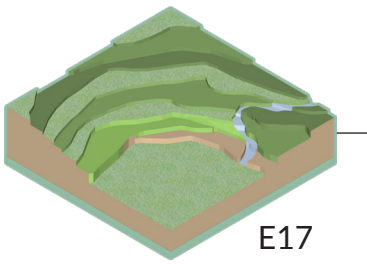

E06
E07
E09
S02
S07
S03
S04
0
250m
500m

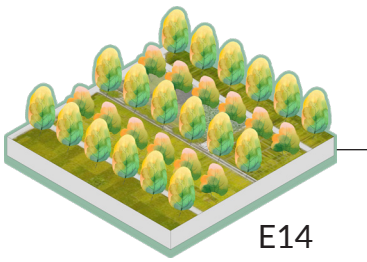
4.3.1 Vision

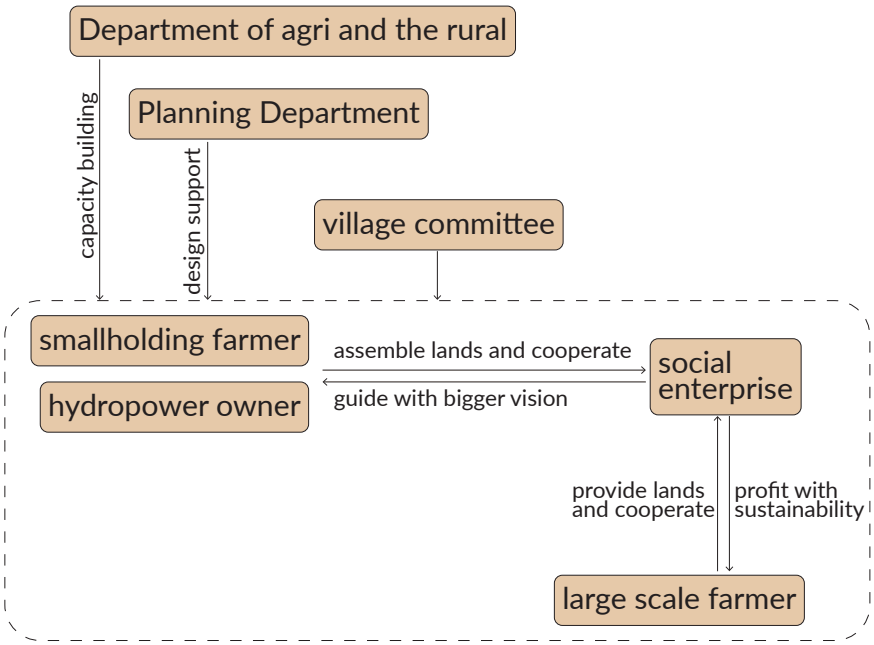
Agriculture

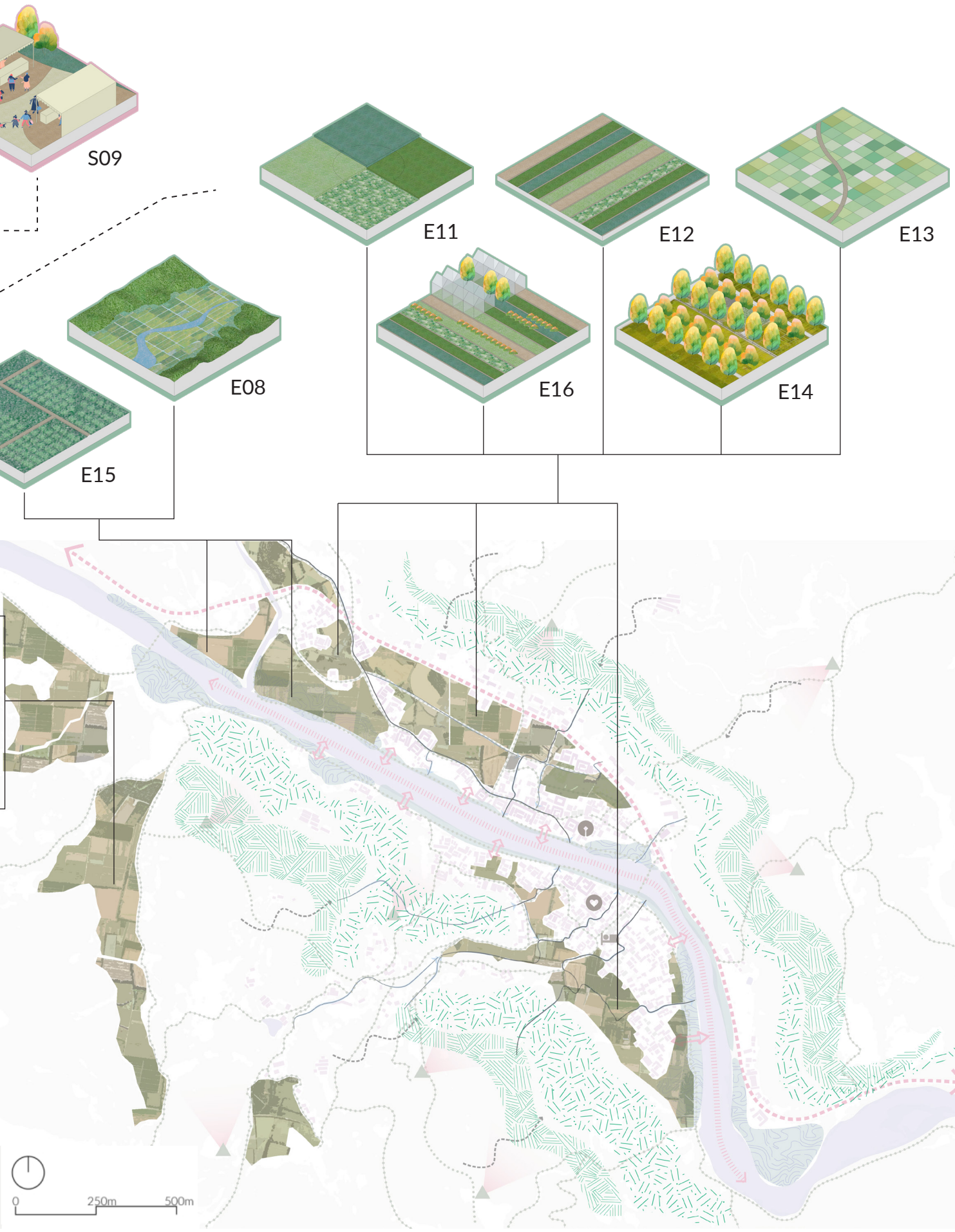
This layer focuses primarily on agriculture. Farmlands situated away from the river can adopt measures E11, E12, E13, E14, and E16 to diversify agricultural production, protect soil health, and promote biodiversity. Farmlands near the river may consider measures E08 and E15 to integrate agriculture with aquaculture or utilize them as flood plains to mitigate flood risks. Additionally, mountainous areas might implement terracing farming to control soil erosion. Furthermore, these measures not only aim to enhance ecological integrity but also correspond with social aspects such as agro-tourism and farmers' markets.










S09
E11
E12
E13
E08
E16
E14
E15
0
250m
500m

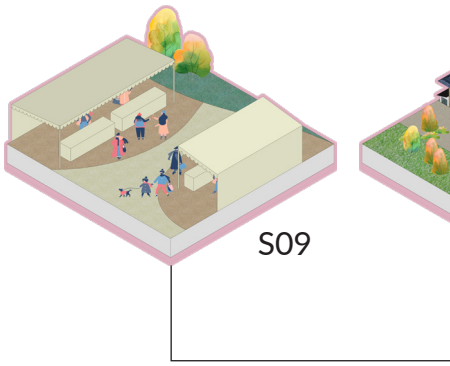
4.3.1 Vision

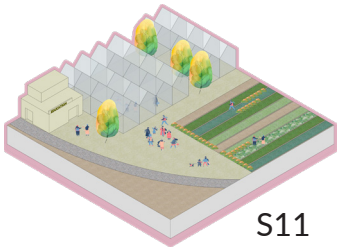
Livelihood

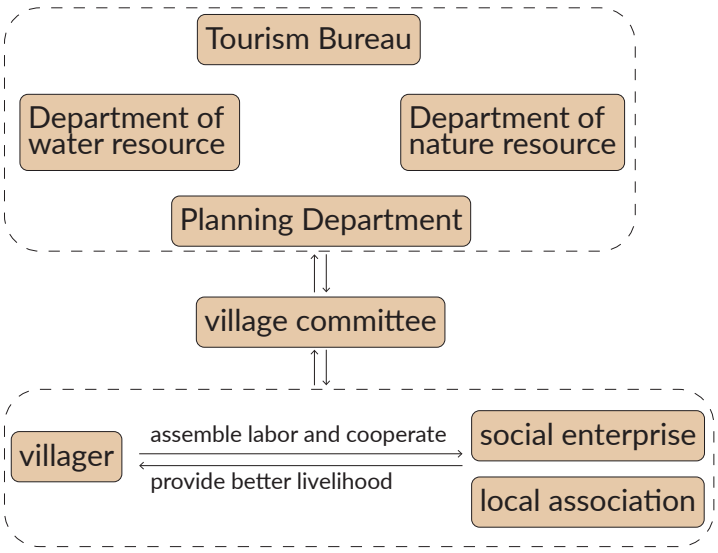
This layer primarily targets livelihood, with potential measures focused on eco-tourism such as S05, S06, S08, S09, and S10 to strengthen local economic activities while also contributing to ecological integrity. Alternatively, measures like S11 and S12, involving educational or research projects, can be implemented to enhance awareness of river and ecosystem conservation.

Regarding governance, it is necessary for government-level subsidies and support to be available, with authority delegated to village committees, villagers, and social enterprises to develop new industries based on local conditions. This approach not only enhances the ecological environment but also improves the quality of life

Diversified agriculture

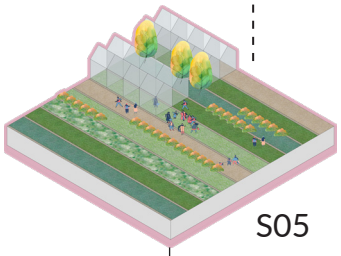




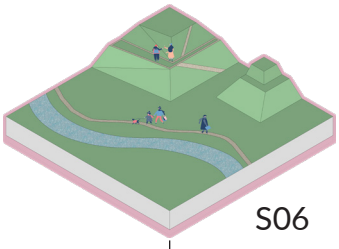


Sustainable agriculture production

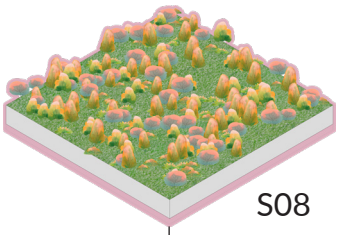
S10



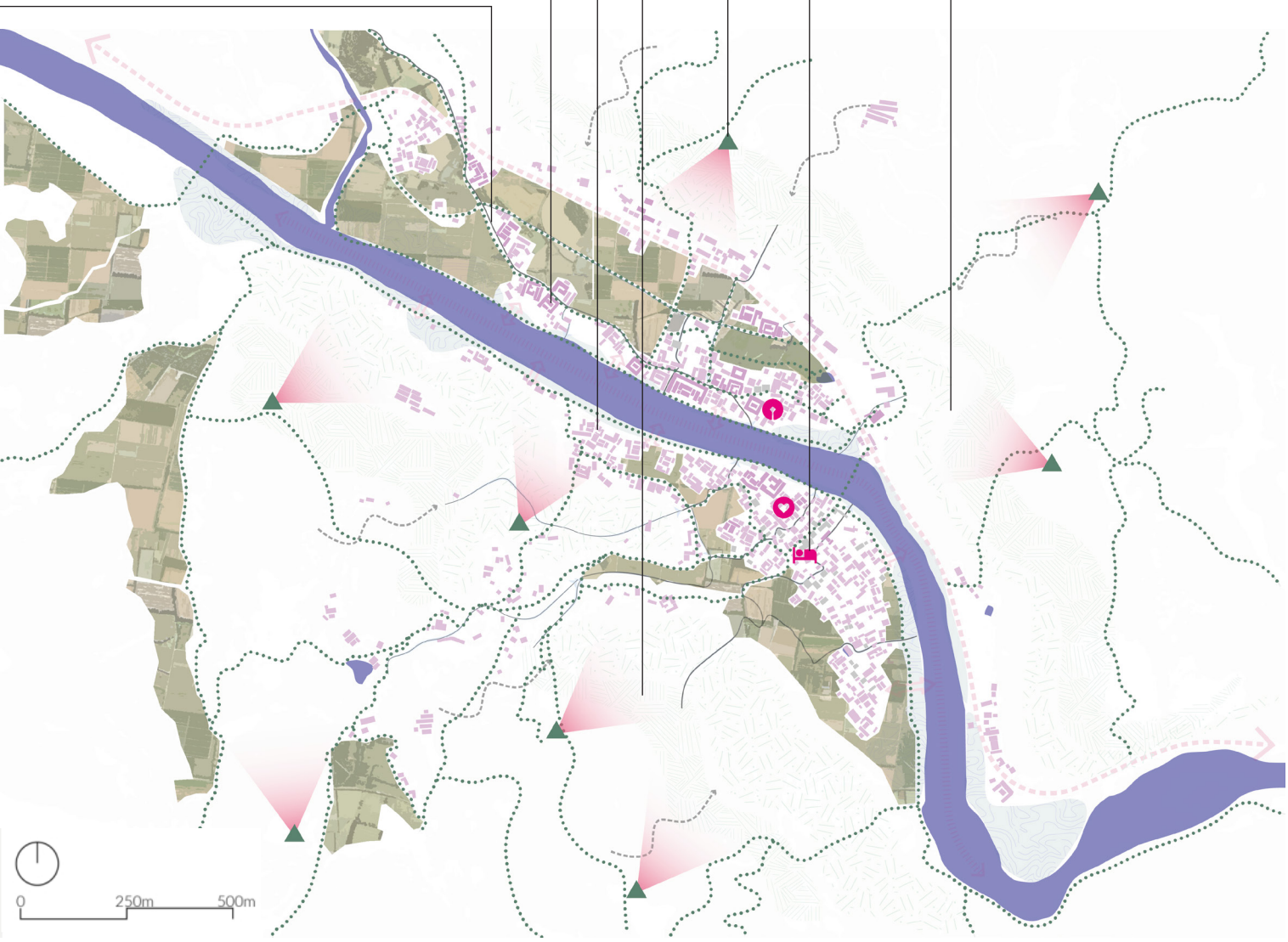
S05



S06



S08

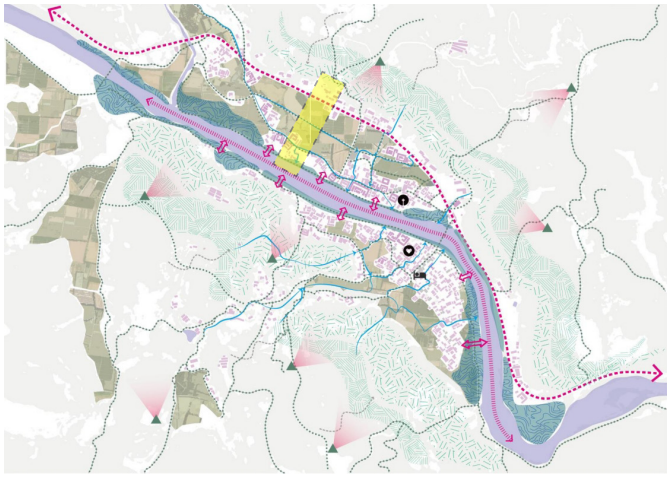


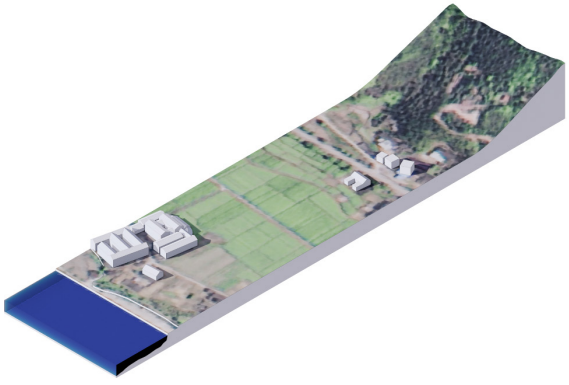
4.3 JIEBU VILLAGE REVITALISATION

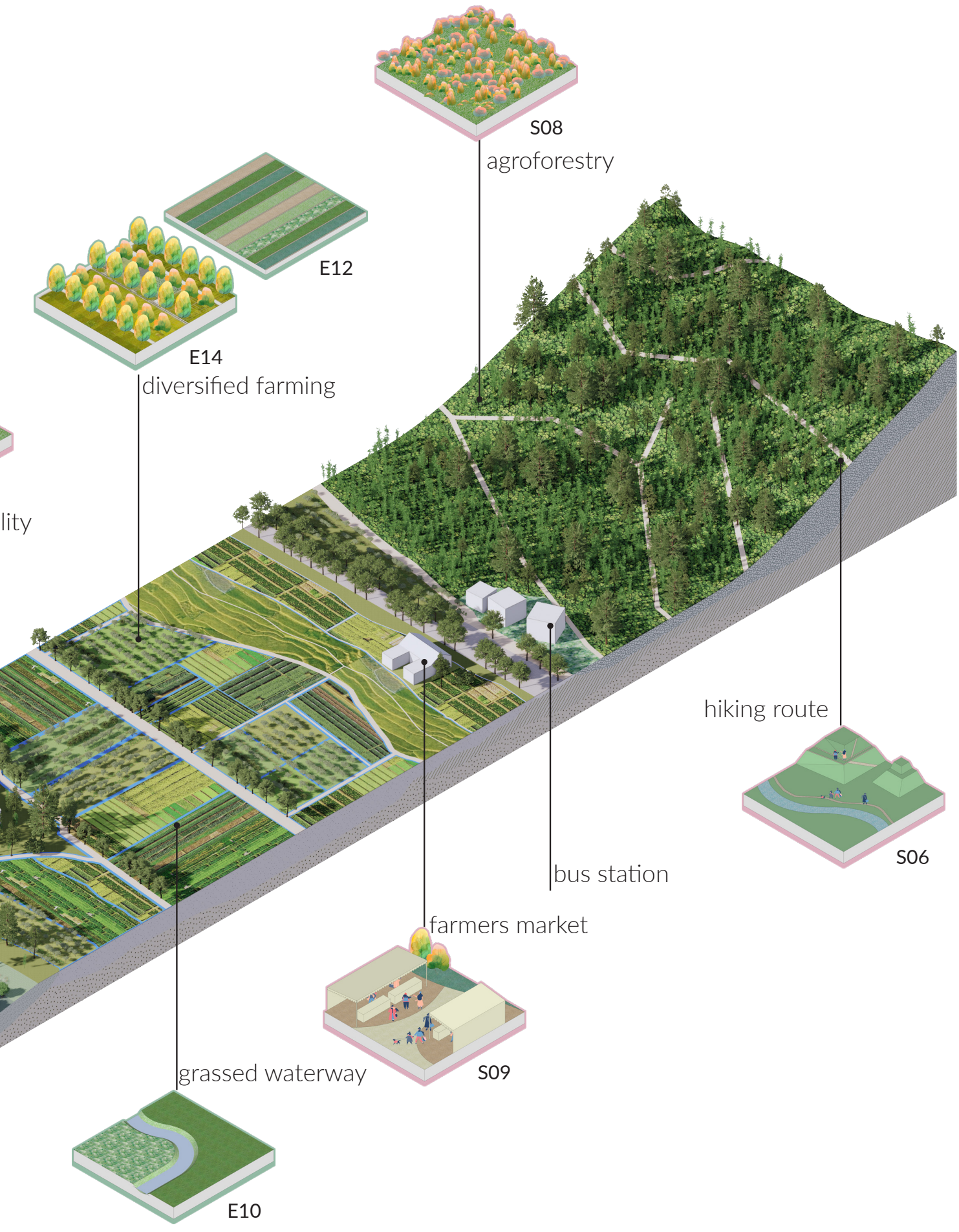
4.3.2 Demostration of design

To further illustrate the strategies, three plots were chosen for design to demonstrate the interactions that occur when different measures meet, and to showcase examples of different measure synthesising under the same principles.The first area extends from a river through a small residential area and large agricultural fields to a hillside. For the riverbanks, the main strategies and principles involve Pollution Control and Natural Purification to improve filtration and regeneration (selected E06), and Floodplain Restoration and Management to enhance absorption and flexibility (selected E08). For the farmlands, Diversification is used to create permanence and harmony (selected E11, E12, E14, E16). For the residential areas and hillside, Developing eco-tourism was chosen to strengthen local economic activities (selected S10, S08, S06).

Plot 1- Synthesising possibility 1






S08
agroforestry
E12
E14
diversified farming
lity
hiking route
S06
bus station
farmers market
S09
grassed waterway
E10

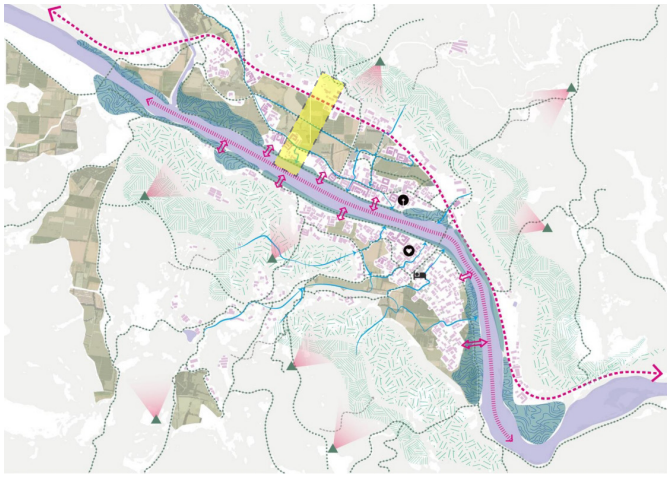
4.3 JIEBU VILLAGE REVITALISATION

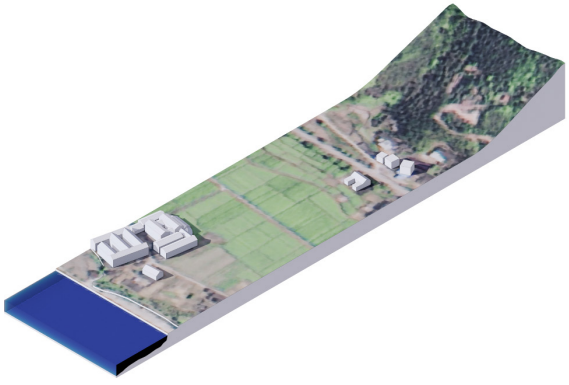
4.3.2 Demostration of design

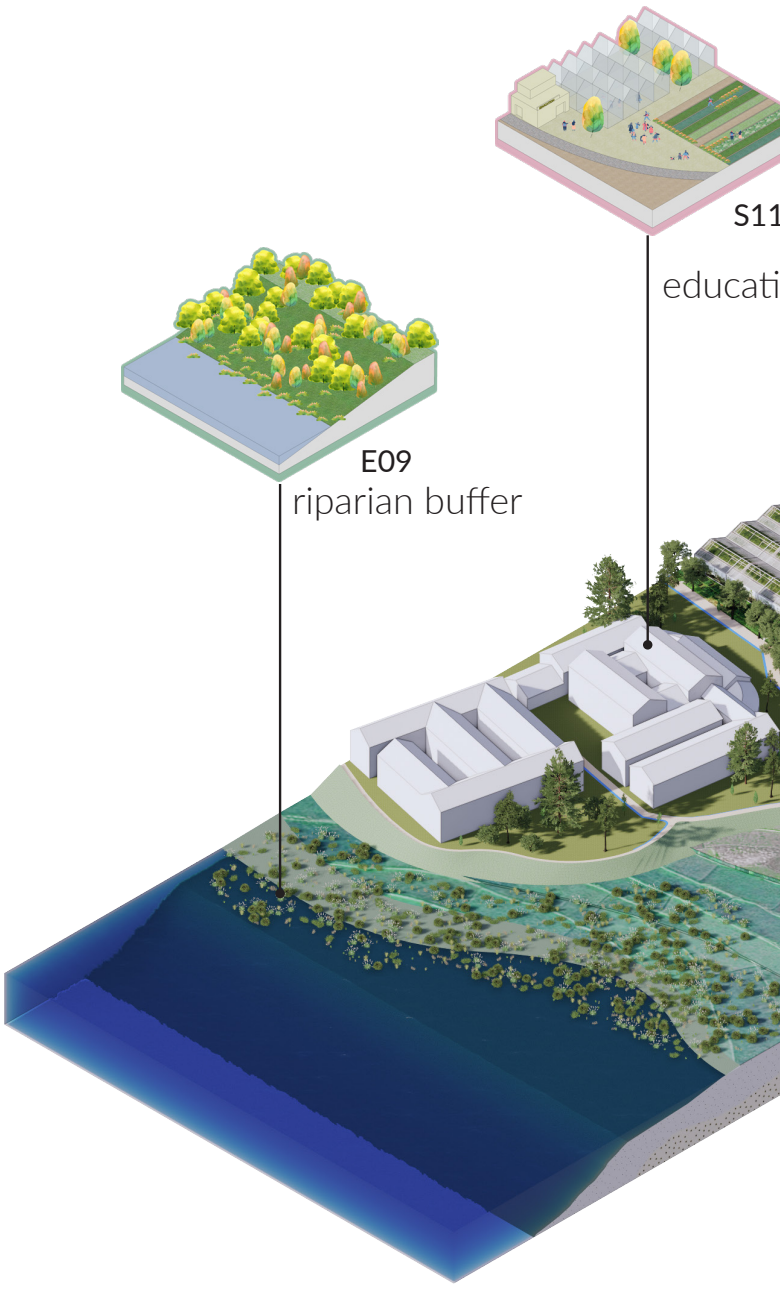
Another possibility for Plot 1 is to focus on different forms of agricultural production in different terrains, combining aquatic crops with floodplain for riverine areas, horticulture for higher sustainability and greater yields in flat areas, and agroforestry and terracing in mountainous areas to enhance soil and water conservation along with agricultural production.

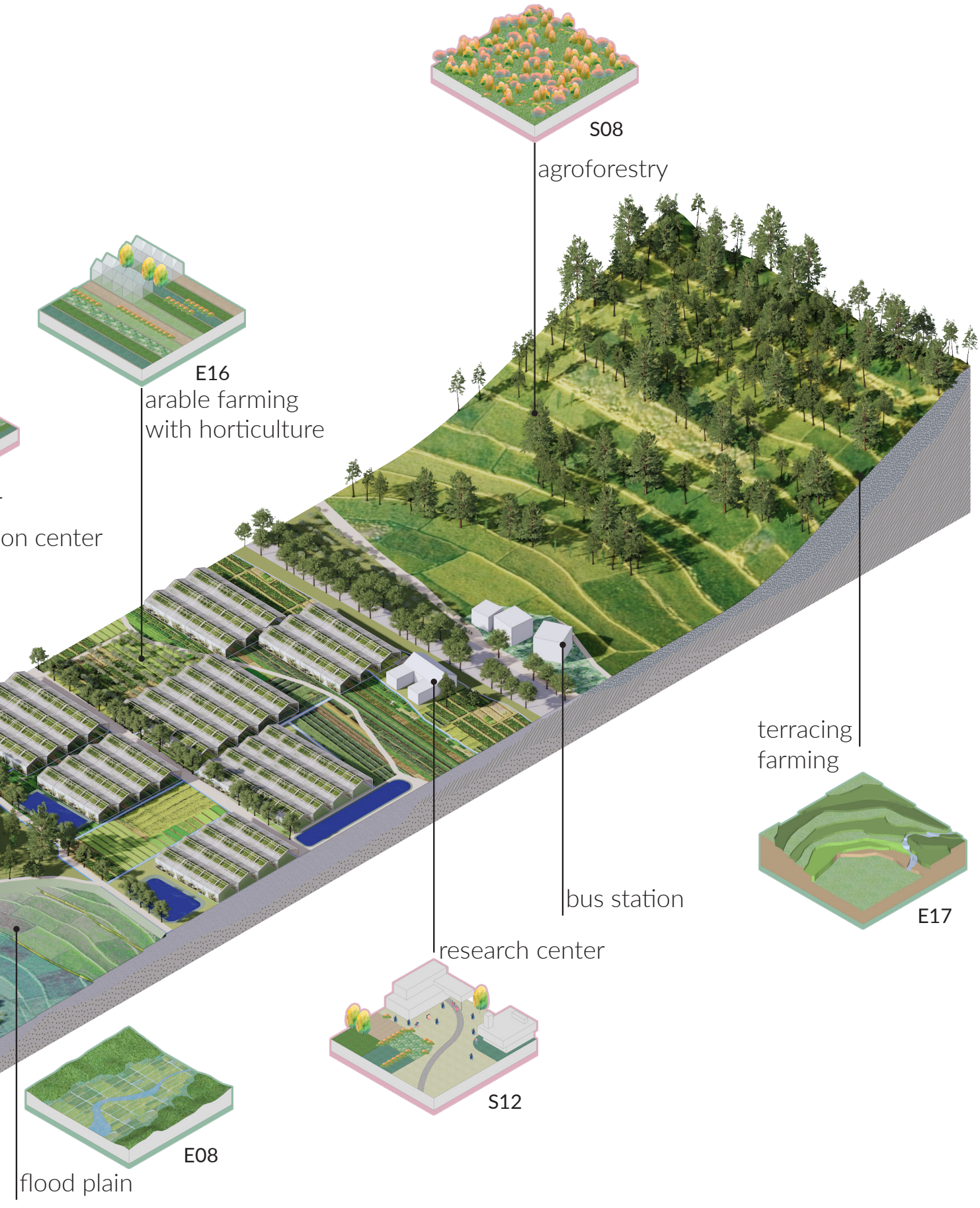
It is important to emphasize that this is just one combination of measures under the same strategies and principles. The selection of measures is diverse, allowing villagers or village committees to choose based on their own conditions during implementation, thus providing flexibility and operability for actual execution.

Plot 1- Synthesising possibility 2





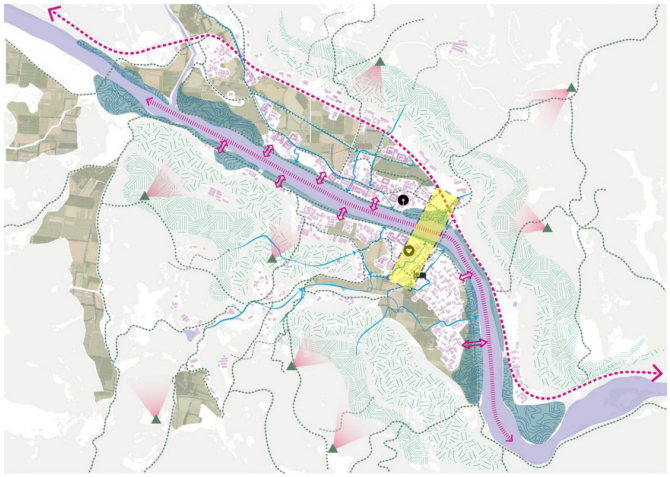



S08
agroforestry
E16
arable farming
with horticulture
on center
terracing
farming
E17
bus station
research center
S12
E08
flood plain

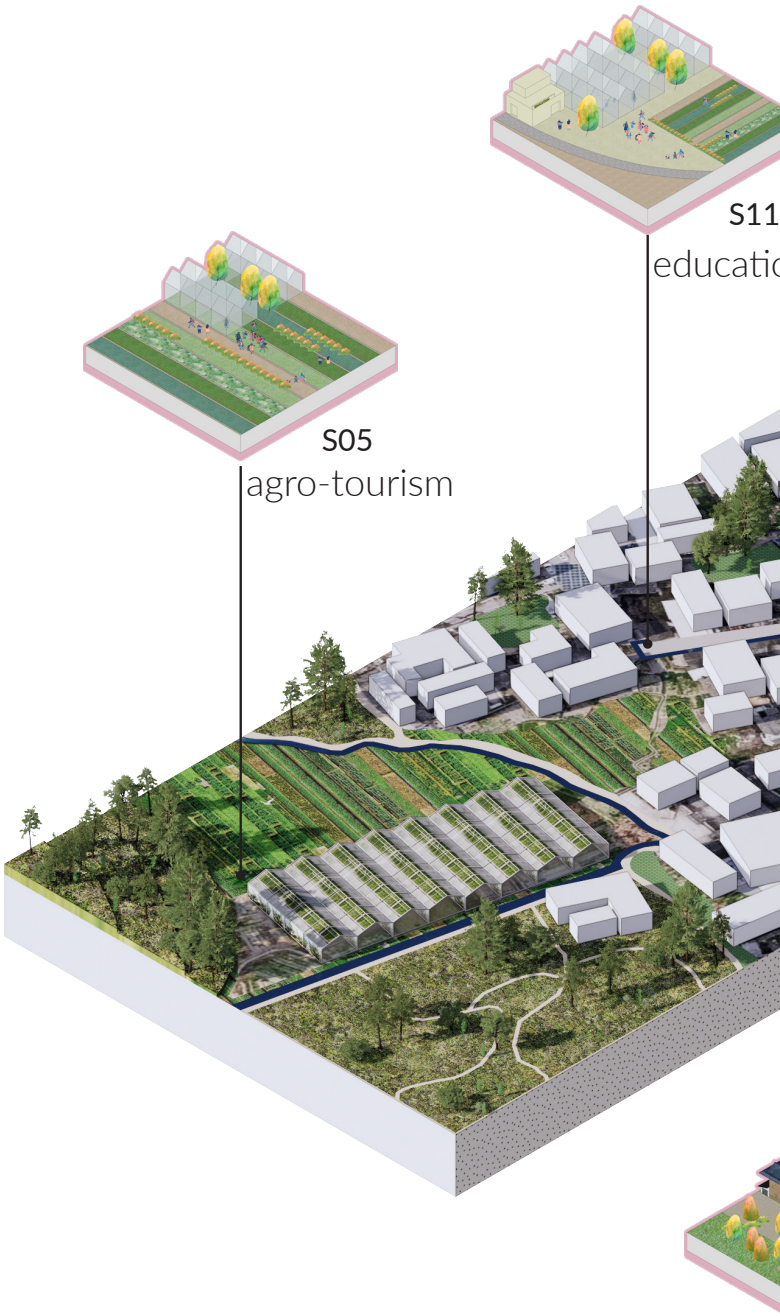
4.3 JIEBU VILLAGE REVITALISATION

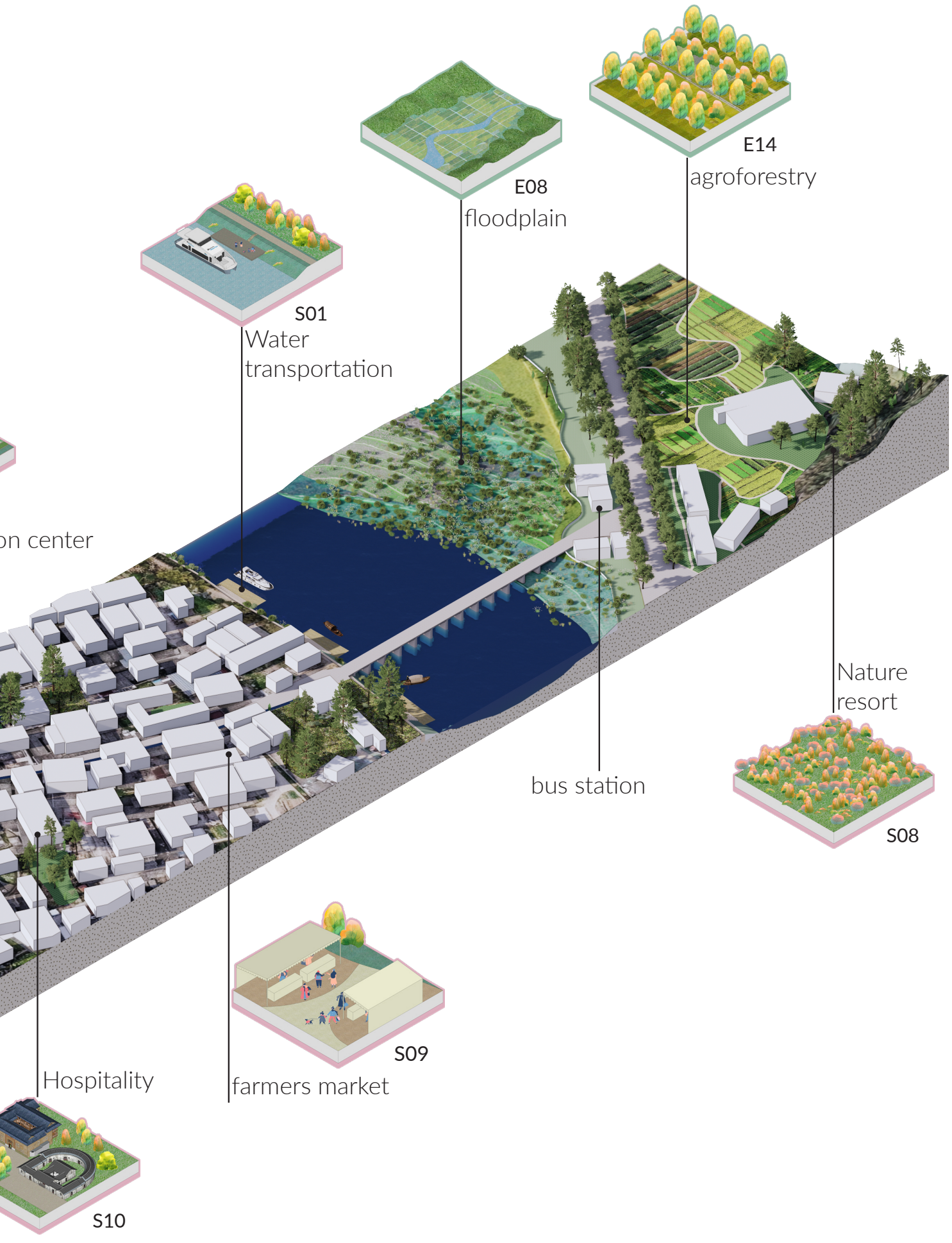
4.3.2 Demostration of design

Plot 2 consists mainly of residential areas, farmland, wide riverbanks, abandoned dams and other landscapes. The first possibility starts from the left, the plot features areas designated for agro-tourism and an education center, emphasizing community engagement and learning. These zones are designed to promote agricultural practices and provide educational resources about sustainable living and local farming techniques. Central to the design is the main village, surrounded by a floodplain that serves as a natural buffer and recreational space. Water transportation routes highlight connectivity, enhancing accessibility within and outside the area. Adjacent to this is a nature resort, providing a retreat for relaxation and nature appreciation. Other key elements include agroforestry to the right, enhancing biodiversity and ecological health, and a farmers market and hospitality area, promoting local produce and tourism. The inclusion of a bus station suggests an emphasis on public transportation, linking all zones efficiently and sustainably.



Plot 2- Synthesising possibility 1

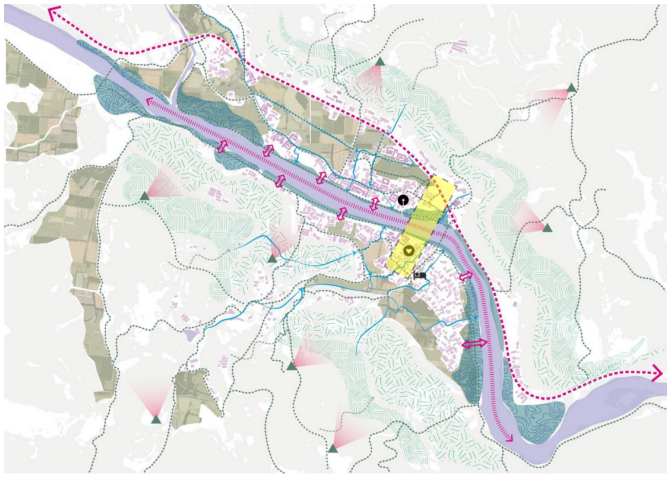



E14
agroforestry
E08
floodplain
S01
Water
transportation
on center
Nature
resort
bus station
S08
S09
Hospitality
farmers market
S10

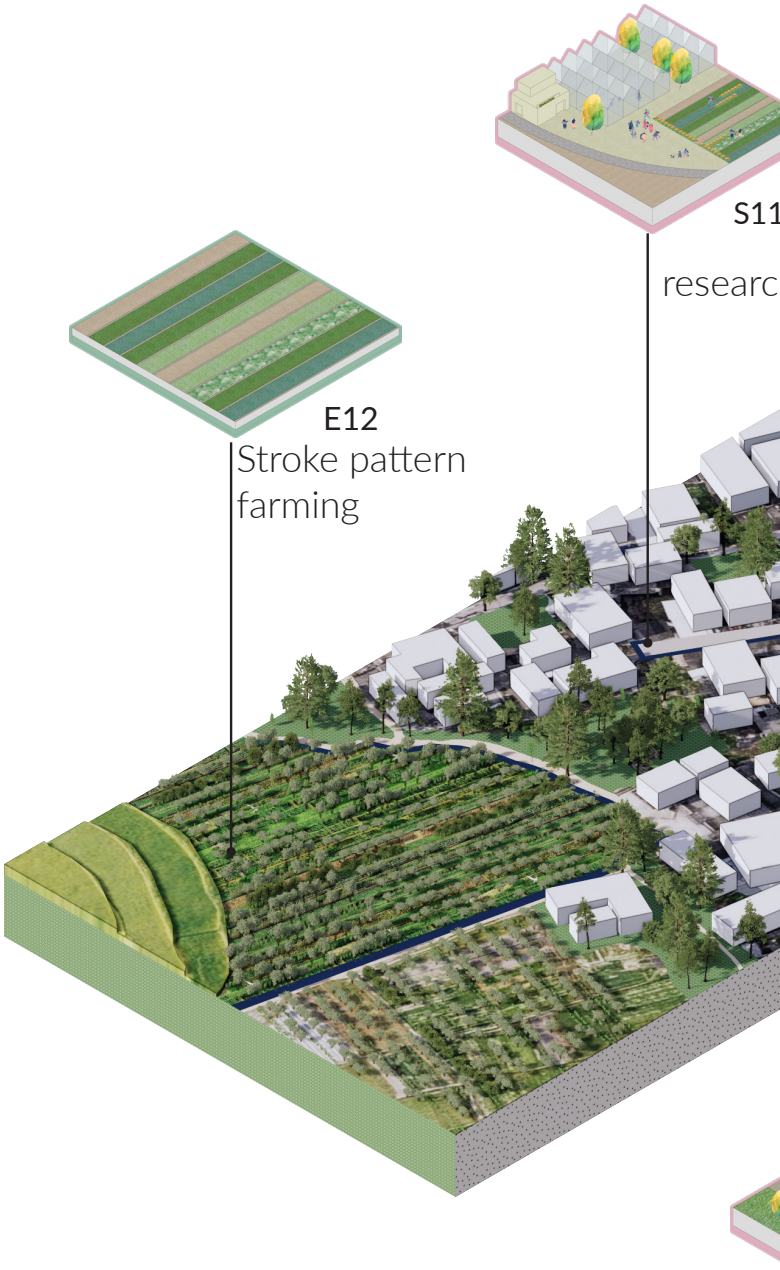
4.3 JIEBU VILLAGE REVITALISATION

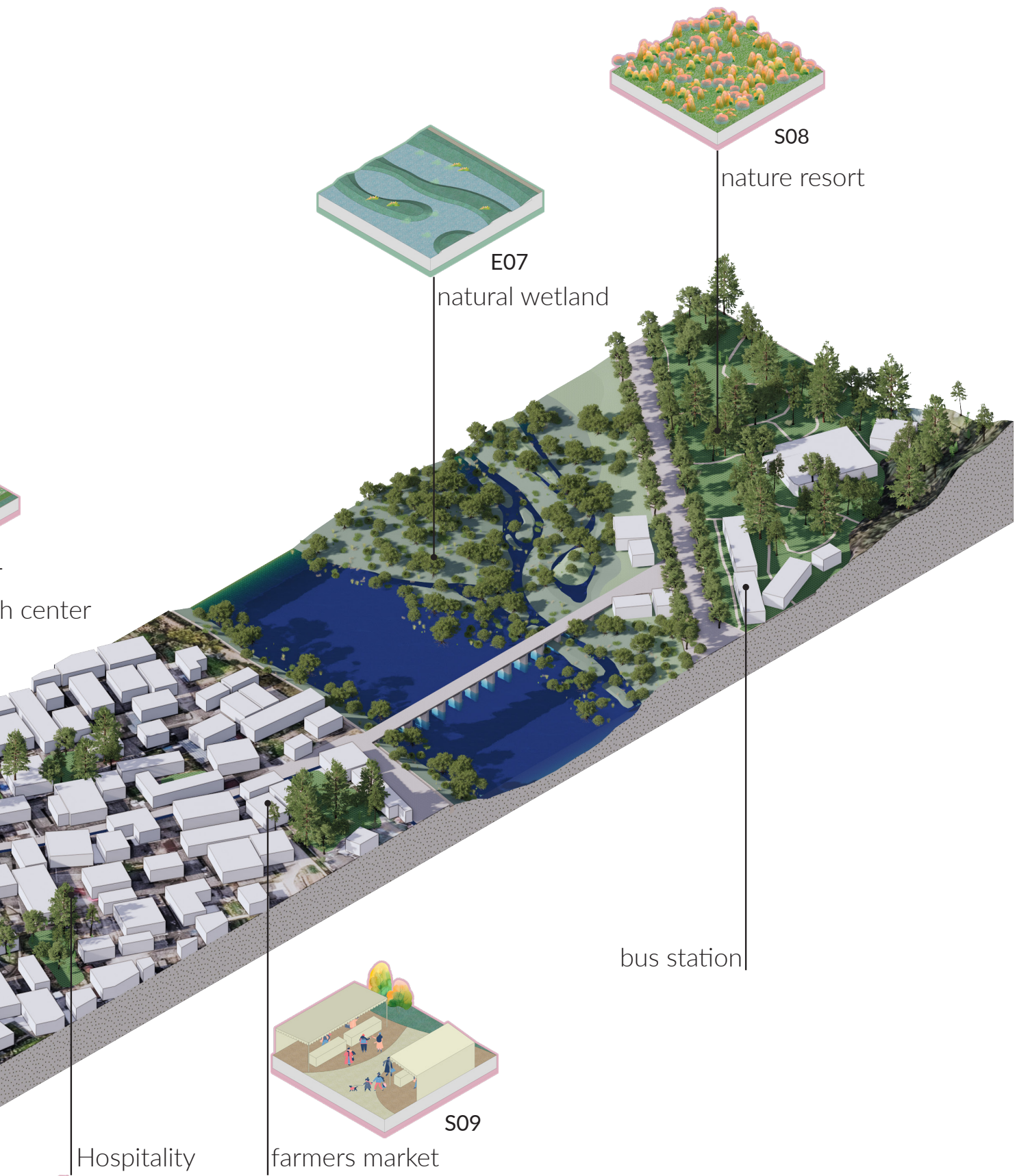
4.3.2 Demostration of design

For the second possibility in plot2, at the forefront is the stroke pattern farming area labeled E12, demonstrating an innovative approach to agriculture that maximizes land use efficiency while promoting biodiversity. This zone serves as a practical model of sustainable farming practices and integrates seamlessly with the central village area, which is densely populated and structured to support strong community interactions. Adjacent to the village is a natural wetland (E07), preserved as an ecological buffer that enhances biodiversity and provides natural water filtration. This zone is essential for maintaining ecological balance and offers educational opportunities about wetland ecosystems. To the right, the plot features a dedicated research center (S11), acting as a hub for scientific study and innovation. This center focuses on sustainable rural technologies and practices, driving forward the community's knowledge and implementation of modern solutions. Additional elements include a nature resort (S08) for ecotourism, promoting local economic development while offering visitors a connection to the area's natural beauty. The integration of a farmers market (S09) and hospitality area (S10) near a bus station underlines the plan's emphasis on accessibility and community engagement, facilitating both local commerce and connectivity.



Plot 2- Synthesising possibility 2

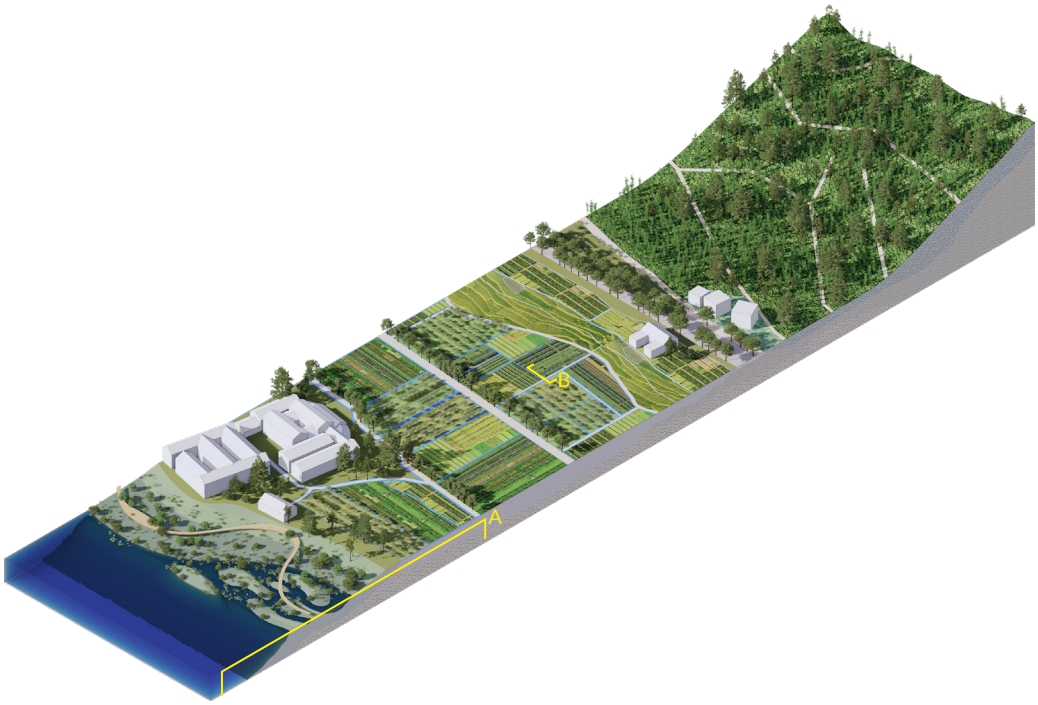


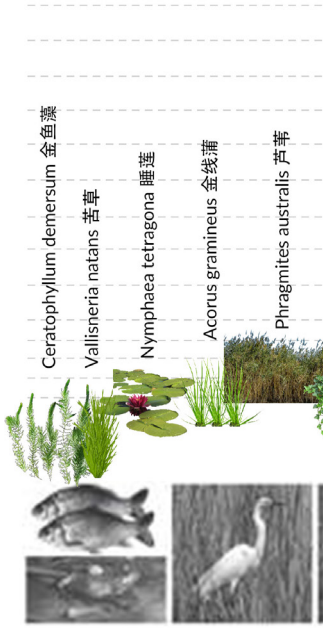

S08
nature resort
E07
natural wetland
h center
bus station
S09
Hospitality
farmers market
S10

4.3 JIEBU VILLAGE REVITALISATION

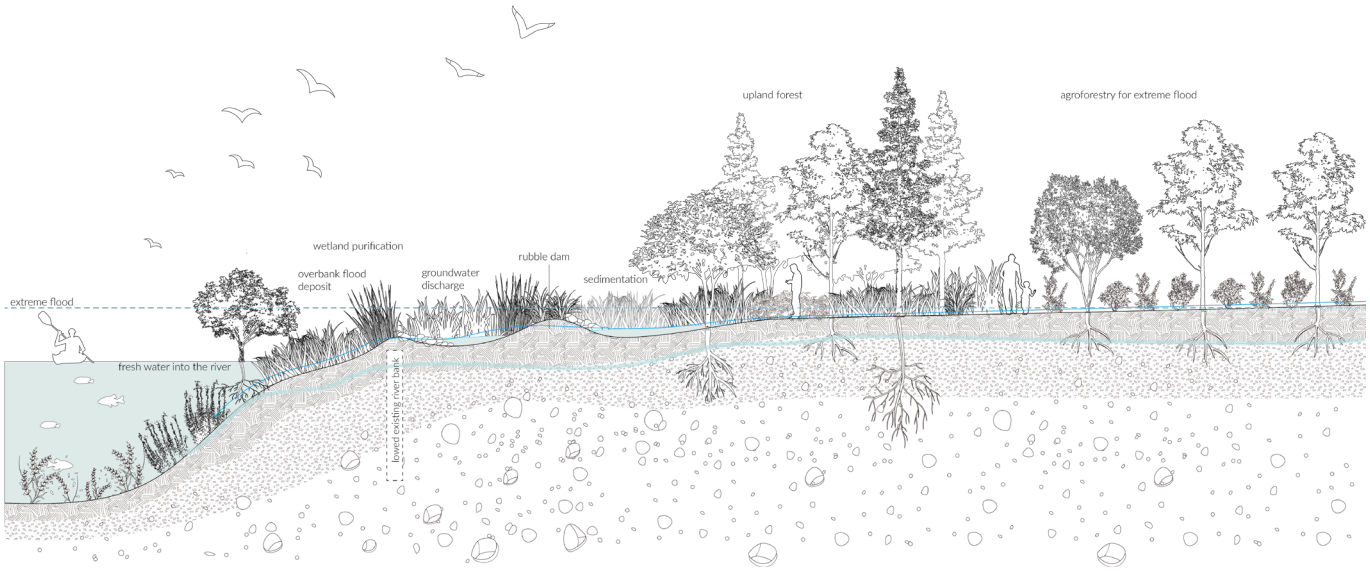
4.3.2 Demostration of design

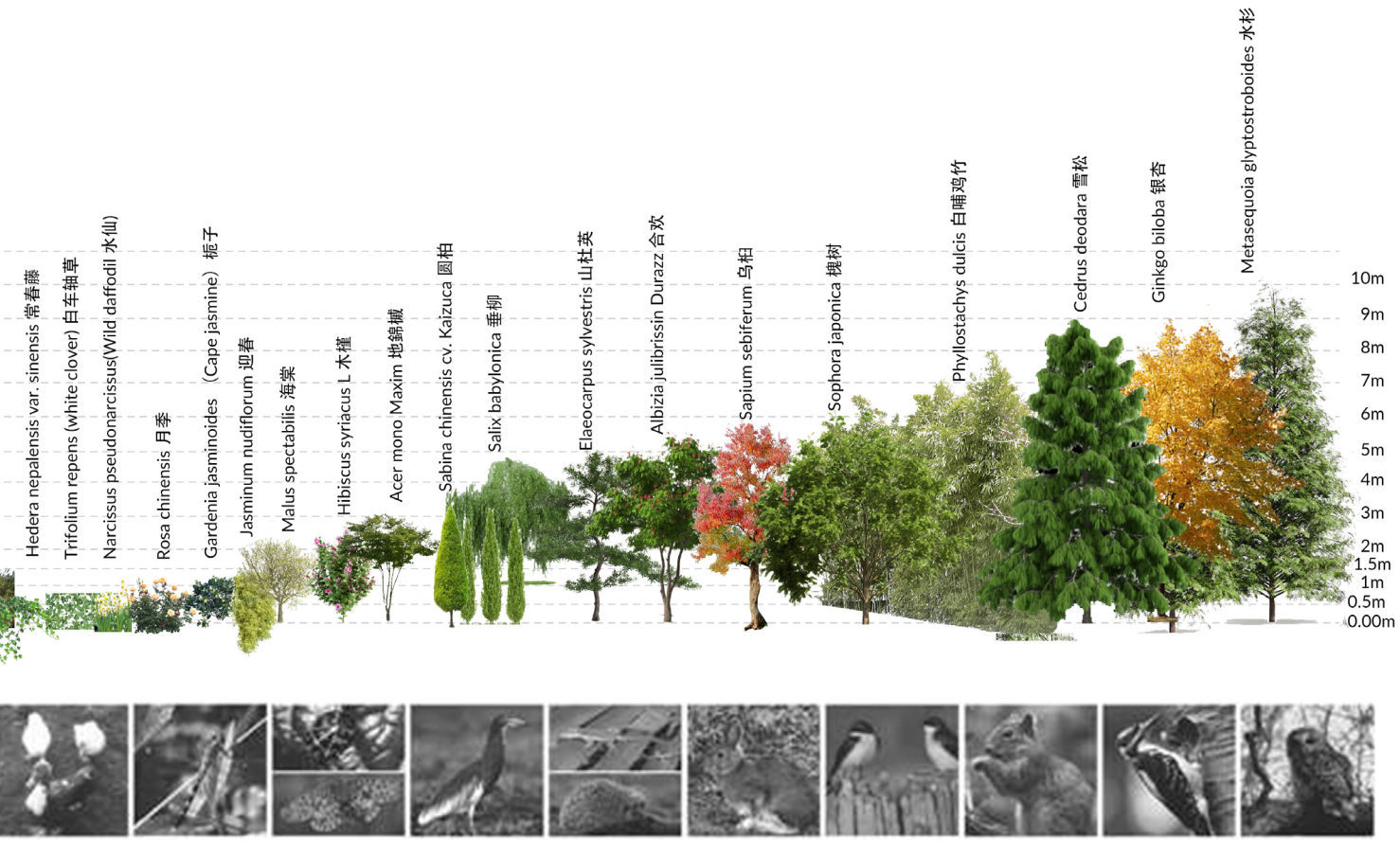
For this design demostration, more detailed cross-sections are displayed, and suitable plant arrangements have been selected specifically for the village for reference.



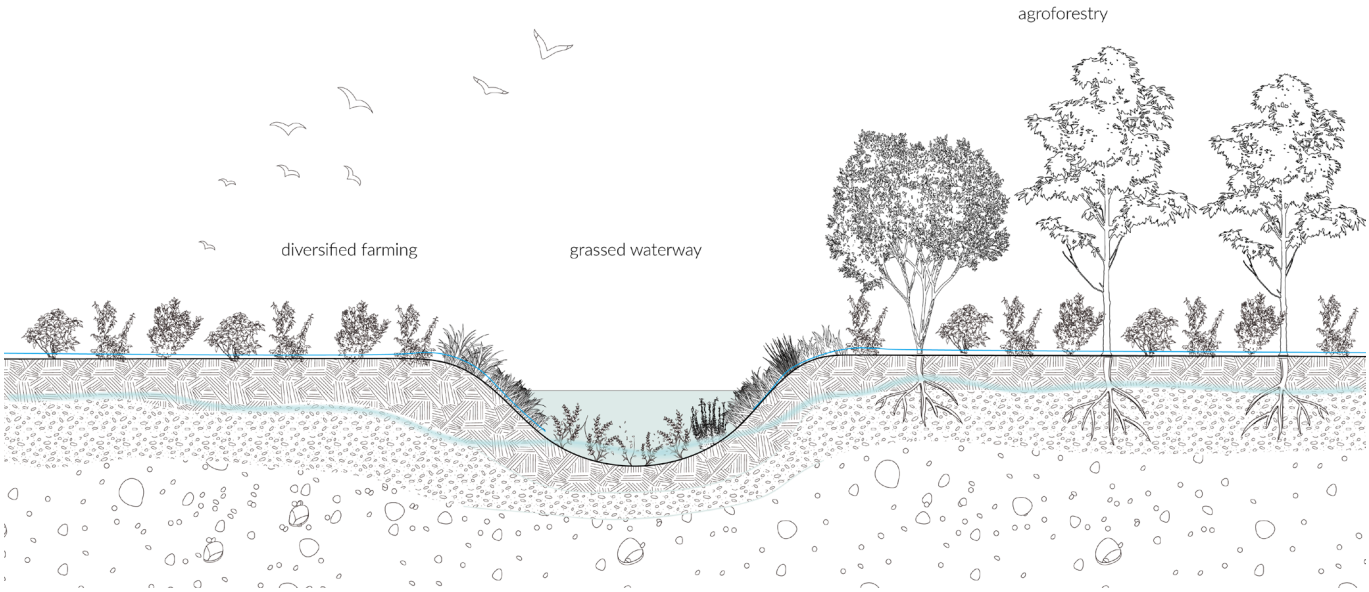


A




Hedera nepalensis var. sinensis 常春藤
Trifolium repens (white clover) 白车轴草
Narcissus pseudonarcissus(Wild daffodil 水仙)
Rosa chinensis 月季
Gardenia jasminoides （Cape jasmine）栀子
Jasminum nudiflorum 迎春
Malus spectabilis 海棠
Hibiscus syriacus L 木槿
Acer mono Maxim 地锦槭
Sabina chinensis cv. Kaizuca 圆柏
Salix babylonica 垂柳
Elaeocarpus sylvestris 山杜英
Albizia julibrissin Durazz 合欢
Sapium sebiferum 乌桕
Sophora japonica 槐树
Phyllostachys dulcis 白哺鸡竹
Cedrus deodara 雪松
Ginkgo biloba 银杏
Metasequoia glyptostroboides 水杉
10m
9m
8m
7m
6m
5m
4m
3m
2m
1.5m
1m
0.5m
0.00m

B


agroforestry
diversified farming
grassed waterway

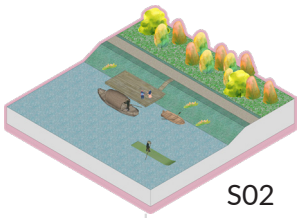
4.3 JIEBU VILLAGE REVITALISATION

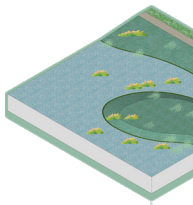
4.3.2 Demostration of design

The scene highlights a well-established riparian buffer, rich with native vegetation that stabilizes the riverbank, filters pollutants, and provides habitat for local wildlife. This green infrastructure is pivotal, not only for its ecological functions but also as a scenic backdrop that enhances the aesthetic value of the area.

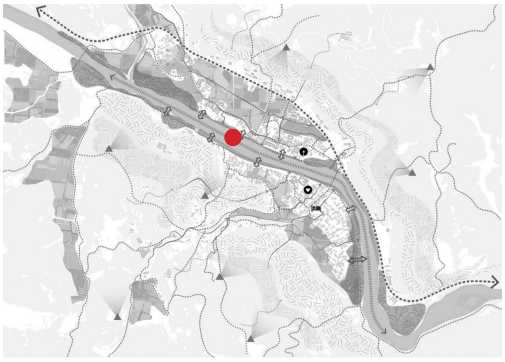
Recreational activities are central to the design, illustrating the dual benefit of ecological spaces that cater to community well-being. Small boats and kayaks glide over the water, showing the river's role as a recreational asset, while footbridges and riverside paths invite residents to walk, relax, and engage with nature. These features make the river accessible and enjoyable, promoting a lifestyle that values and interacts with the natural environment.

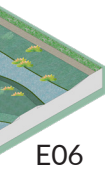
The integration of the riparian buffer with community spaces exemplifies how ecological restoration efforts can coexist with human-centered designs. This approach not only supports



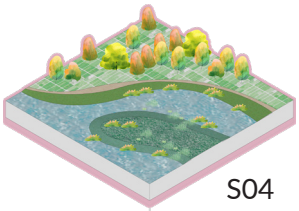


biodiversity and ecosystem health but also fosters social interactions and recreational opportunities, making the river a focal point for community life and sustainable development. This rendering captures the essence of a community thriving in synergy with its natural surroundings, where ecological care underpins societal growth.

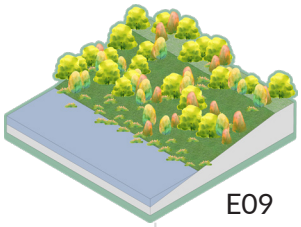




E06



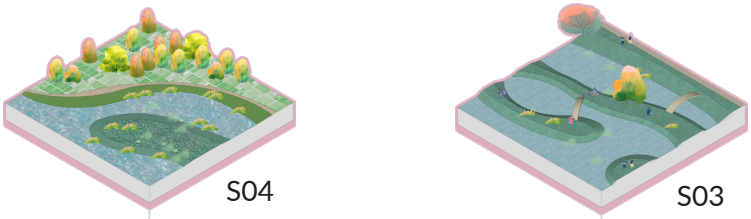
S04

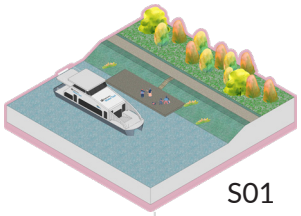


E09

4.3 JIEBU VILLAGE REVITALISATION

4.3.2 Demostration of design





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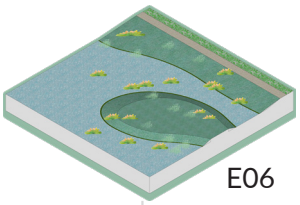


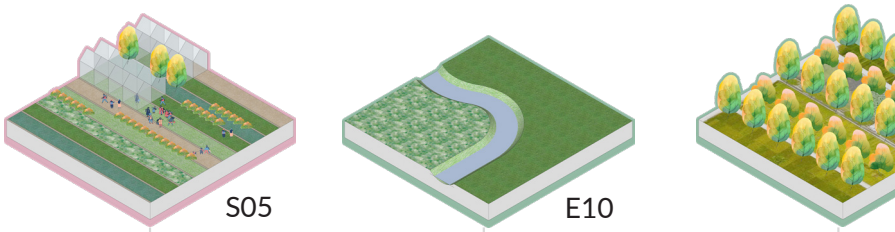
E06

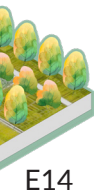
4.3 JIEBU VILLAGE REVITALISATION

4.3.2 Demostration of design

The scene portrays a variety of agricultural techniques that emphasize sustainability: Agroforestry merges tree cultivation with crop production to enhance biodiversity and soil health; Crop rotation and Stroke pattern farming are illustrated through the varied cultivation patterns, optimizing soil nutrients and minimizing pest cycles; Arable farming alongside horticulture diversifies the landscape, promoting a healthy ecosystem and increasing yield resilience.

The inclusion of a Grassed waterway running through the farmland demonstrates an effective soil erosion control strategy, ensuring that water runoff is managed sustainably. This agricultural setup not only supports ecological balance but also fosters community involvement and educational opportunities. The depiction of local residents and visitors engaging with the farm highlights Agro-tourism and Sustainable farming education initiatives, creating a space where knowledge about sustainable practices is shared and celebrated.





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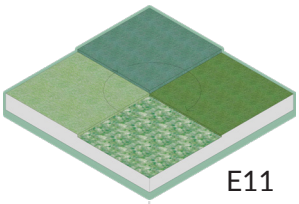

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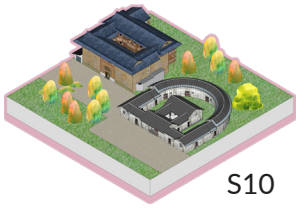
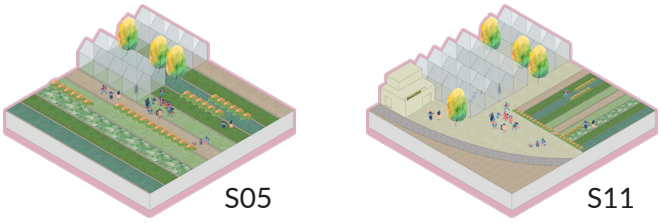


S10

4.3 JIEBU VILLAGE REVITALISATION

4.3.2 Demostration of design

Social interactions are woven throughout the scene, from children learning about farming techniques to adults participating in the cultivation processes, depicting a community deeply connected to its environment. This integration of ecology and society exemplifies a model where environmental care and community development coalesce, driving forward a sustainable future for both the land and its people. This approach ensures that the landscape is not only productive but also a source of educational enrichment and social cohesion, illustrating a practical and replicable model of sustainable rural development.



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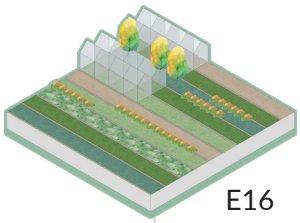


E16

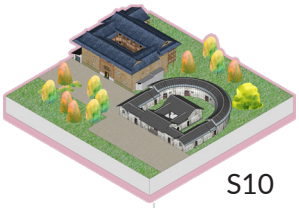
4.3 JIEBU VILLAGE REVITALISATION

4.3.2 Demostration of design

This rendering showcases a bustling farmers market nestled within a traditional village setting, emphasizing the fusion of culture, hospitality, and local livelihood. The market scene is framed by historical buildings, whose architectural charm underscores the region's rich cultural heritage, providing an authentic backdrop that enriches the community experience.

Stalls are laden with fresh, locally-sourced produce and artisanal goods, highlighting the community's commitment to sustainable living and support for local farmers. These markets not only serve as a critical economic hub for local agriculture but also act as vibrant social spaces where residents and visitors can engage directly with producers, fostering a strong sense of community and mutual support.

The integration of hospitality elements is evident through the inviting arrangement of shaded areas, seating, and pedestrian-friendly pathways that encourage visitors to linger and enjoy the

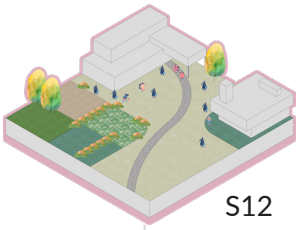


S10

ambiance. This setup enhances the market's role as a community gathering spot, promoting cultural exchange and social interaction.
Overall, this farmers market is more than just a place to buy food; it is a celebration of local culture and a vital part of the community's social fabric. It plays a key role in enhancing local livelihoods, preserving cultural identities, and building a sustainable future for the village.

You can learn more through VR:
Link:
https://www.720yun.com/t/dfaki77w5r9
QR code:

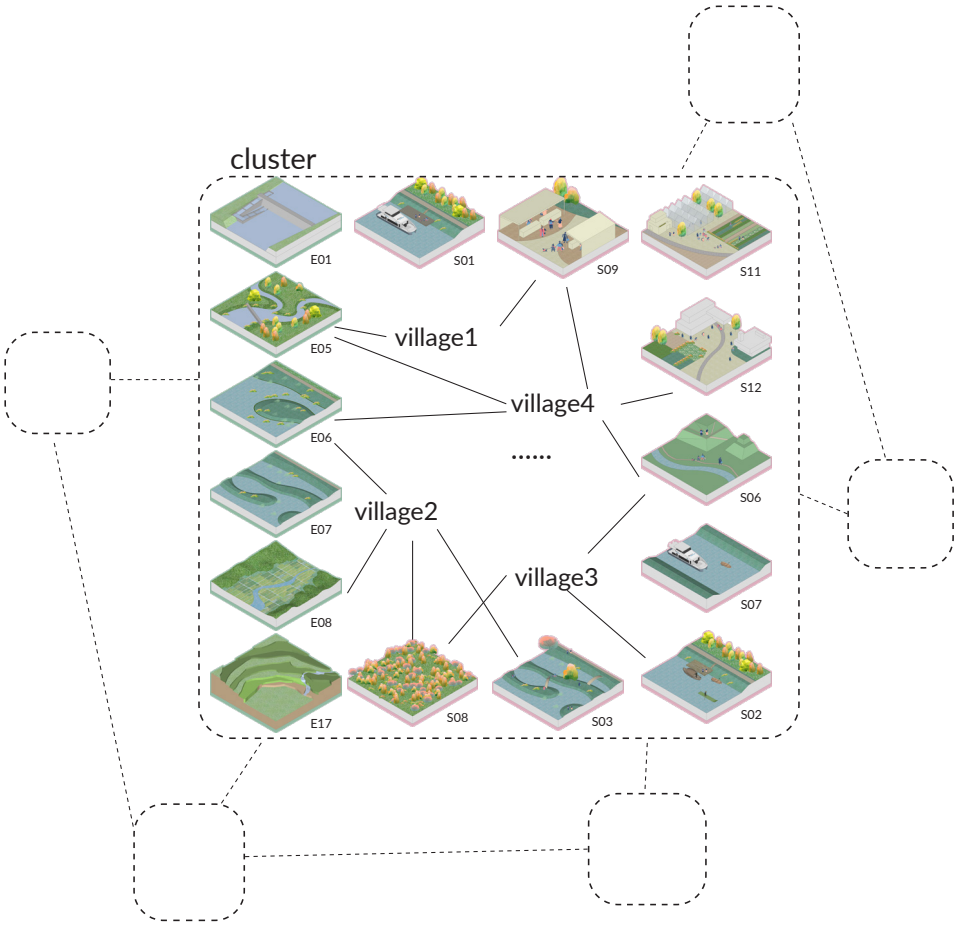

S09

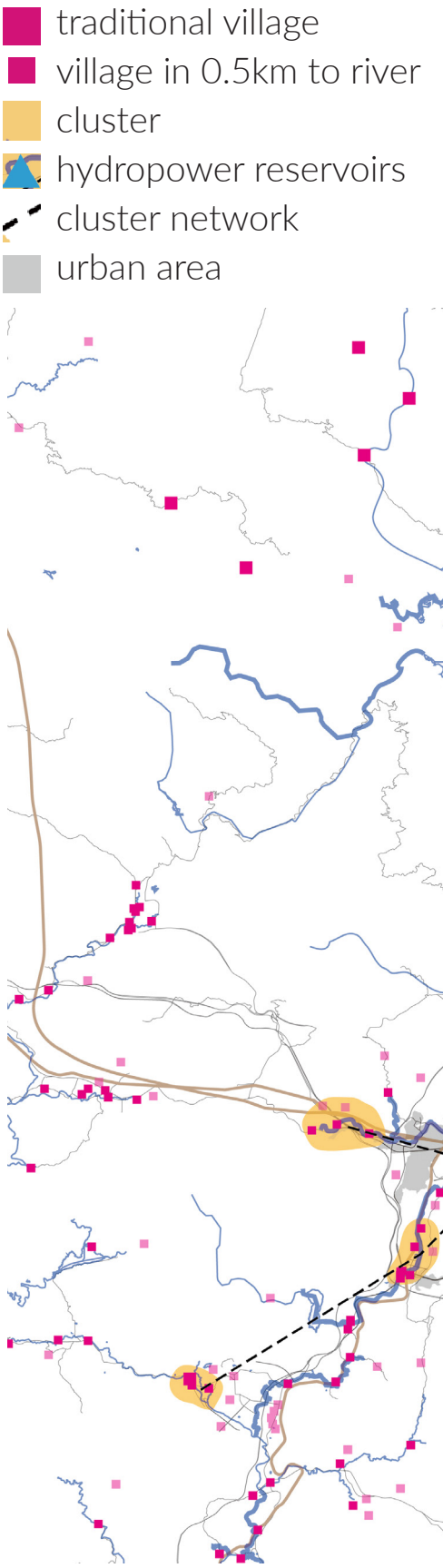

S12

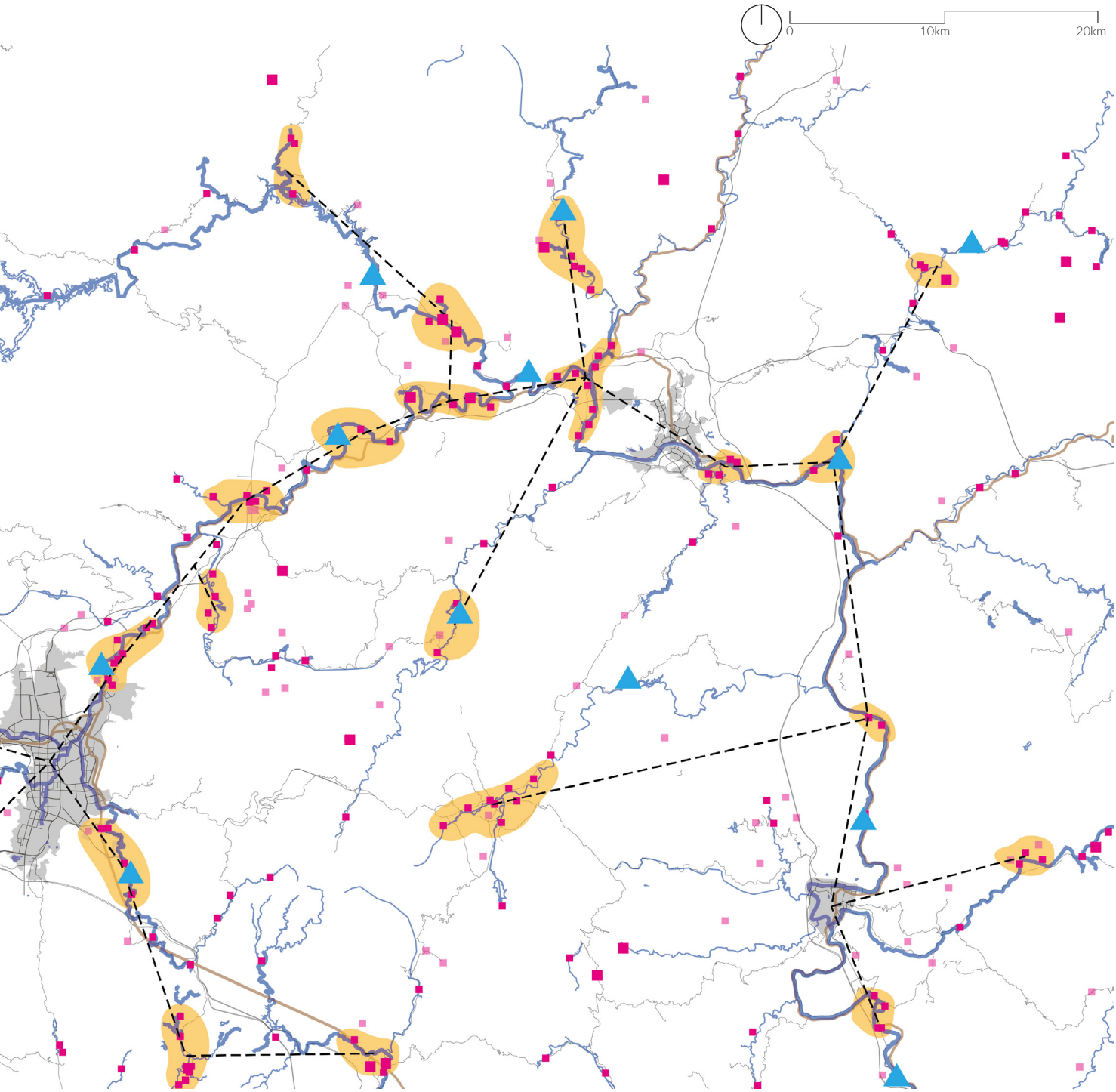
4.4 UPSTREAM REGION REVITALISATION

4.4.1 Cluster

From previous excursions and analyses, it is evident that many traditional villages are distributed along the river in the upstream region. Although each village has its unique conditions, neighboring villages can share infrastructure and scale up similar industries to generate greater benefits, thereby improving ecological integrity more effectively. Therefore, the concept of clustering is introduced at this stage, integrating factors such as village conditions, proximity, and relationships with hydropower stations to determine clusters as shown on the map. Measures that mainly related and need collaboration within clusters are showed in the diagram.



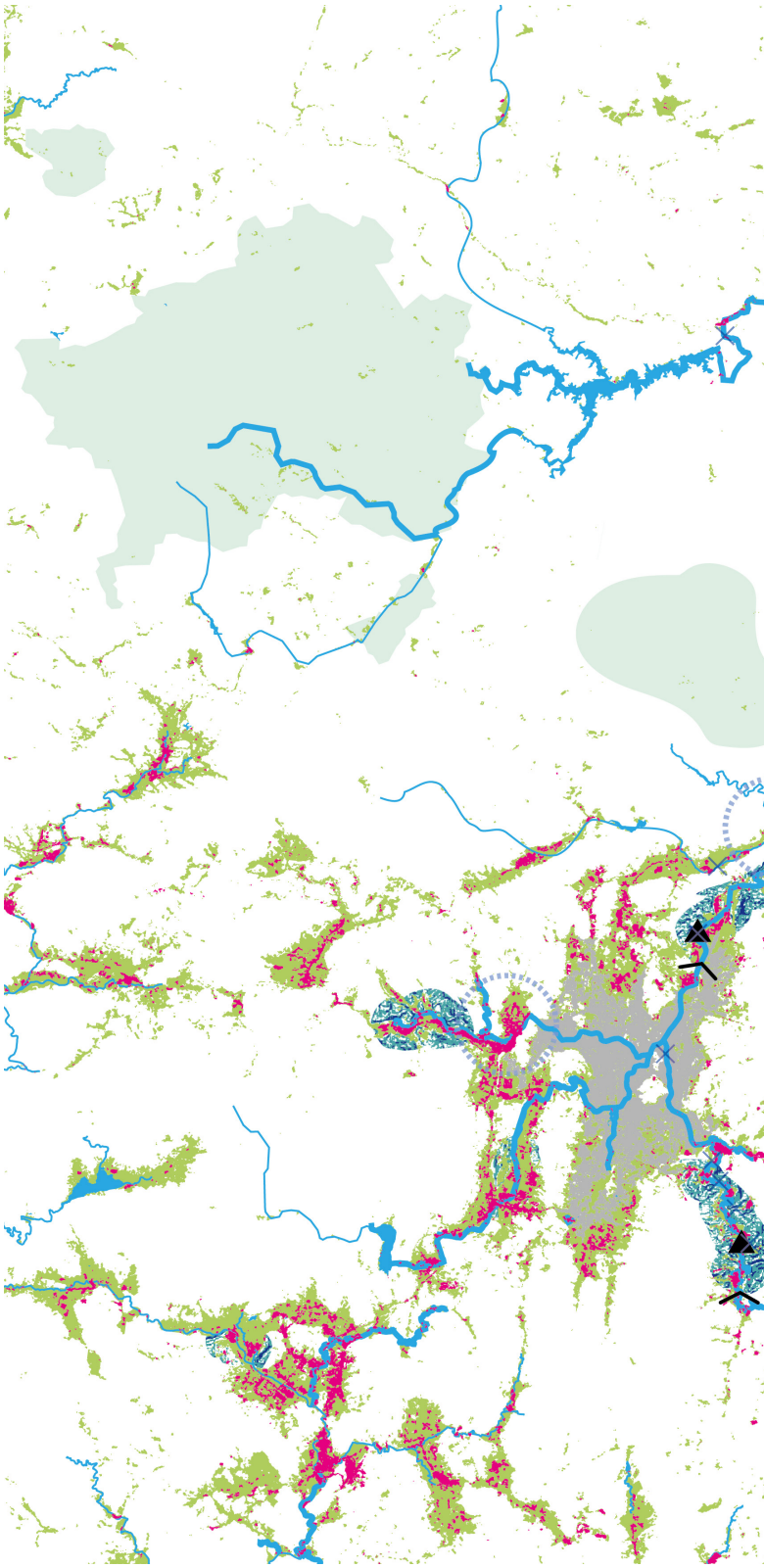



0
10km
20km

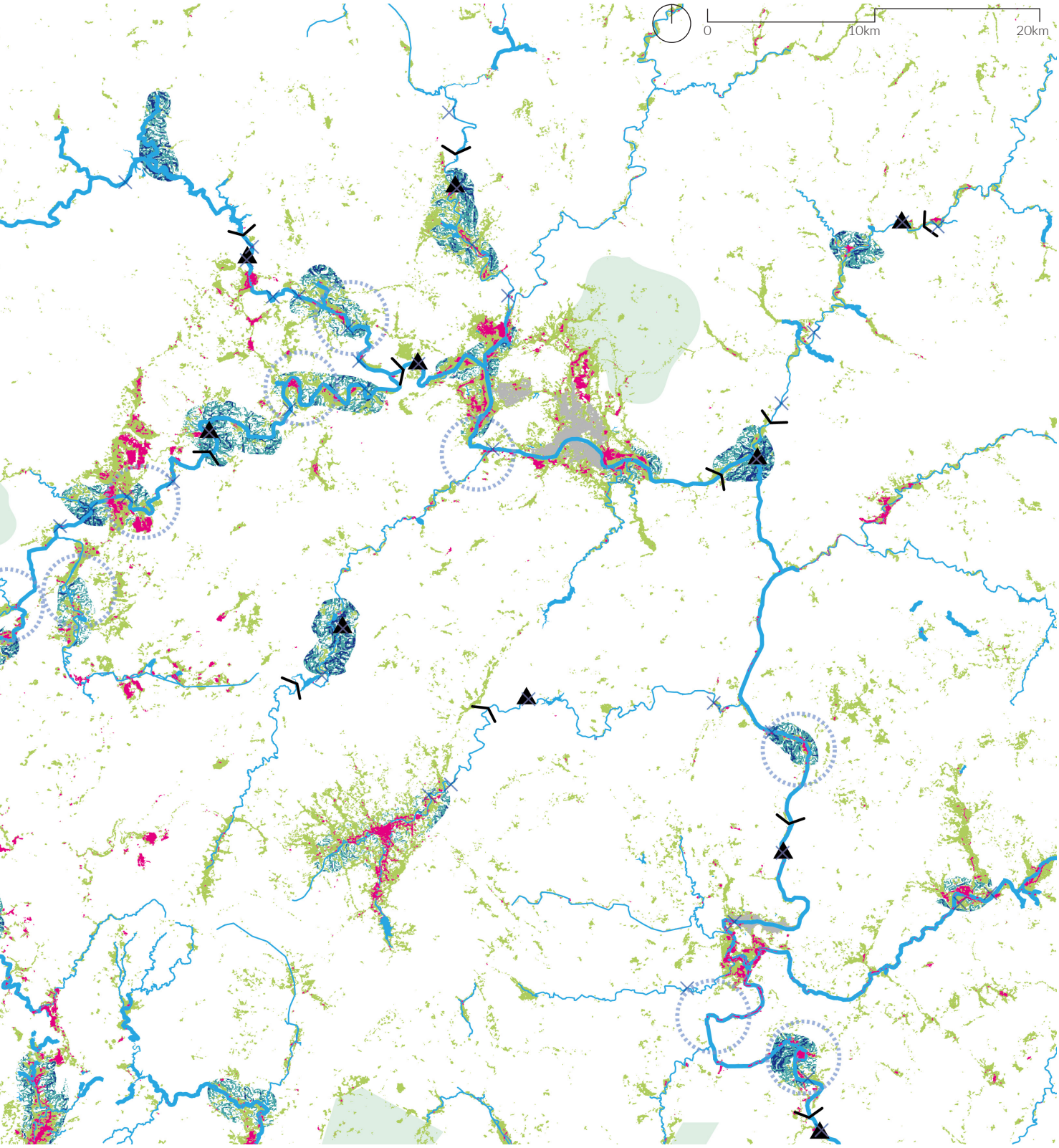
4.4 UPSTREAM REGION REVITALISATION

4.4.2 Ecological network

In the ecological network at the upstream regional scale, the phasing out of hydropower stations is proposed, with only key stations retained as shown in the diagrams, thus improving the connectivity of the water network. The rivers link the various clusters, and within these clusters, areas at risk of significant soil erosion due to steep slopes (greater than 15 degrees) are identified for vegetation management.Furthermore, riverbanks within the cluster areas are to be enhanced, for instance, by establishing wetlands to purify water, conserve soil, and reduce flood risks. The agricultural fields within the region are also diversified and employ sustainable practices. As a result, a new ecological blue-green network is formed, enhancing the overall environmental resilience and sustainability of the area.



- slope 15-30°
- slope >30°
- arable land
- national forest park
- rural area
- urban area
- waterway
- riverflow direction
- hydropower reservoir
- removed hydropower reservoir
- flood risk area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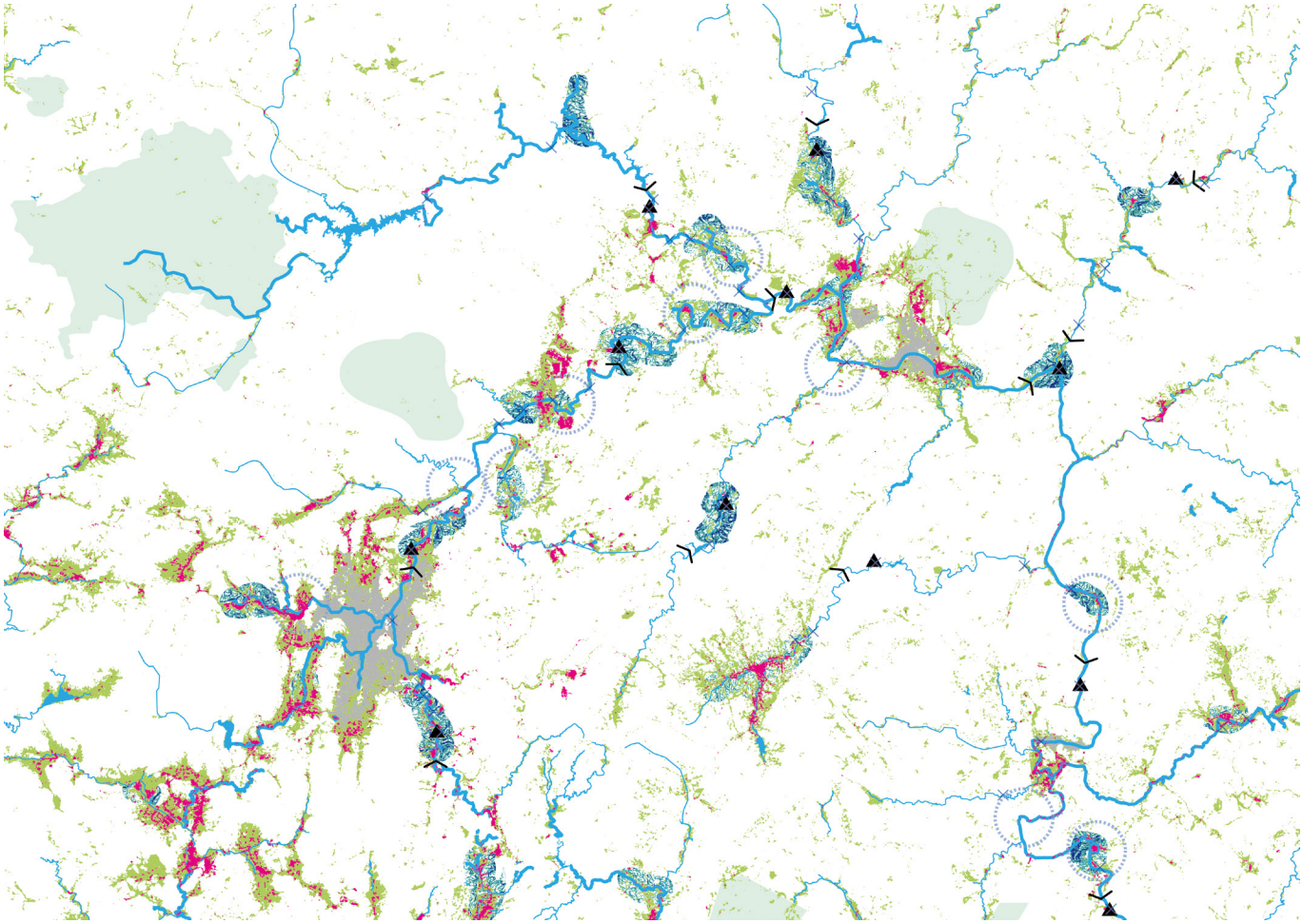
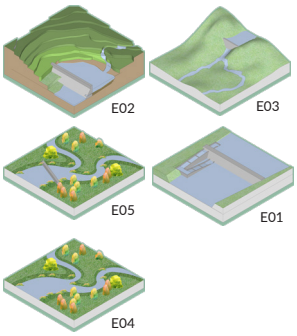
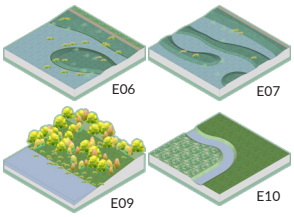
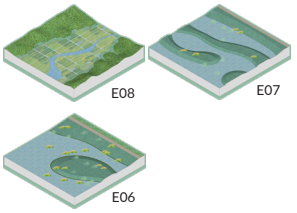
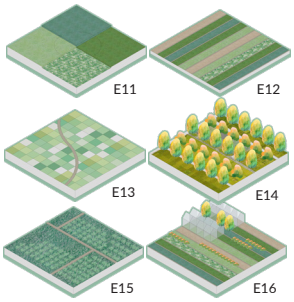
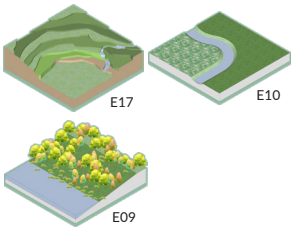
4.4 UPSTREAM REGION REVITALISATION

4.4.2 Ecological network



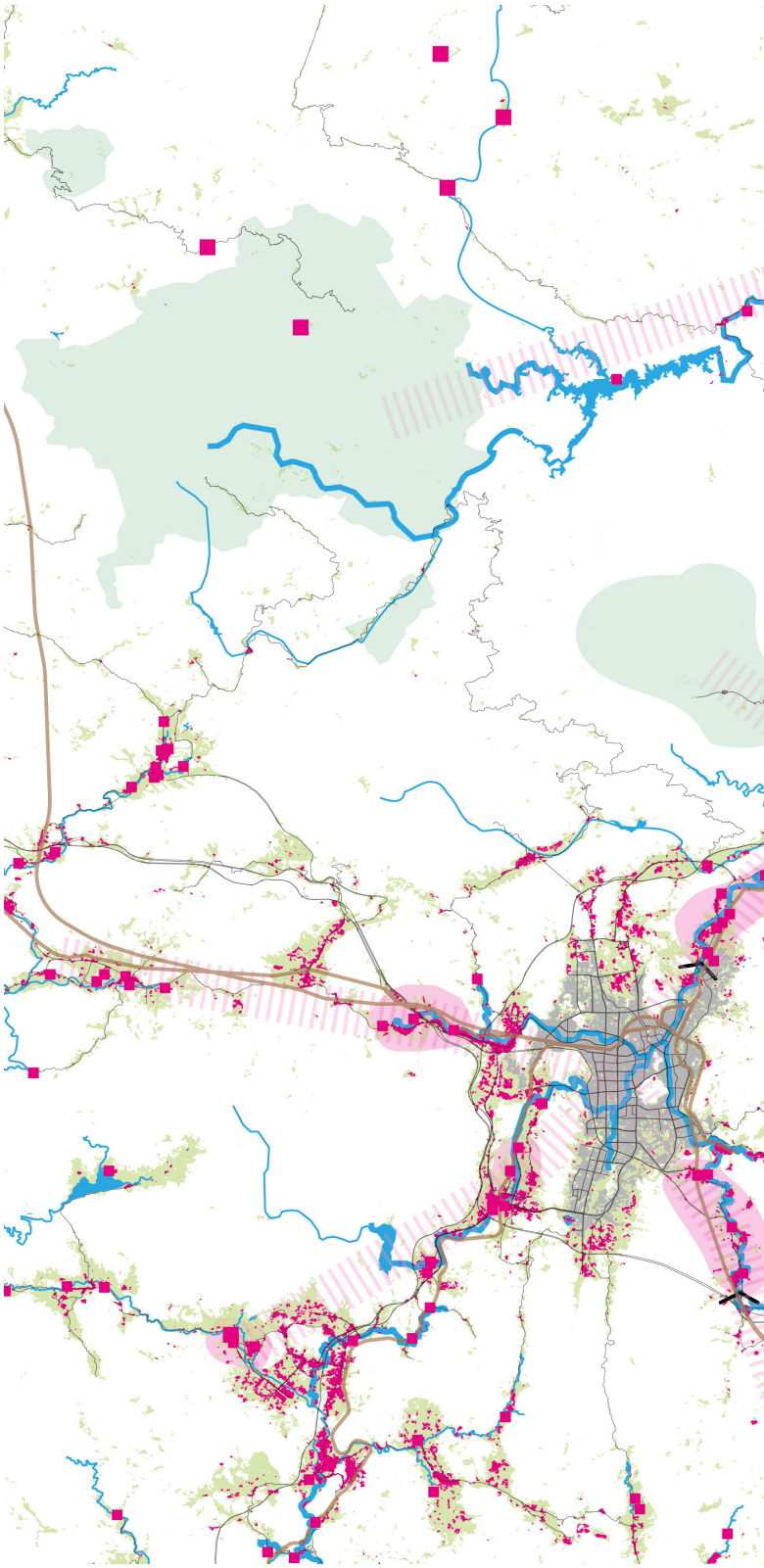
Legend	Strategy	Principle	Possible Measure
waterway hydropower reservoir removed hydropower reservoir	Integrated River Management	Restore and enhance ecological connectivity and resilience	
waterway riverfront	Pollution Control and Natural Purifcation	Improve filtration and regeneration	
flood risk area	Floodplain Restoration	Enhance absorption and flexibility	
arable land	Diversifcation Sustainable Practices in Agriculture	Create permanence and harmony	
slope 15-30° slope >30°	Erosion Control Sustainable Land Management	Create and enhance soistability and productivity	

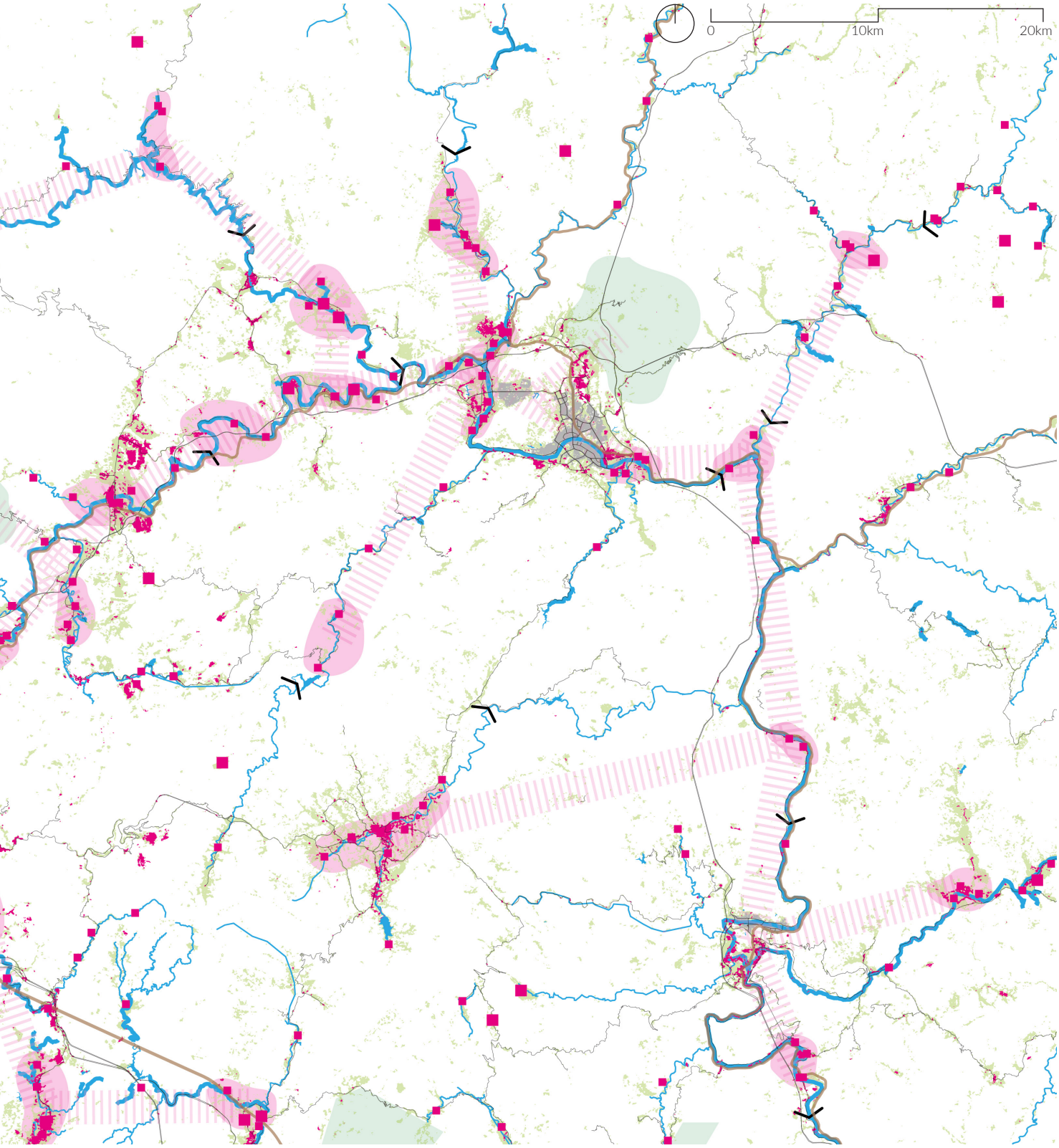
4.4 UPSTREAM REGION REVITALISATION

4.4.3 Societal network

Clusters are gatherings of villages that inherently possess deep historical and cultural value. The interconnections between these clusters form a cultural network, which, when combined with untapped economic and industrial opportunities, also creates a social network.

The social network intertwines with the ecological network, with the river acting as a central axis. This integration revitalizes the upstream riverside villages, promoting both ecological sustainability and social development. Together, these networks foster a holistic approach to rural revitalization, enhancing the quality of life and preserving the cultural heritage while ensuring environmental integrity.

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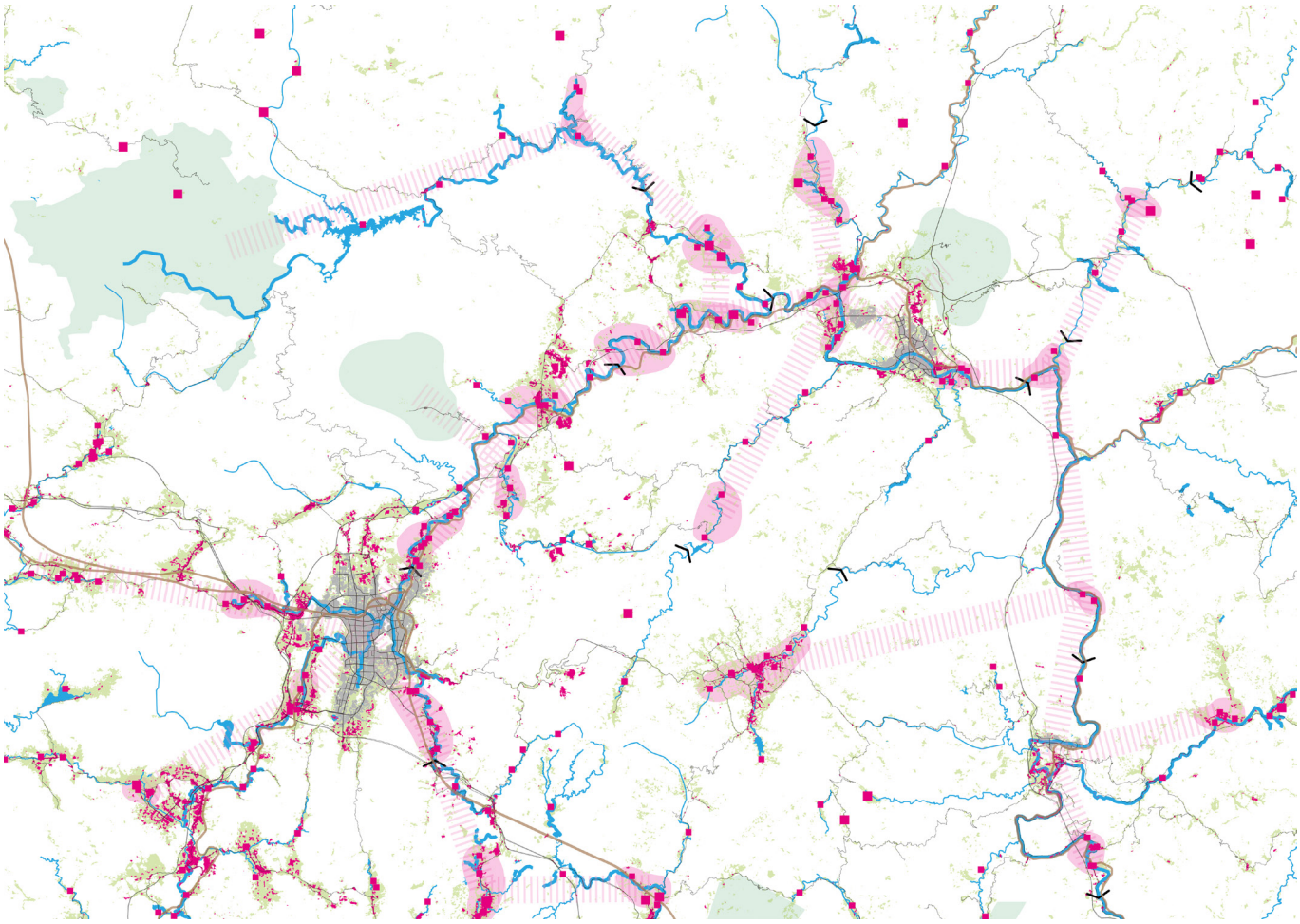
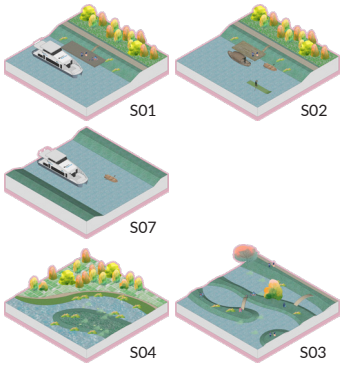
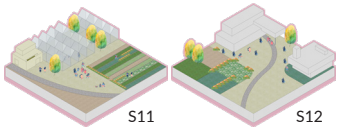
4.4 UPSTREAM REGION REVITALISATION

4.4.3 Societal network



Legend	Strategy	Principle	Possible Measure
waterway	Riverfront/riverline Development& Community Involvement	Foster accessibility and participation	
arable land	Sustainable agriculture production	Enhance local economies through sustainable, river-related activities	
collaboration cluster traditional village village in 0.5km to river rural area	Develop eco-tourism		
traditional village	Educational Programs and Research Collaboration	Increase knowledge and community engagement with river conservation	

4.4 UPSTREAM REGION REVITALISATION

4.4.4 E-participation platform

The Jiulong River Revitalization Digital Platform is an innovative tool designed to engage stakeholders comprehensively in the sustainable development of the Jiulong River upstream region. This platform leverages the widespread accessibility of the internet and the popularity of platforms like WeChat and TikTok among locals to foster a participatory approach in rural revitalization efforts. By doing so, it efficiently harnesses the collective knowledge and engagement of a dispersed and diverse population that spans numerous villages.

The primary aim of the platform is to facilitate a collaborative ecosystem where villagers, government officials, social enterprises, academics, and the general public can come together to share knowledge, discuss issues, propose solutions, and implement sustainable projects effectively. The platform serves not just as a repository of resources but as a dynamic workspace that guides the trajectory of rural development towards sustainability, cultural preservation, and economic vitality.

Functionally, the platform is divided into several key areas:

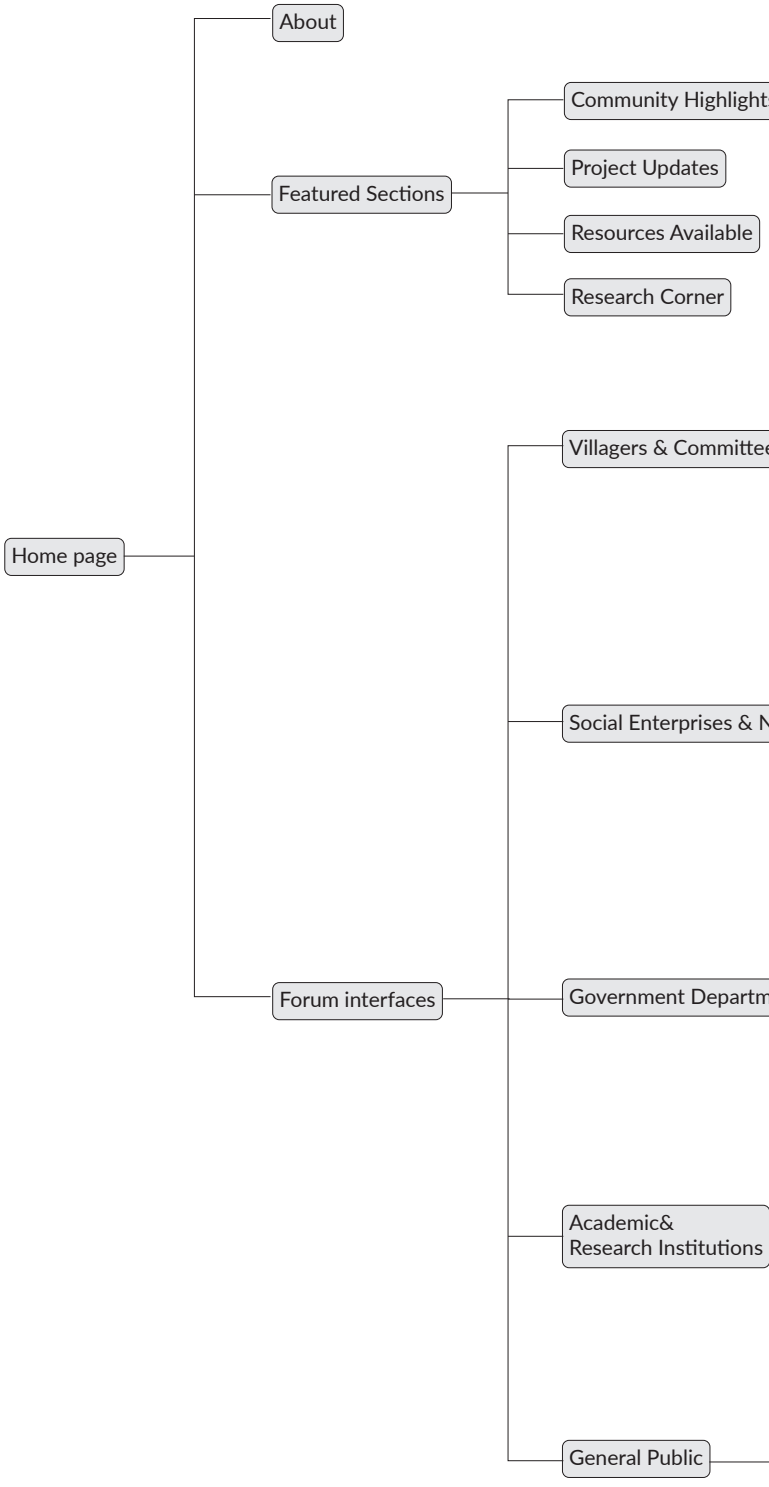
-Community Engagement: Through features like forums, surveys, and polls, the platform gathers input directly from the community, ensuring that their voices are heard and incorporated into project planning and decision-making.

-Resource Sharing: A comprehensive catalog lists available resources, ranging from funding opportunities to expertise and materials, all contributed by social enterprises and other stakeholders.

-Project Collaboration: Tools for submitting and managing project proposals allow for transparent and coordinated project implementation, with timelines and milestones tracked through a sophisticated project management interface.

-Knowledge Exchange: An extensive digital library, alongside blogs and interactive forums, facilitates the dissemination and discussion of research findings, traditional practices, and innovative techniques.

By centralizing these functions within a single digital interface, the platform ensures that urban planners and project managers can oversee and steer projects more effectively, with real-time updates and community feedback integrated throughout the project lifecycle. This digital approach tries to not only increase efficiency and impact but also strengthens the community's capacity to pursue self-directed development over the long term.




Profile Pages
Personal Information: Name, Village, Skills, Interests
Contribution Section: List of uploaded traditional practices, knowledge, and community activities
Gallery: Photos and videos related to cultural practices and festivals
Knowledge Sharing Platform
Resource Library: Collection of documents, videos, and other media shared by villagers
Blogs and Forums: Interactive spaces where villagers can post blogs and engage in discussions
Feedback Mechanisms
Surveys and Polls: Tools for gathering input on project proposals and local needs
Suggestion Box: Space for submitting ideas and feedback
Resource Catalog
List of Resources: Detailed descriptions of available funding, expertise, and materials
Resource Contribution Form: Social enterprises can submit and update their resource offerings
Collaboration Proposals
Project Proposal Submission: Form for submitting project ideas and collaboration proposals
Interest Expression: Villagers can express interest and get involved in proposed initiatives
Success Stories
Case Studies: Detailed stories of successful collaborations and projects
Testimonials: Feedback and experiences from past collaborations
Data Dashboard
Interactive Maps: Display project locations, environmental data, and community feedback
Statistical Graphs: Visualize key metrics such as engagement levels, project progress, and environmental impacts
Communication Tools
Messaging System: Direct communication channels between government officials, villagers, and social enterprises
Wechat official accounts
Project Management
Timeline and Milestones: Gantt charts and project timelines
Reporting Tools: Automated reporting features to generate insights and summaries
Research Database
Repository: Organized collection of research papers, studies, and reports
Search Functionality: Searchable by topics such as ecology, agriculture, and community development
Collaborative Research Projects
Project Collaboration Form: Submission form for proposing and managing research projects
Findings Sharing: Space for sharing research findings and recommendations
Public Information Portal
News and Updates: Regular updates about project progress and key milestones
Educational Content: Information about the importance of the Jiulong River and the revitalization efforts
Volunteer Opportunities
Volunteer Sign-Up: Form for registering interest in volunteering activities
Donation Portal: Information on how to support the project financially
Social Media Integration
Social Media Links: Links to the platform's social media pages for broader engagement
Share Features: Tools for sharing updates and information on social media

4.4 UPSTREAM REGION REVITALISATION

4.4.4 E-participation platform

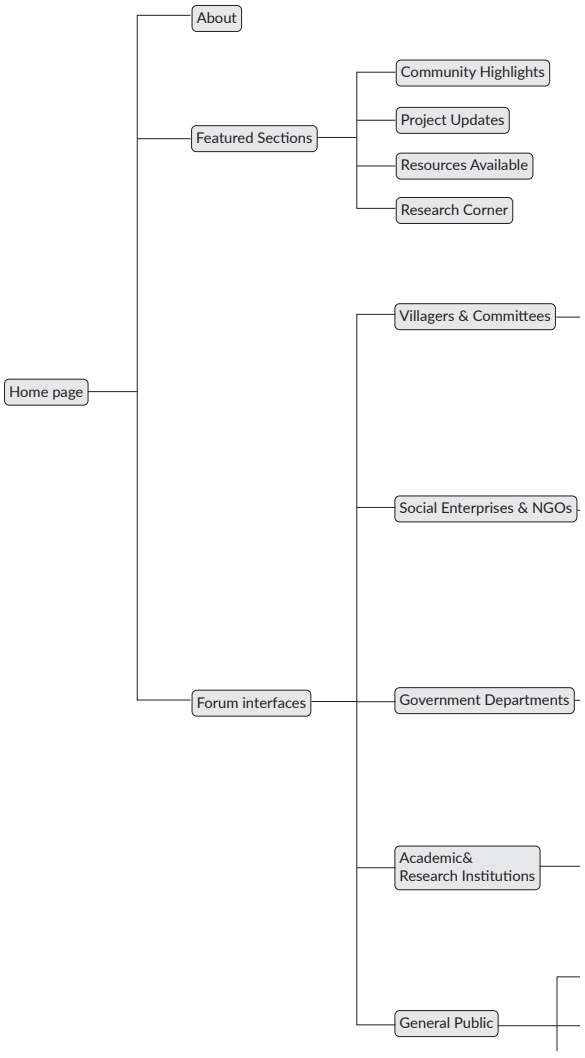
Home page

The home page of the platform serves as a dynamic gateway, guiding visitors through various facets of rural revitalization initiatives and sustainable development. It is meticulously designed to facilitate easy navigation and instant access to critical resources, updates, and community insights.

At the core of the home page layout is the "About" section, providing a comprehensive overview of the platform's purpose, its stakeholders, and the overarching goals of the Jiulong River revitalization efforts. This section sets the stage for new visitors to understand the importance of their participation and the impact of the projects underway.

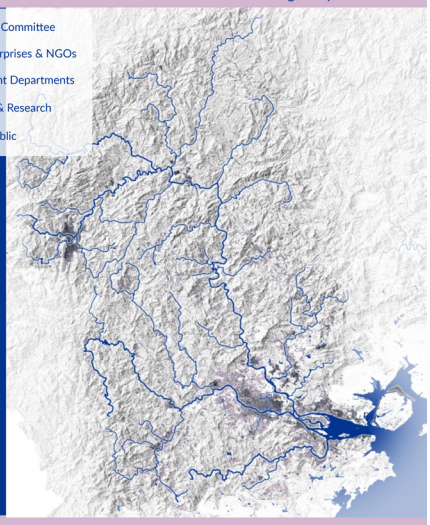
"Featured Sections" further enrich the user experience by offering quick links to "Community Highlights," where success stories and significant achievements within the community are celebrated; "Project Updates," providing the latest progress on ongoing initiatives; "Resources Available," listing available tools, expertise, and funding options; and "Research Corner," showcasing academic and practical research contributions to the field.

Additional navigation options branch out to tailored interfaces for different stakeholders, including "Villagers & Committees," "Social Enterprises & NGOs," "Government Departments," "Academic & Research Institutions," and the "General Public." Each section is designed to meet the specific needs and interests of these groups, ensuring that everyone — from local farmers to international researchers — can find relevant information and engage meaningfully.



Home About Forum Socio-Ecological system

- Villagers & Committee
- Social Enterprises & NGOs
- Government Departments
- Academic & Research
- General Public



Jiulong River Upstream

Rural Revitalization Platform

About

Welcome to the Jiulong River Revitalization Platform, dedicated to promoting sustainable development in the Jiulong River upstream region. Our mission is to preserve the area's rich cultural heritage and ecological integrity while fostering community-driven growth.

Our platform unites local villagers, social enterprises, government departments, academic researchers, and the general public to collaborate on revitalization efforts. Villagers can share traditional knowledge and participate in development projects, ensuring their voices are heard and valued. Social enterprises can manage resources, propose projects, and connect with the community. Government departments use our data tools for informed decision-making and targeted support. Researchers access a comprehensive repository for studies and findings. The public can stay informed, engage in volunteer opportunities, and support initiatives through our platform.

By integrating traditional practices with modern solutions, we aim to create a sustainable future for the Jiulong River region. Join us in this journey and contribute to a vibrant, resilient community that honors its past while embracing progress.

Community Highlights

Explore stories and experiences from local villagers, showcasing the vibrant cultural heritage and community spirit of the Jiulong River region.

Read More

Resource Available

Access a comprehensive catalog of resources provided by social enterprises and partners to support community initiatives and development efforts.

Read More

Project Updates

Stay informed about the latest developments and progress in our ongoing and upcoming revitalization projects aimed at sustainable growth.

Read More

Research Corner

Discover cutting-edge research, studies, and findings from academic institutions focused on sustainable practices and the ecological health of the Jiulong River region.

Read More

4.4 UPSTREAM REGION REVITALISATION

4.4.4 E-participation platform

Forum interface- Villagers & Committee

The "Villagers & Committees" interface is thoughtfully designed to empower local residents and village committees by providing tools and spaces to share, collaborate, and manage community-driven initiatives effectively.

Profile Pages within this interface serve as personal portfolios for villagers, where they can display their personal information, such as names, village affiliations, skills, and interests.

This section fosters a sense of community identity and allows for better collaboration among villagers with complementary skills.

The Contribution Section enables villagers to upload and share traditional practices, knowledge, and community activities. This serves not only to preserve valuable cultural heritage but also to inform and educate others within and outside the community.

Gallery offers a visual exploration space where villagers can upload photos and videos related to cultural practices and festivals, further enriching the cultural tapestry of the community and promoting local tourism.

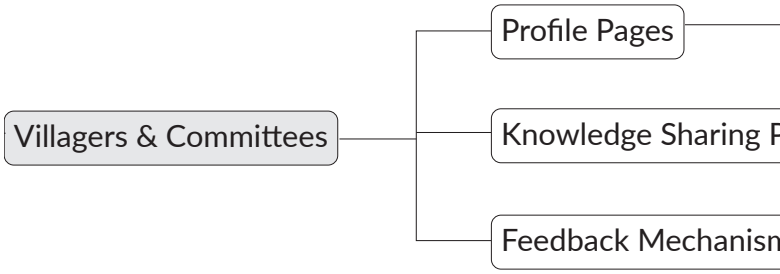
The Resource Library acts as a repository for documents, videos, and other media that are invaluable for educational and operational purposes, enhancing communal learning and development.

Blogs and Forums provide interactive platforms for villagers to voice opinions, share experiences, and discuss community issues. These platforms are vital for maintaining an active and engaged community.

Lastly, the Feedback Mechanisms, including surveys and polls, are critical tools for gathering community input on projects and local needs.

The Suggestion Box allows villagers to submit ideas and feedback directly to the platform, ensuring that every voice has the opportunity to be heard in the decision-making process.

This interface is a cornerstone of the platform, ensuring that villagers are not only participants but active contributors to the revitalization efforts.



latform

Personal Information: Name, Village, Skills, Interests
Contribution Section: List of uploaded traditional practices, knowledge, and community activities
Gallery: Photos and videos related to cultural practices and festivals

Resource Library: Collection of documents, videos, and other media shared by villagers
Blogs and Forums: Interactive spaces where villagers can post blogs and engage in discussions

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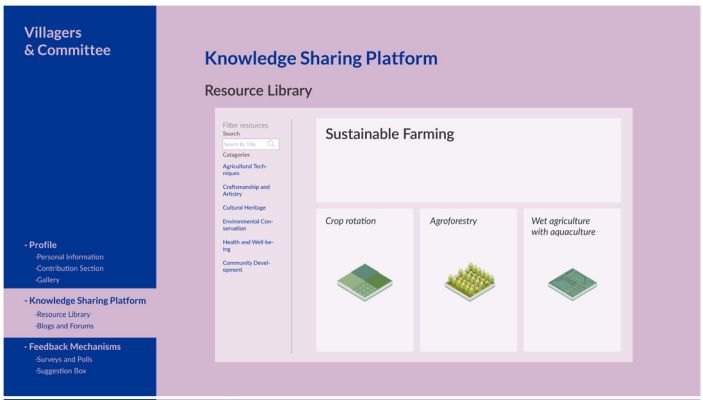
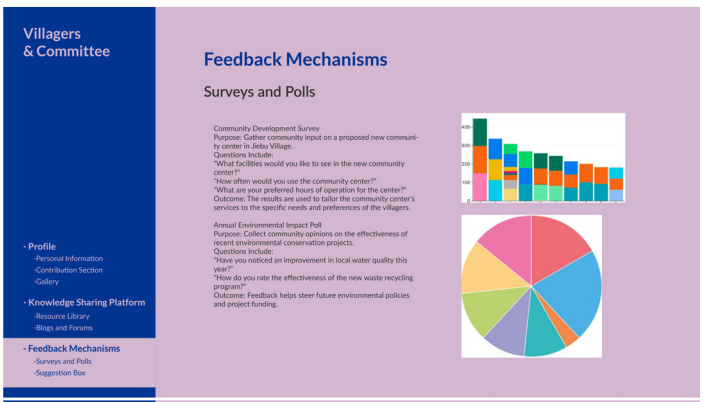
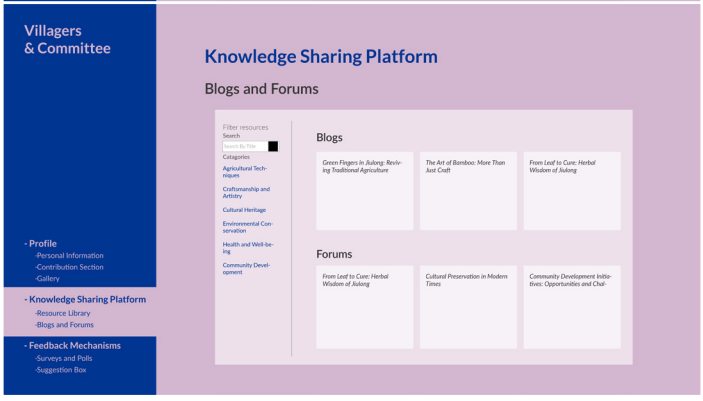
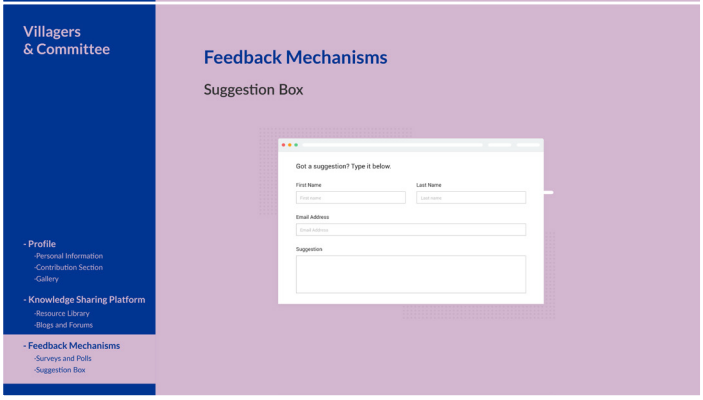
Surveys and Polls: Tools for gathering input on project proposals and local needs
Suggestion Box: Space for submitting ideas and feedback







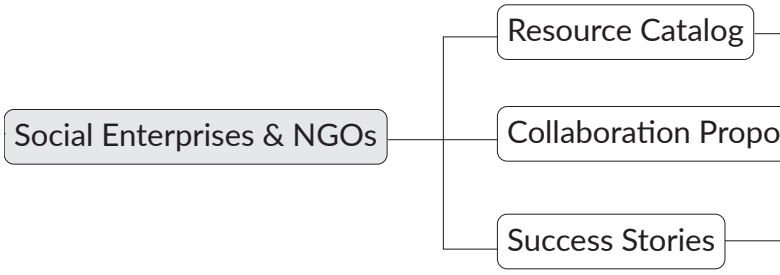


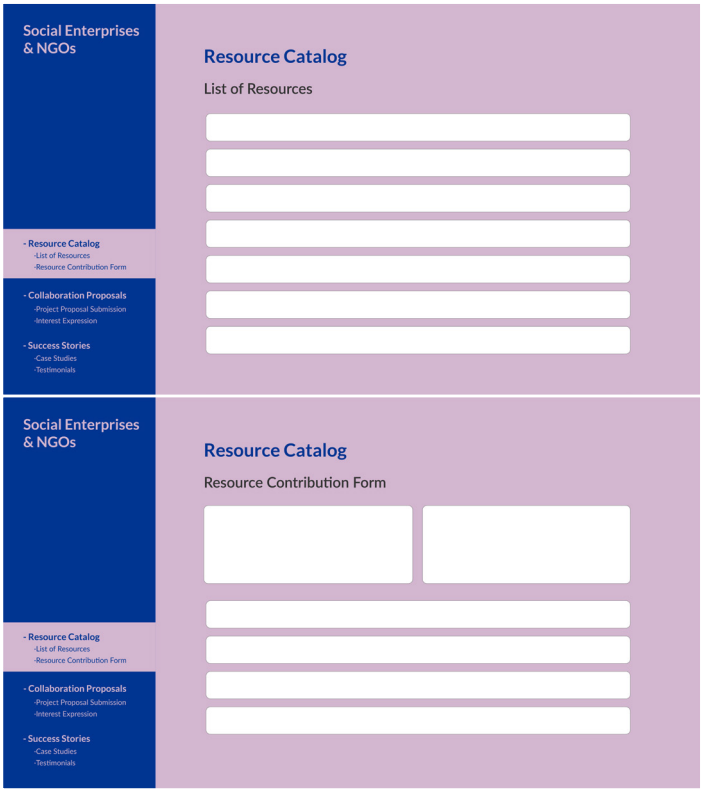
4.4 UPSTREAM REGION REVITALISATION

4.4.4 E-participation platform

Forum interface- Soical enterprises & NGOs

The "Social Enterprises & NGOs" interface serves as a critical hub for driving collaborative efforts between social enterprises, non-governmental organizations, and the community.
This interface facilitates the pooling of resources, sharing of expertise, and initiation of collective action towards sustainable development goals.
Within the Resource Catalog, users find a comprehensive list of resources, including detailed descriptions of available funding, expertise, and materials. This catalog is continually updated through the Resource Contribution Form, where social enterprises can submit and refine their offerings, ensuring that the most current and beneficial resources are accessible.
The Collaboration Proposals section is designed for submitting project ideas and proposals for projects. It includes an Interest Expression feature where social enterprises or NGOs can actively participate and express their desire to get involved, fostering a sense of ownership and direct involvement in projects that affect community.
Additionally, the interface showcases Success Stories and Testimonials, providing narrative evidence and reflections on past successful collaborations. These stories highlight the impact and effectiveness of partnerships fostered through the platform, serving both as inspiration and proof of concept for future initiatives.



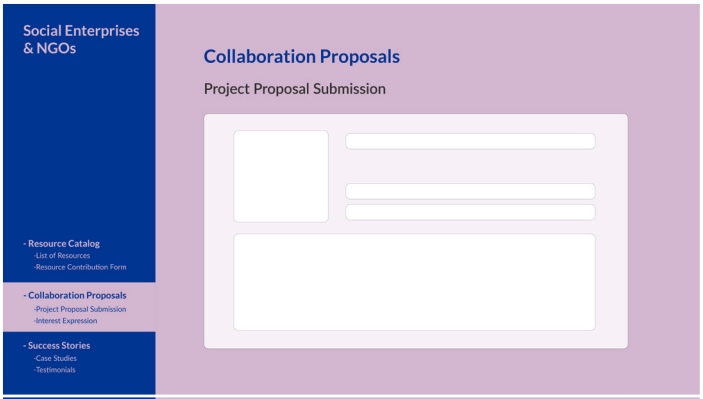


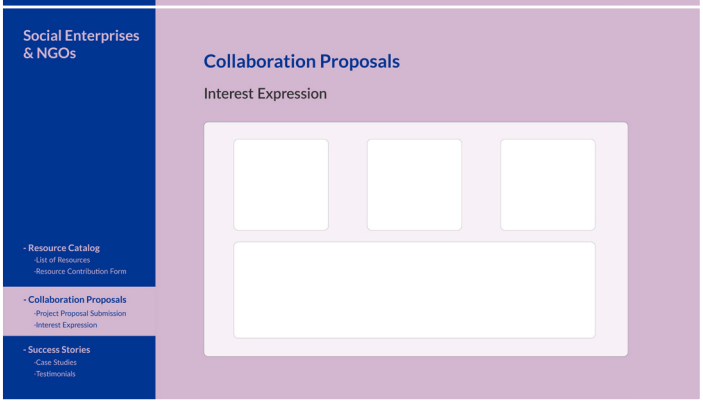
List of Resources: Detailed descriptions of available funding, expertise, and materials
Resource Contribution Form: Social enterprises can submit and update their resource offerings

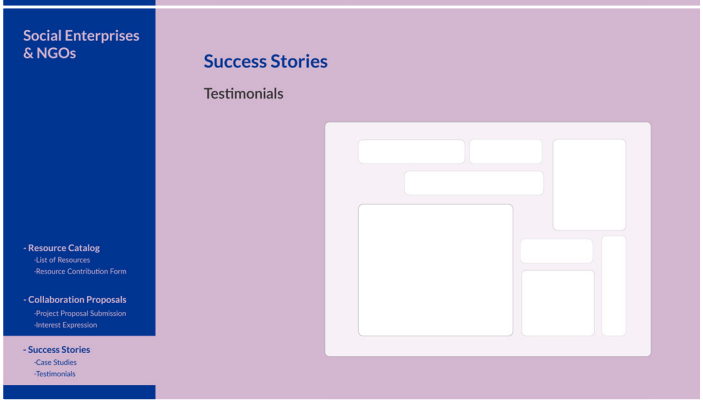
sals

Project Proposal Submission: Form for submitting project ideas and collaboration proposals
Interest Expression: Villagers can express interest and get involved in proposed initiatives

Case Studies: Detailed stories of successful collaborations and projects
Testimonials: Feedback and experiences from past collaborations







4.4 UPSTREAM REGION REVITALISATION

4.4.4 E-participation platform

Forum interface- Government departments

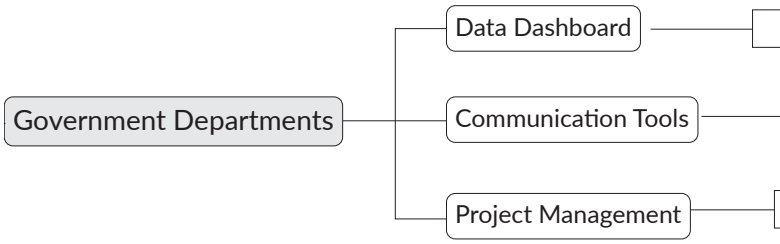
The "Government Departments" interface is designed to enable efficient and effective project management, communication, and data analysis, specifically tailored to meet the needs of government officials overseeing sustainable development initiatives.

Data Dashboard: This section is the nerve center of project monitoring, featuring interactive maps and statistical graphs. Interactive maps provide a geographical visualization of project locations along with pertinent environmental data and community feedback. Statistical graphs offer real-time insights into key metrics such as engagement levels, project progress, and environmental impacts, enabling data-driven decision-making.

Communication Tools: The platform integrates a robust messaging system to facilitate direct and secure communication channels between government officials, villagers, and social enterprises. This includes the integration of WeChat official accounts, which are widely used in the region, thus ensuring broad accessibility and seamless communication.

Project Management: This module is equipped with tools for comprehensive project oversight, including Gantt charts for detailed timeline management and milestones tracking. Automated reporting tools enhance this functionality by generating summaries and detailed reports, which are essential for reviewing progress, making adjustments, and providing transparent accountability to stakeholders.

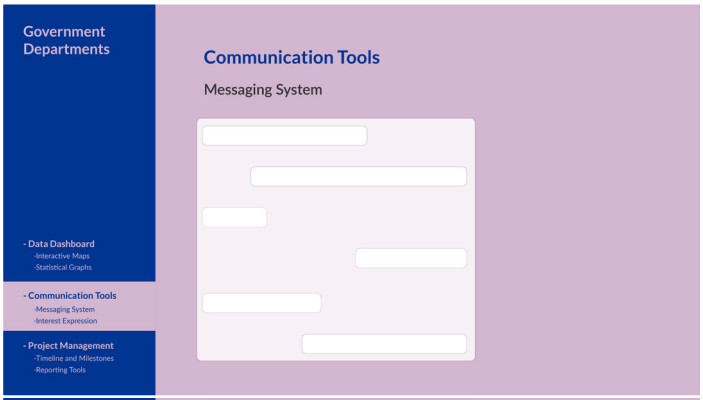
Designed to streamline the operational aspects of rural revitalization projects, this interface ensures that government departments can effectively manage, monitor, and communicate throughout the lifecycle of each initiative, fostering a transparent, accountable, and collaborative environment.



Interactive Maps: Display project locations, environmental data, and community feedback
Statistical Graphs: Visualize key metrics such as engagement levels, project progress, and environmental impacts

Messaging System: Direct communication channels between government officials, villagers, and social enterprises
Wechat official accounts

Timeline and Milestones: Gantt charts and project timelines
Reporting Tools: Automated reporting features to generate insights and summaries



4.4 UPSTREAM REGION REVITALISATION

4.4.4 E-participation platform

Forum interface- Acdemic & research institutions

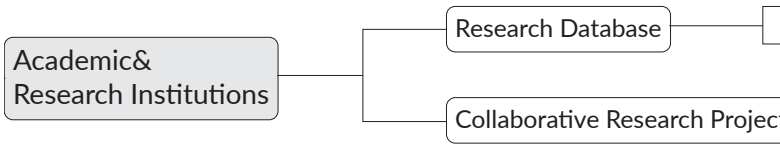
The "Academic & Research Institutions" interface is specifically designed to support and enhance the research capabilities and contributions of academic bodies involved in rural and sustainable development. This interface acts as a vital resource for universities, research institutes, and individual scholars focusing on the Jiulong River region.

Research Database: Central to this interface, the Research Database serves as a comprehensive repository of research papers, studies, and reports. It includes advanced search functionality, allowing users to easily locate resources related to key topics such as ecology, agriculture, and community development.

Collaborative Research Projects: This section facilitates the submission and management of research project proposals. It encourages collaboration between academics and practitioners, ensuring that research efforts are aligned with practical needs and can have a tangible impact on the community.

Findings Sharing: Dedicated to disseminating research outcomes, this space enables scholars to share their findings and recommendations, fostering an environment of continuous learning and improvement. It allows for the exchange of valuable insights that can influence future projects and policies, bridging the gap between theoretical research and practical application.

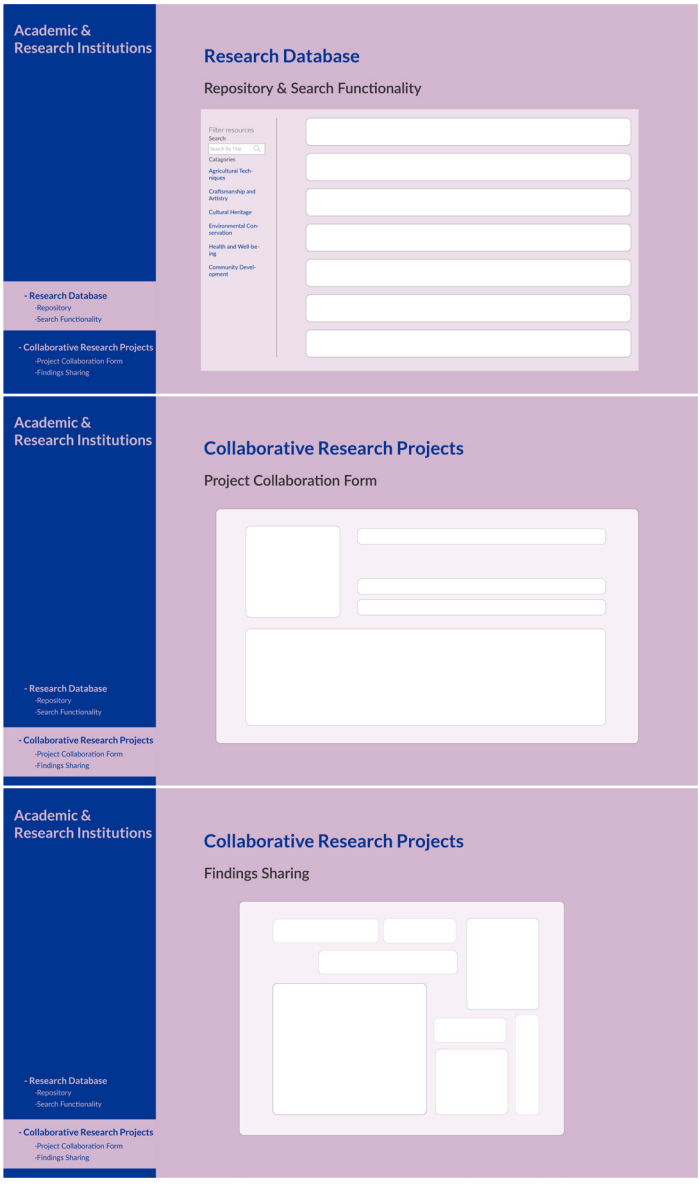
Overall, this interface strengthens the academic community's role in rural revitalization by providing the tools needed to share knowledge, collaborate on research initiatives, and contribute to sustainable development practices effectively.



Repository: Organized collection of research papers, studies, and reports
Search Functionality: Searchable by topics such as ecology, agriculture, and community development

ts

Project Collaboration Form: Submission form for proposing and managing research projects
Findings Sharing: Space for sharing research findings and recommendations



4.4 UPSTREAM REGION REVITALISATION

4.4.4 E-participation platform

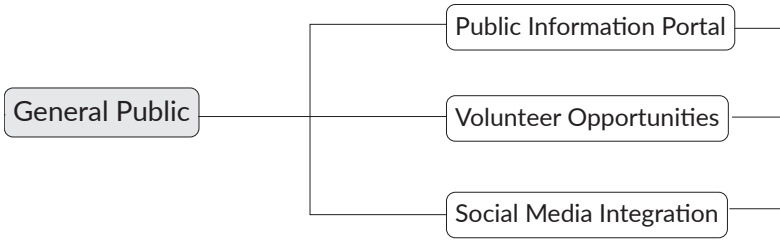
Forum interface- General public

The "General Public" interface is designed to engage the wider community and audience in the ongoing efforts to rejuvenate the Jiulong River region. This interface serves as a vital link between the project, its initiatives, and the public, ensuring transparency and fostering widespread participation.

Public Information Portal: This section provides timely news and updates on the progress of various projects and key milestones. It also features educational content that highlights the significance of the Jiulong River and the objectives of the revitalization efforts, aiming to raise awareness and promote informed engagement.

Volunteer Opportunities: The platform offers a dedicated space where individuals can sign up to volunteer, allowing them to contribute directly to the projects that resonate with them. This is complemented by a Donation Portal, which provides information on how supporters can contribute financially to the initiatives.

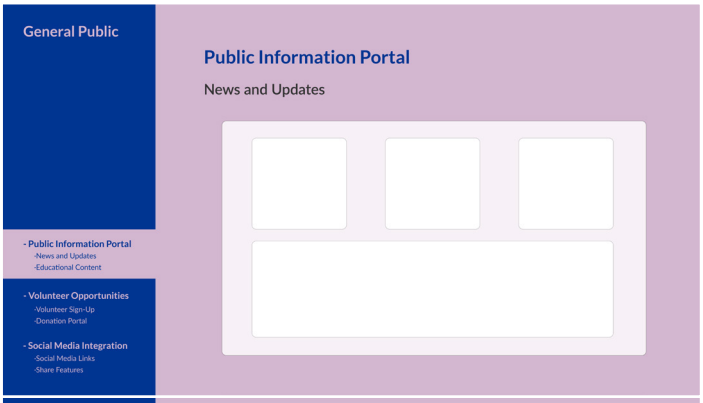
Social Media Integration: Essential for modern digital engagement, this component includes links to the platform's social media pages and sharing tools that facilitate the easy dissemination of information and updates, encouraging users to spread the word and engage with content on platforms like Wechat, Tiktok, Litter Red Book, Weibo, etc. This integration ensures that the revitalization efforts reach a broad audience, maximizing impact and support.

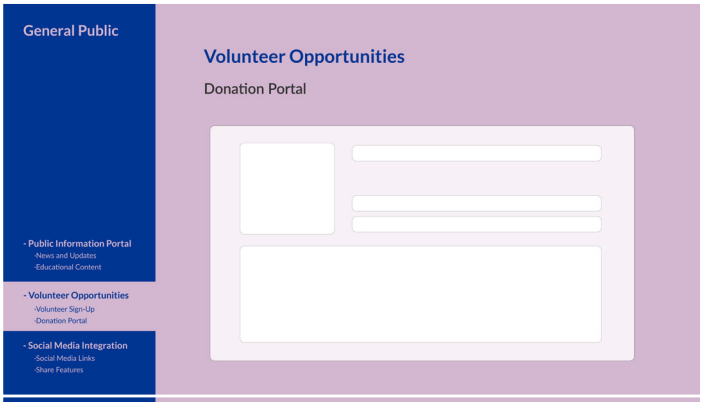


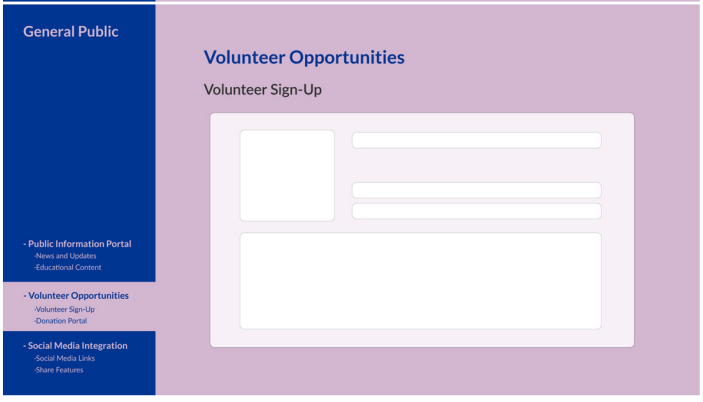
News and Updates: Regular updates about project progress and key milestones
Educational Content: Information about the importance of the Jiulong River and the revitalization efforts

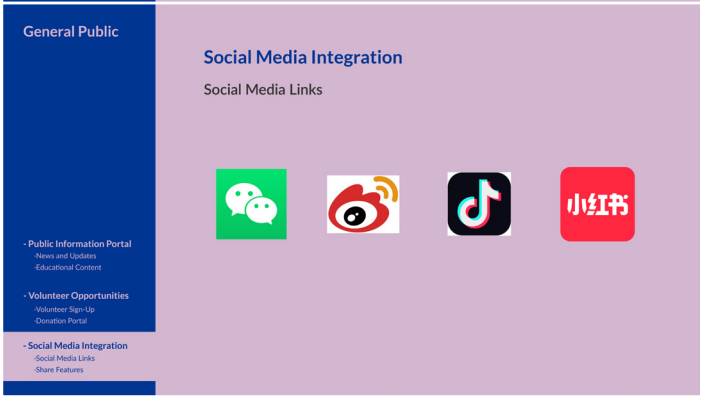
Volunteer Sign-Up: Form for registering interest in volunteering activities
Donation Portal: Information on how to support the project financially

Social Media Links: Links to the platform's social media pages for broader engagement
Share Features: Tools for sharing updates and information on social media









5 CONCLUSION AND REFLECTION

CONCLUSION

Overview

This project starts from the long-standing phenomenon of rural decline in China, aiming to understand the discussions surrounding rural revitalization in a broader context. It focuses on rural areas closely linked with rivers, in conjunction with the current trend of comprehensive watershed management in China. The research area is pinpointed to the Jiulong River Basin, which holds significant potential, with a particular emphasis on the upstream regions that serve as vital sources. The project explores river-centric regional design approaches applied to the revitalization of these upstream rural areas, highlighting ecological integrity and socio-economic resilience. It discusses how rivers, as central axes, can interconnect ecological and social aspects to design socio-ecological systems. Additionally, the project investigates how to enhance bottom-up voices within China's top-down governance structure. From both ecological and social perspectives, it designs a strategic framework that ranges from identifying problems to strategies, principles, and various measure choices, explaining through designs at different scales how these aspects are interconnected and interact. The following will elaborate on the specific conclusions by addressing the research questions.

Sub question 1: What is the current ecological status of the Jiulong River Upstream, and what are the primary environmental challenges and potentials for enhancing ecosystem services and biodiversity?

The upstream region of the Jiulong River Basin has a solid natural foundation. Although the terrain is primarily mountainous, the extensive vegetation coverage offers significant potential for biodiversity and ecological integrity. However, field research, data analysis, and information gathered through digital media reveal several challenges facing this area. Firstly, the presence of numerous hydroelectric stations and dams of varying sizes has fragmented river systems and disrupted ecological flows for energy and economic gains. Secondly, the treatment of domestic and agricultural wastewater along the riverside villages is insufficient. Thirdly, the terrain's significant elevation differences, combined with the removal of some dams and hydroelectric stations, expose some areas to flood risks. Fourthly, the hard riverbanks and steep mountain slopes contribute to soil erosion, impacting river health. Lastly, the pursuit of profit and efficiency through monoculture agriculture harms soil health and biodiversity. In summary, despite a strong foundation, human activities and the unique terrain significantly affect ecological integrity.

Sub question 2: What is the current societal condition and governance and how do they influence both the ecological integrity of the river and the socio-economic resilience of the rural communities?

The current situation in the upstream region of the Jiulong River Basin resembles the rural hollowing-out phenomenon seen in other parts of China. Most young people have left the countryside, leaving behind the elderly and children. This has resulted in villages primarily dependent on agriculture, where small-scale farming fails to provide adequate living conditions, thus creating a vicious cycle where more people leave the villages. Additionally, to maximize yield and profits, the use of chemical fertilizers has damaged soil health and polluted the rivers. On the other hand, during the Republic of China era, riverside villages enjoyed a period of prosperity through waterborne transport. However, the fragmentation of the water system has weakened the villagers' connection with the water, reducing their relationship with what they call their "mother river" to one predominantly of production. This has led to a diminished awareness of the river's ecological and economic importance. Moreover, due to the loss of manpower and economic conditions, many culturally and historically significant buildings have gradually deteriorated and disappeared. Despite these challenges, there are many untapped opportunities in this region, its diverse natural landscapes, close geographical relationship with the river, and unique cultural landscape hold great potential for improving the spatial quality of village life and developing new industries.

Sub question 3: What river-centric spatial strategies and design principles can be implemented to promote ecological conservation and enhance local livelihoods?

The strategy framework addresses challenges by establishing corresponding strategies and principles. For ecological aspects, strategies include Integrated River Management to restore and enhance ecological connectivity and resilience against the segmentation of the river system. Pollution Control and Natural Purification improve filtration and regeneration to combat water pollution. Floodplain Restoration and Management enhance absorption and flexibility to manage flood risks. Erosion Control and Sustainable Land Management create and enhance soil stability and productivity to address soil erosion. Diversification and Sustainable Practices in Agriculture aim to create permanence and harmony to improve monoculture agriculture.

In social aspects, Riverfront Development and Community Involvement foster accessibility and participation to address alienation to the river. Sustainable agriculture production and the development of eco-tourism strengthen local economies by utilizing underutilized economic opportunities. Educational Programs and Research Collaboration increase knowledge and community engagement with river conservation to address the low awareness of the ecological and economic importance of the river.

Each strategy and principle offer multiple measures for selection, providing flexibility and operationalization as different villages and regions have unique conditions, which also involves and strengthens bottom-up voices. Demonstrative designs are used to showcase how different measures manifest in specific spaces, with variants displaying different forms and spatial effects under unified principles.

Sub question 4: What governance and management strategies can be applied to optimize the sustainable use and conservation?

The strategic framework developed through the analysis of stakeholders includes strategies for engaging stakeholders, illustrating the required roles for implementing measures or specific strategies, and emphasizing the importance of integration. Additionally, at the village and regional scales, the framework outlines the responsibilities of various stakeholders and how they collaborate to bridge gaps and empower those at the lower levels, simultaneously catering to a broader range of stakeholder interests and enhancing the operability of the strategies. For instance, villagers, village committees, and agricultural departments collaborate to diversify agricultural production to enhance sustainability. This process requires top-down guidance and subsidies from the agricultural department and bottom-up support and implementation by villagers and village committees. The availability of multiple options for measures provides villagers with flexibility and empowerment to implement strategies based on their specific circumstances, satisfying the agricultural department's goals for sustainable agriculture and improving the villagers' living conditions through better farming practices. Overall, the project's governance strategies involve adjusting stakeholders' interests and powers within specific strategies, clearly defining their responsibilities, and facilitating mutual cooperation. The flexibility in choosing various measures strengthens bottom-up engagement.

Furthermore, the digital platform facilitates effective communication and coordination among stakeholders, crucial for the successful implementation of sustainability strategies at both village and regional levels. It acts as an integrative tool that connects various stakeholders—villagers, village committees, social enterprises, government departments, and public—providing a centralized hub for sharing information, resources, and feedback. By leveraging technology, the platform ensures that all parties are well-informed about their roles and responsibilities, updates on agricultural practices, and availability of subsidies and other supports. This promotes transparency and accountability, essential for fostering trust and collaboration among stakeholders. Moreover, the platform offers tailored features such as interactive maps, resource databases, and project management tools, which allow stakeholders to visualize the impact of their activities, track progress in real-time, and adjust strategies as needed. This dynamic capability ensures that governance strategies are not only implemented but are also continuously improved based on direct stakeholder input and environmental feedback. Incorporating this digital platform into the governance model empowers stakeholders at the grassroots level by providing them with the tools and information needed to make informed decisions and implement sustainable practices effectively.

REFLECTION

Overview

This project targets rural areas closely connected to rivers, using the upper reaches of the Jiulong River Basin as a case study area, and employs a river-centric approach to help revitalize the countryside. The project includes a summary of the general situation in the countryside under a broad context and discussions on rural revitalization, then identifies rivers as a focal point. It analyzes the watershed, upstream areas, and specific villages from both ecological and social perspectives, combined with direct field research experiences. The project summarizes issues in these aspects and governance, then develops a strategic framework including specific strategies, principles, and corresponding measures, which are then presented in spatial form. This includes large-scale maps and small-scale village designs. It also incorporates an analysis of stakeholders and strategies for engagement to demonstrate operationalization. Overall, the project analyzes from large to small scales and then designs and plans from small to large scales, showcasing how a river-centric approach can be used to help revitalize villages along rivers.

Reflection on methodology

This project adopts various methods to advance research and design, each playing a significant role but also presenting certain challenges and limitations. Firstly, literature research provided substantial help at the beginning of the study in identifying topics and entry points, and also laid the theoretical foundation for the project. For instance, the topic of rural revitalization is vast as Chinese villages are highly diverse and the complex political structures and economic conditions add layers of complexity. However, literature research, combined with personal experience, revealed the great potential of studying villages along waterways, which gave me confidence to delve deeper into the research and design. However, at times, extensive literature research caused me to lose focus on the project itself, as the myriad theories and conceptual frameworks were overwhelming and made it difficult to define my own understanding and framework for the project, leaving it in a state of ambiguity for a period.

Secondly, mapping through GIS data and other media provided a clear and direct understanding of the site's uniqueness and current state, allowing for alternating analysis and thinking across different scales and elements to advance the research. However, data collection also faced significant limitations, especially in remote rural areas outside urban centers, and in China, where much data is not publicly available, making it difficult to map data to reflect the actual situation, requiring reliance on other media.

Thirdly, excursions arguably played the largest role in this project. Before the P2 phase, the project primarily involved literature research and GIS mapping, where abstract theories and insufficiently specific data made it difficult to grasp the project's key points, leading to feedback that the project was too ambitious. However, spending two weeks on the ground in my research area, seeing the village landscapes and hearing the villagers' opinions firsthand, provided the most vivid and direct impressions and information. This allowed me to experience the area I was designing for from a human perspective, giving me motivation and confidence and enabling more concrete thinking and exploration in design.

Fourthly, the layer approach, by decomposing complex systems into layers, presented spatial information more clearly to aid planning and design. However, I believe the connections between different layers are not yet thoroughly understood, which is one of my goals for further learning and research.

Fifthly, stakeholder analysis is a crucial means to embody spatial justice and also a tool to make strategies more feasible, especially under China's strong top-down governance. How to involve bottom-up voices and bridge the gaps in the middle is crucial.

Lastly, the combination of vision making, strategy making, and design plays a critical role. Vision can visually present a desirable future for discussion, and strategy explores how to achieve it. Design, on the one hand, complements the vision and, on the other hand, serves as a tool for discussion, such as the designs for three small plots in the village and the presentation of different possibilities showing how various measures can meet and connect.

In summary, each method has its advantages and disadvantages, but they can compensate for each other, making the research and design more comprehensive. To me, this is the most important meaning of methodology.

Reflection on the feedback by mentors

Firstly, I must extend my gratitude once again to my two mentors for their crucial feedback throughout the entire graduation project phase. Lei primarily provided feedback from the perspectives of spatial planning and governance, helping me control the overall structure and process of the project, while Steffen offered more insights from the landscape architecture perspective on my design. This combination of mentors allowed my project to advance more comprehensively. However, during this process, I also experienced the differences between urbanism and landscape architecture in terms of working methods and definitions of concepts. For example, I habitually start analyzing space from a larger scale, but Steffen suggested analyzing different landscapes in specific villages directly to find clues. Following this advice, I chose a village that interested me and had relatively more data to begin my study, which clarified the significance of a river-centric approach for different elements of the village.This difference required some time to adapt and understand, and I tried to integrate these two methods into my research and design. Although I believe the integration was not completely thorough, the inspiration it provided was significant.

Reflection on the relation between my graduation project topic, urbanism track and your MSc AUBS

Rural revitalization is a complex and long-standing topic, where the decline of the countryside is not only of its own making, but is inextricably linked to urban, economic, social, ecological and political aspects, and even a small area is also closely linked to a region on a larger scale. Discovering specific topics and threads in complex systems and exploring pathways to development is what the PCC studio does. The scope of my project is watershed, focusing on rural areas that are closely connected to rivers, using rivers as a clue to understand the countryside and develop strategies for rural revitalisation, which involves multilevel and cross-scale analysis, as well as discussion of the interaction between spatial design and governance, complemented by design practice, which is also in line with the Urbanism track. I believe that whether it is urbanism or other tracks, the MSc AUBS is an attempt to explore sustainable development approaches to ecological and social challenges, and my project discusses both aspects with an emphasis on the integration of the two with the river at the centre, demonstrating how design and planning can contribute to environmental stewardship and human well-being.

Reflection on societal relevance

Societal relevance: Urbanisation, industrialisation and rapid economic growth have long been important goals of national development, with the rural areas becoming subordinate or peripheral to the city, sacrificed and abandoned when necessary (He & Zhang, 2022). In contrast to the infinite spatial and epistemological extension of the city, the understanding of the countryside is static and monolithic. At the same time, the lack of resources and job opportunities in the countryside has led to a large number of immigrants going to the cities. It is important to know that the idea of "root" is very deep in the hearts of Chinese people, but leaving one's home village is a last resort, which has made the binary division between the city and the countryside even more serious. Although there have been a number of reforms in the countryside in China and the policy has also been adjusted to reduce the dichotomy, the long-standing concepts are still rooted in most people's minds, and people seem to have lost confidence in the countryside. My graduation project contributes to developing the rural areas in JRB, making it an equal option to the city to help local people get a better life, and at the same time, attract people from the urban to the rural. By focusing on river-centric design, it aligns with global efforts to improve rural livelihoods, protect cultural heritage and increase community resilience. In today's world facing rapid urbanisation and rural depopulation, this project highlights the importance of sustainable rural development, ensuring that rural communities are not left behind in the pursuit of overall social progress.

REFLECTION

Reflection on scientific relevance

The idea of Socio-ecological system was introduced as intricate adaptive systems with strong connections to both humans and nature, typically perceived as a composition of elements that come together and interact within ecological and social subsystems(Holling, 1973). In recent years, more studies on social-ecological systems have begun to extend to rural areas, decomposing rural systems into population, industrial, and land subsystems (Long and Liu, 2016, Tu et al., 2018, Tong et al., 2023). Furthermore, prior research has identified natural conditions, land usage, and socioeconomic characteristics as the primary driving factors behind the spatial transformation of rural settlements. However, these studies commonly overlook the reciprocal influence of spatial structure on socioeconomic progress (Yang et al., 2016; Zang et al., 2021, Tong et al., 2023). In addition, the decline of China's rural areas faces its own unique challenges, while its unique farming culture and history also hold great potential. Therefore, from a socio-ecological point of view, it is important to explore the performance and enhancement of the system at different scales in a particular rural area through design, which can help to further improve rural socio-ecological system research. At same time, this research enhances the understanding of integrated watershed management and its role in rural revitalisation. It contributes to the growing knowledge of how rivers are at the centre of solutions to ecological and socio-economic challenges in rural areas. By adopting an interdisciplinary approach and focusing on specific case studies, the project adds empirical data and theoretical insights to the academic discourse in environmental science, rural studies and sustainable development.

Reflection on transferability

Reflecting on the integration of ecological and societal strategies in my research, the innovative aspect of my thesis lies in melding river-centric ecological conservation with socio-economic enhancement in rural settings. This dual focus not only addresses environmental issues but also revitalizes local communities, establishing a robust model for rural development.

By implementing Integrated River Management together with Community Involvement and Sustainable Agriculture, my strategies highlight how ecological health and community welfare can be interdependent. This integration encourages a holistic view of river basins as not just ecological assets but as central elements in the community's socio-economic fabric. For instance, enhancing biodiversity and water quality directly supports agricultural and recreational activities that, in turn, provide economic opportunities for the local population.

Furthermore, the governance strategies I propose ensure that these integrated solutions are not top-down impositions but are developed through active participation from local stakeholders, including villagers and local authorities. This approach fosters a sense of ownership and responsibility towards sustainable practices, crucial for the long-term success of ecological and societal interventions.

Such a model is transferable to other rural regions with similar geographical and socio-economic conditions. It serves as a blueprint that can be adapted to local specifics while maintaining the core principles of ecological integrity and socio-economic resilience, demonstrating a comprehensive strategy for rural revitalization through the lens of watershed management.

Reflection on limitation and solution

Several critical areas emerge where challenges may inhibit the effectiveness of proposed strategies.
Onelimitation is the scale and complexity of integrating ecological and societal strategies across diverse rural contexts. Each village within the basin possesses unique environmental conditions and socio-economic backgrounds, which can complicate the uniform application of strategies like Integrated River Management and Community Involvement. Even though I suggest various measures for every strategy, these differences may lead to varied outcomes, making it challenging to ensure consistency and predictability in the impacts of these interventions.
Another limitation is the dependency on local stakeholder engagement and the existing top-down governance structure. While my thesis advocates for enhancing bottom-up approaches, the success of such initiatives heavily relies on the willingness and ability of local communities to engage. In regions where community cohesion or interest in participatory governance is low, implementing these strategies could prove challenging.
To address these limitations, adaptive management practices could be employed. This approach involves ongoing monitoring and evaluation of the strategies' impacts, allowing for real-time adjustments based on what is or isn't working. This flexibility would be vital in accommodating the unique aspects of each village and in responding to unforeseen challenges.
Furthermore, building stronger educational and awareness programs could enhance community engagement and support. Educating local stakeholders about the benefits of sustainable practices and integrated river management can foster a deeper commitment to these initiatives, potentially overcoming hesitance due to traditional views or unfamiliarity with new practices.

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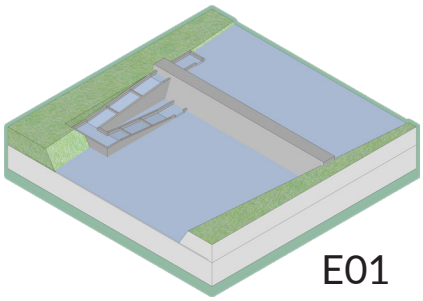
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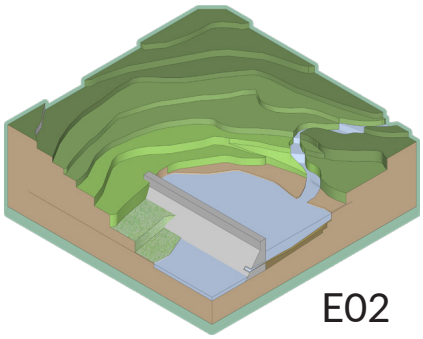
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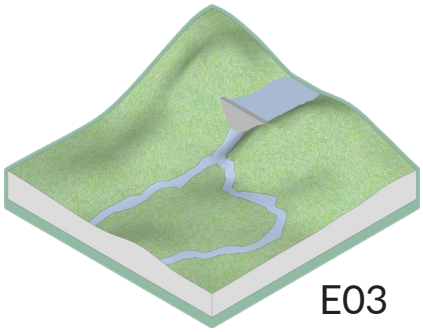
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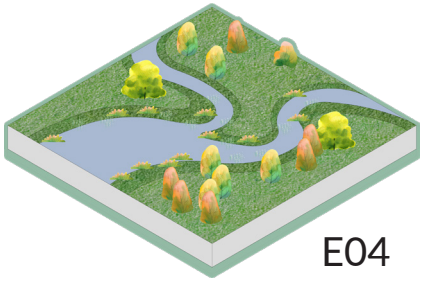
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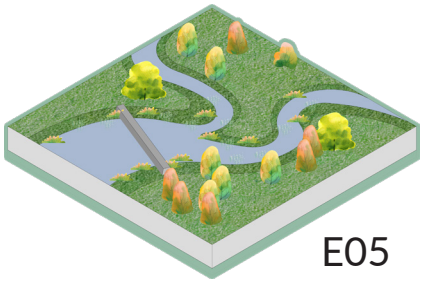
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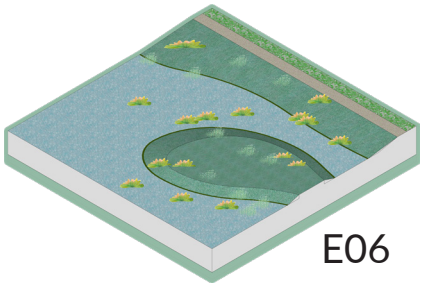
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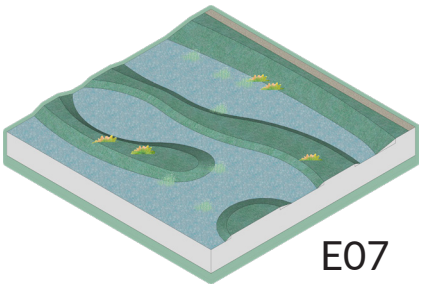
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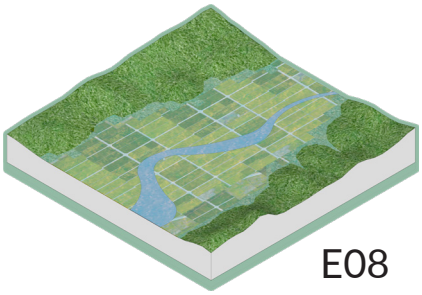
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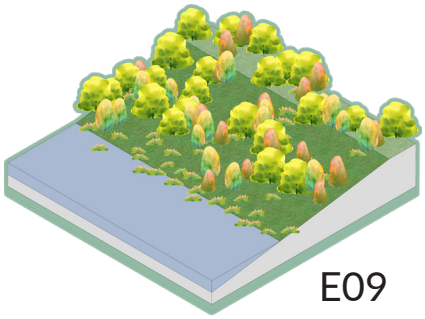
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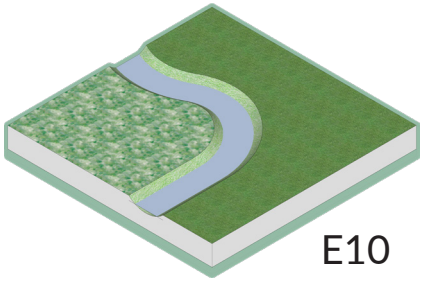
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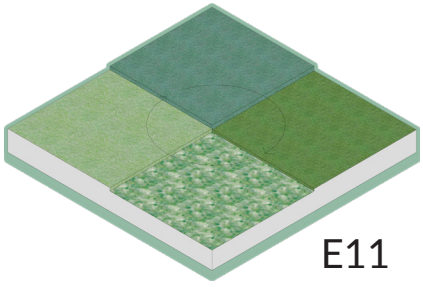
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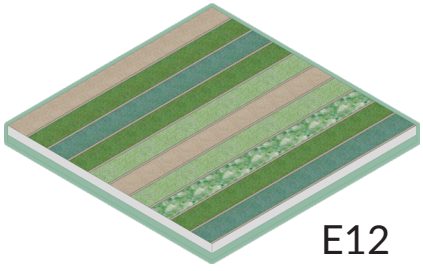
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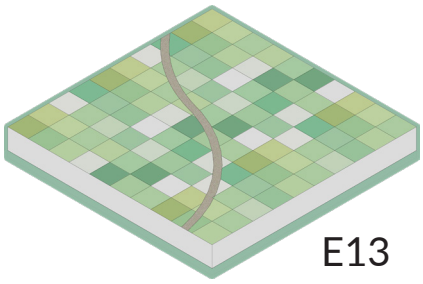
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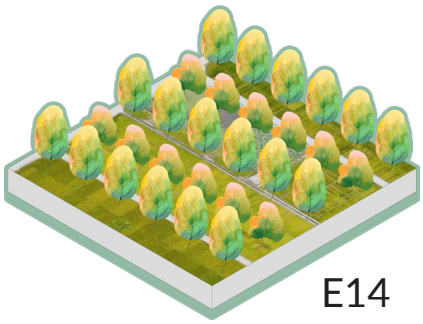
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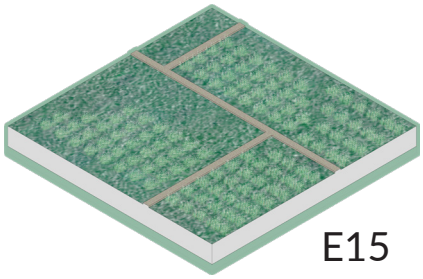
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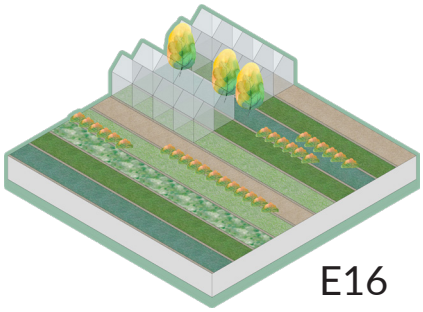
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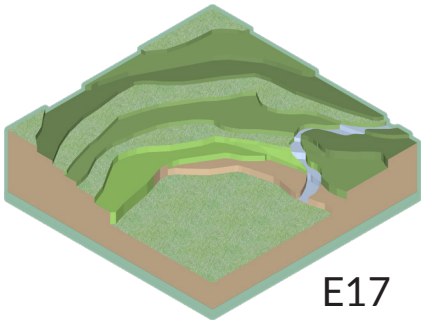
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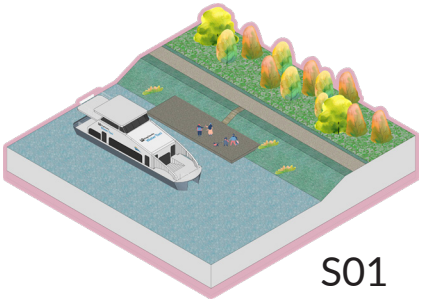

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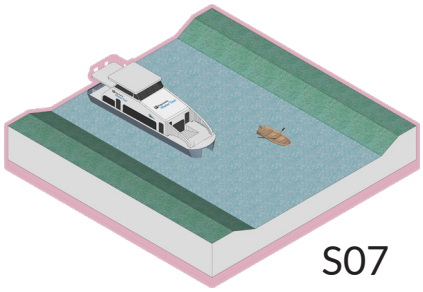

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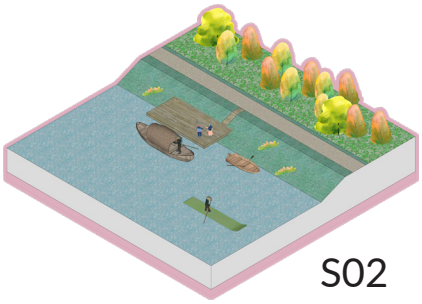

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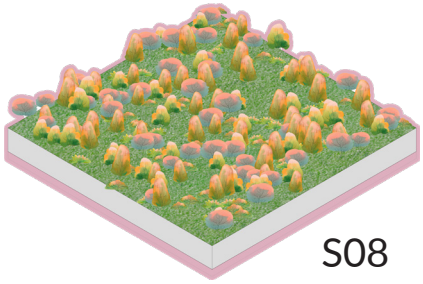

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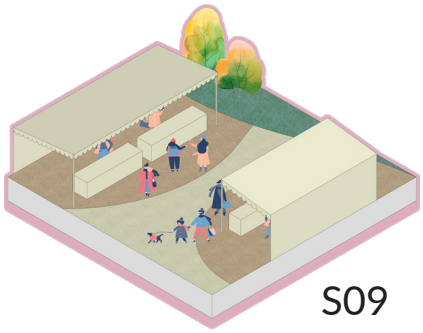

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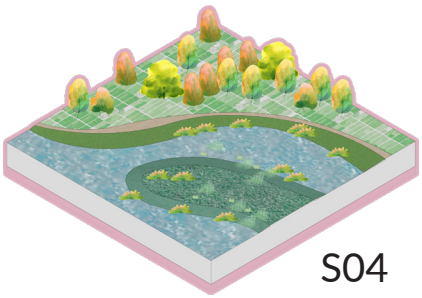

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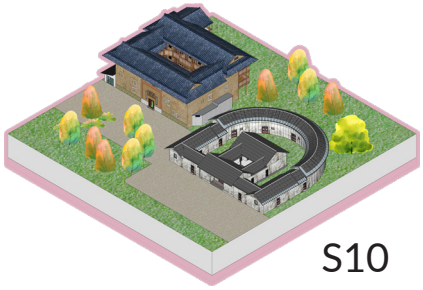

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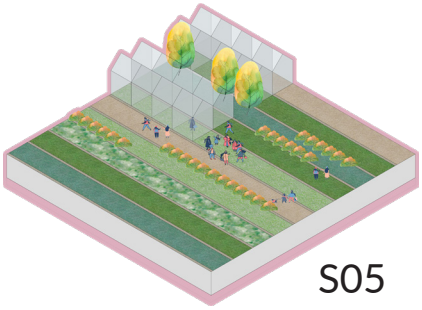

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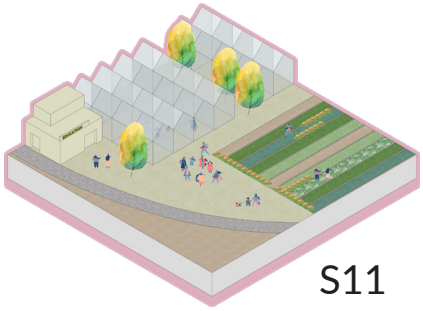

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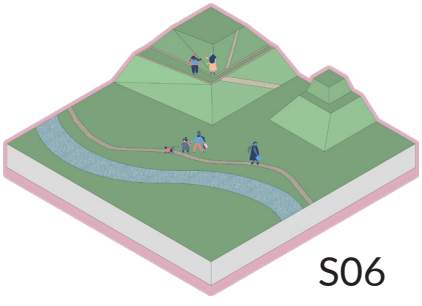

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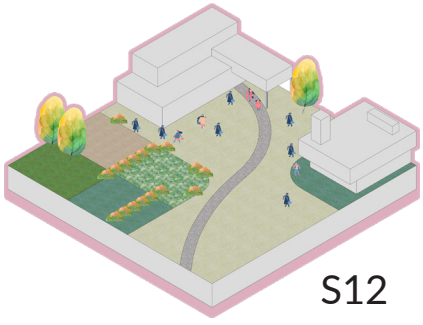

S12

About

Welcome to the Jiulong River Revitalization Platform, dedicated to promoting sustainable development in the Jiulong River upstream region. Our mission is to preserve the area's rich cultural heritage and ecological integrity while fostering community-driven growth.

Our platform unites local villagers, social enterprises, government departments, academic researchers, and the general public to collaborate on revitalization efforts. Villagers can share traditional knowledge and participate in development projects, ensuring their voices are heard and valued. Social enterprises can manage resources, propose projects, and connect with the community. Government departments use our data tools for informed decision-making and targeted support. Researchers access a comprehensive repository for studies and findings. The public can stay informed, engage in volunteer opportunities, and support initiatives through our platform.

By integrating traditional practices with modern solutions, we aim to create a sustainable future for the Jiulong River region. Join us in this journey and contribute to a vibrant, resilient community that honors its past while embracing progress.

Community Highlights

Explore stories and experiences from local villagers, showcasing the vibrant cultural heritage and community spirit of the Jiulong River region.

Read More

Resource Available

Access a comprehensive catalog of resources provided by social enterprises and partners to support community initiatives and development efforts.

Read More

Project Updates

Stay informed about the latest developments and progress in our ongoing and upcoming revitalization projects aimed at sustainable growth.

Read More

Research Corner

Discover cutting-edge research, studies, and findings from academic institutions focused on sustainable practices and the ecological health of the Jiulong River region.

Read More

Villagers & Committee

Profile

Personal Information

Name:
Li Wei

Village:
Yingbian Village, Baishan Town, Longyan City

Skill:
Traditional tobacco farming
bamboo crafting
herbal medicine

Villagers & Committee

- Profile
  - ·Personal Information
  - ·Contribution Section
  - ·Gallery
- Knowledge Sharing Platform
  - ·Resource Library
  - ·Blogs and Forums
- Feedback Mechanisms
  - ·Surveys and Polls
  - ·Suggestion Box

Profile

Contribution Section

Traditional Practices

Traditional Tobacco Farming Techniques
Description:
This guide provides an in-depth look at the traditional methods used in Jiebu Village for planting and harvesting rice. It includes a detailed calendar of seasonal activities, from soil preparation in early spring to harvesting in late autumn.
Details:
Soil Preparation: Techniques for preparing paddy fields, including plowing, leveling, and water management.
Planting: Step-by-step instructions on planting rice seedlings, spacing techniques, and the best times for planting to ensure optimal growth.
Maintenance: Traditional methods for maintaining rice fields, including water management, weeding, and pest control using natural methods.
Harvesting: Guidelines for harvesting rice, including timing, techniques for cutting and threshing, and traditional storage methods to preserve rice quality.

Community Activities

Dragon Boat Festival Preparations
Description:
An overview of the annual Dragon Boat Festival, a significant cultural event in Jiebu Village. This section describes the historical significance of the festival, the communal preparation activities, and the festival's main events.
Details:
Boat Making: Description of the traditional boat-making process, including the selection of materials, crafting techniques, and the role of community members in the construction.
Festival Rituals: Outline of the rituals performed before the races, such as the offering of incense, dragon boat eye-dotting ceremony, and the preparation of traditional foods.
Race Day: Details of the race day activities, including the race schedule, participant roles, and the significance of the race in fostering community spirit and cooperation.

Knowledge Sharing

Bamboo Weaving Tutorials
Description:
A series of tutorials on bamboo weaving, showcasing the intricate techniques used to create traditional baskets, mats, and other items. This section also explores the cultural significance of bamboo weaving in Jiebu Village.
Details:
Introduction to Bamboo Weaving: Overview of the history and cultural importance of bamboo weaving in Jiebu.
Tools and Materials: List of tools and materials needed for bamboo weaving, including types of bamboo best suited for different products.
Basic Weaving Techniques: Step-by-step tutorials on basic weaving patterns, including flat weaving, circular weaving, and complex patterns used in traditional designs.
Advanced Projects: Instructions for creating advanced bamboo items such as baskets, furniture, and decorative pieces, with tips on maintaining quality and durability.
Cultural Context: Explanation of the role bamboo weaving plays in local festivals, economic activities, and daily life in Jiebu Village.

Villagers & Committee

- Profile
  - ·Personal Information
  - ·Contribution Section
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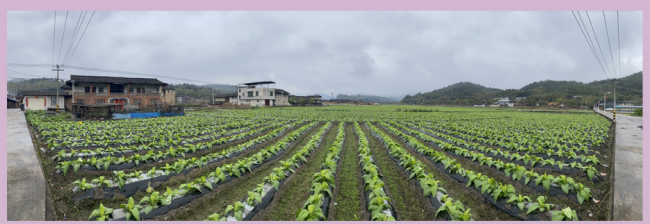
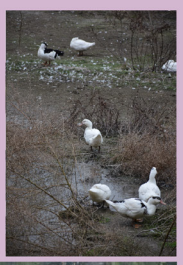
Profile

Gallery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- Profile
  - ·Personal Information
  - ·Contribution Section
  - ·Gallery
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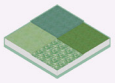
Knowledge Sharing Platform

Resource Library

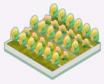
Filter resources
Search
Search By Title
Catagories
Agricultural Techniques
Craftsmanship and Artistry
Cultural Heritage
Environmental Conservation
Health and Well-being
Community Development

Sustainable Farming

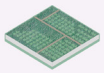
Crop rotation



Agroforestry



Wet agriculture with aquaculture



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  - ·Contribution Section
  - ·Gallery
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Blogs

Green Fingers in Jiulong: Reviving Traditional Agriculture

The Art of Bamboo: More Than Just Craft

From Leaf to Cure: Herbal Wisdom of Jiulong

Forums

From Leaf to Cure: Herbal Wisdom of Jiulong

Cultural Preservation in Modern Times

Community Development Initiatives: Opportunities and Chal-

Villagers & Committee

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  - ·Personal Information
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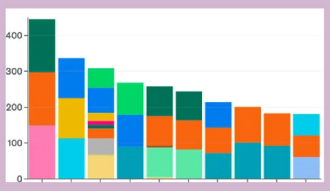
Feedback Mechanisms

Surveys and Polls

Community Development Survey
Purpose: Gather community input on a proposed new community center in Jiebu Village.
Questions Include:
"What facilities would you like to see in the new community center?"
"How often would you use the community center?"
"What are your preferred hours of operation for the center?"
Outcome: The results are used to tailor the community center's services to the specific needs and preferences of the villagers.

Annual Environmental Impact Poll
Purpose: Collect community opinions on the effectiveness of recent environmental conservation projects.
Questions Include:
"Have you noticed an improvement in local water quality this year?"
"How do you rate the effectiveness of the new waste recycling program?"
Outcome: Feedback helps steer future environmental policies and project funding.



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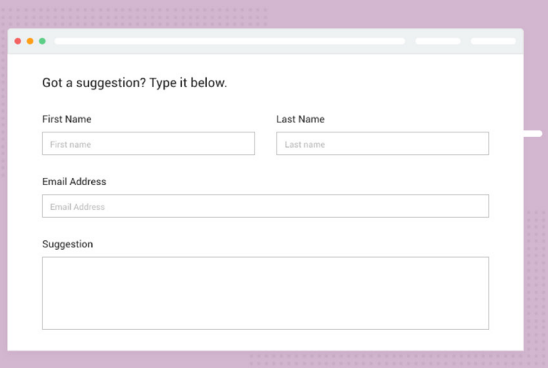
Feedback Mechanisms

Suggestion Box



Social Enterprises & NGOs

- Resource Catalog
  - ·List of Resources
  - ·Resource Contribution Form
- Collaboration Proposals
  - ·Project Proposal Submission
  - ·Interest Expression
- Success Stories
  - ·Case Studies
  - ·Testimonials

Resource Catalog

List of Resources

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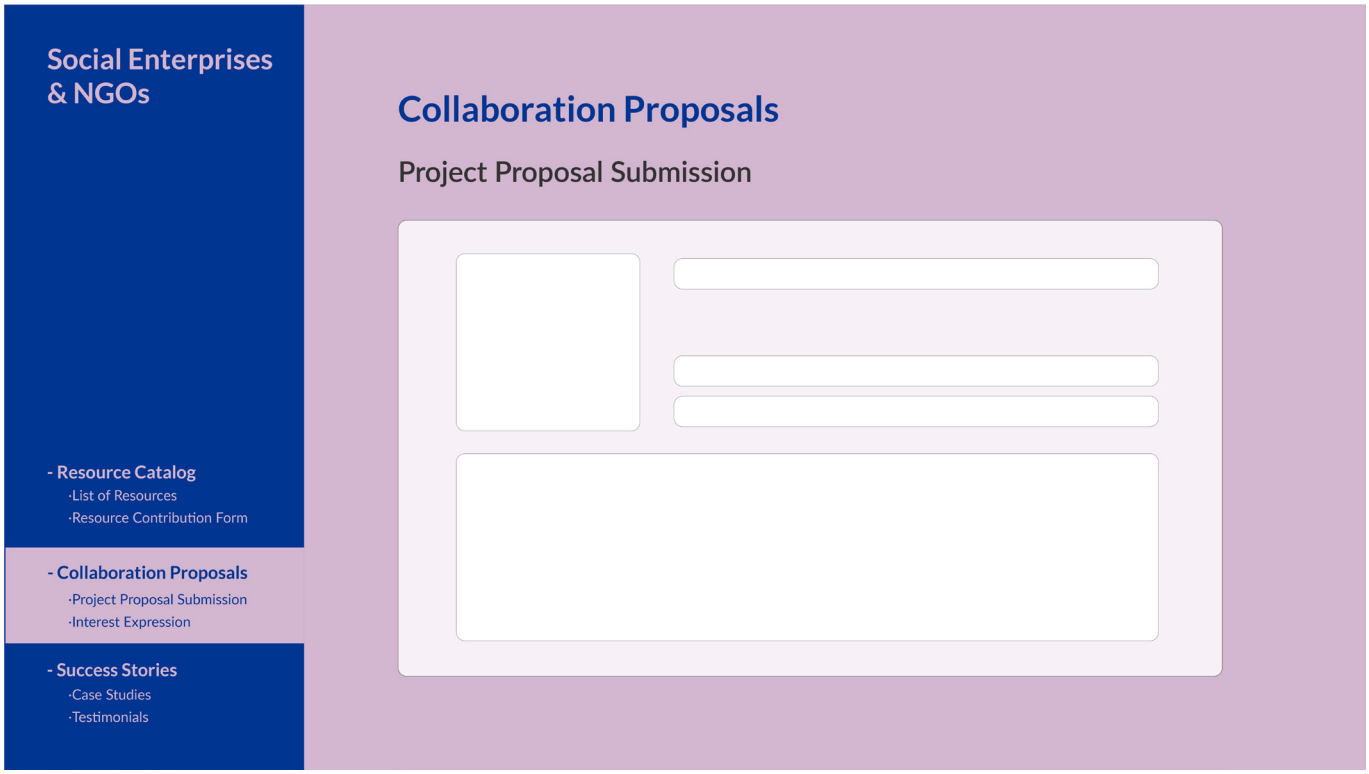
Resource Catalog

Resource Contribution Form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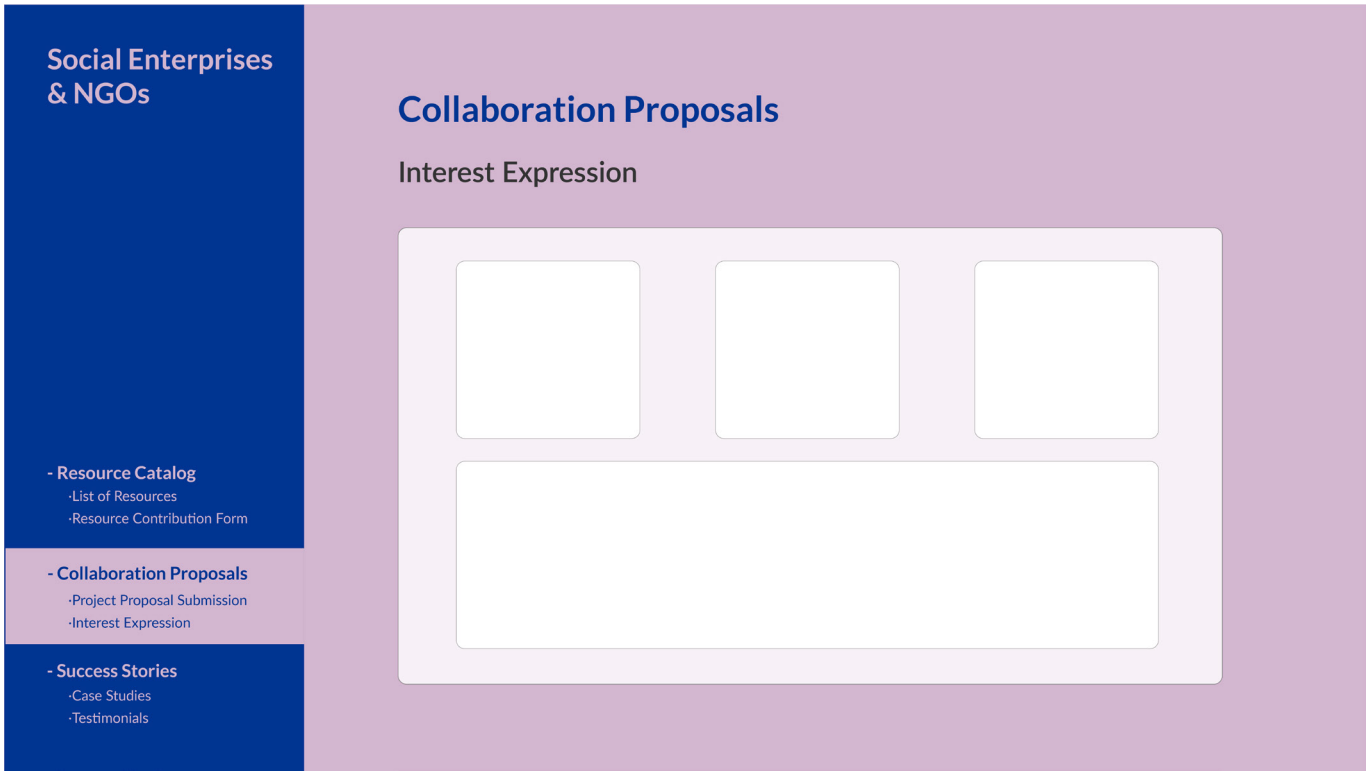
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Success Stories

Case Studies

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  - ·List of Resources
  - ·Resource Contribution Form
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  - ·Case Studies
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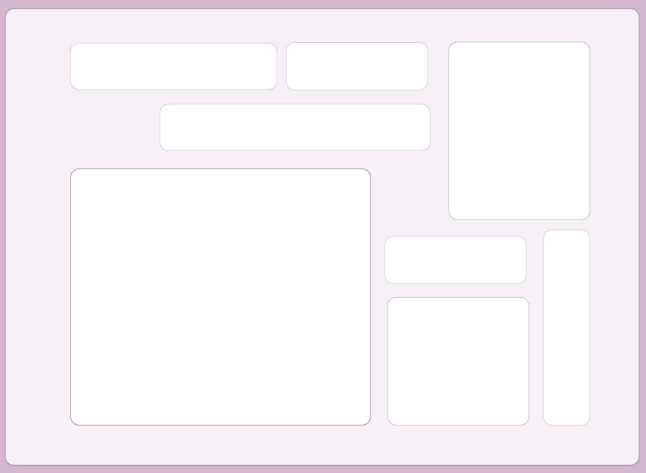
Success Stories

Testimonials

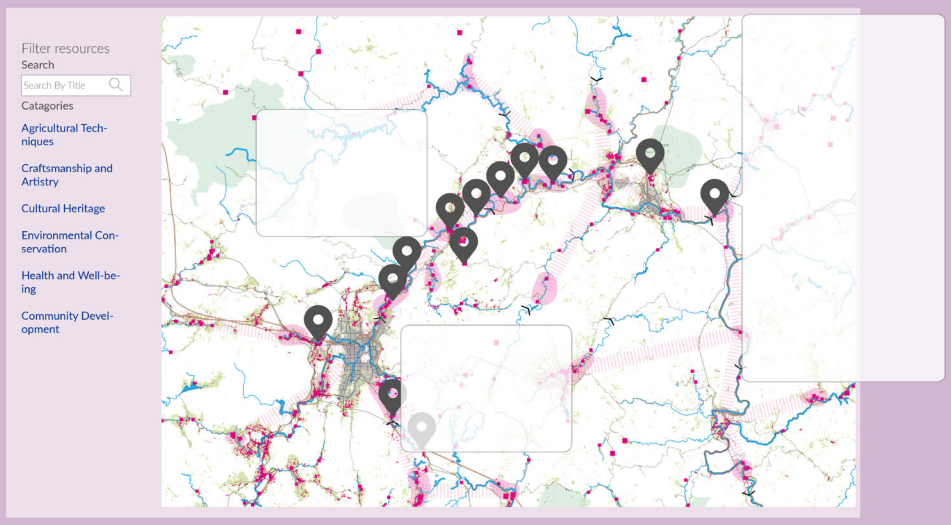


Government Departments

- Data Dashboard
  - ·Interactive Maps
  - ·Statistical Graphs
- Communication Tools
  - ·Messaging System
  - ·Interest Expression
- Project Management
  - ·Timeline and Milestones
  - ·Reporting Tools

Data Dashboard

Interactive Maps



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Data Dashboard

Statistical Graphs

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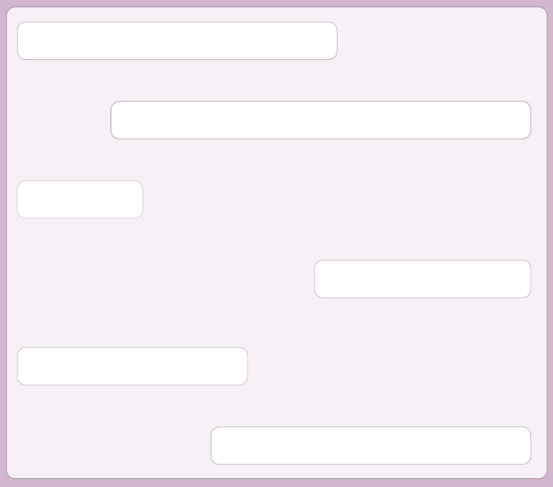
Communication Tools

Messaging System



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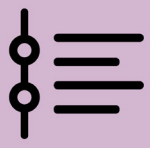
Project Management

Timeline and Milestones



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Project Management

Reporting Tools

Academic & Research Institutions

- **Research Database**
  - ·Repository
  - ·Search Functionality
- **Collaborative Research Projects**
  - ·Project Collaboration Form
  - ·Findings Sharing

Research Database

Repository & Search Functionality

Academic &
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Collaborative Research Projects

Project Collaboration Form

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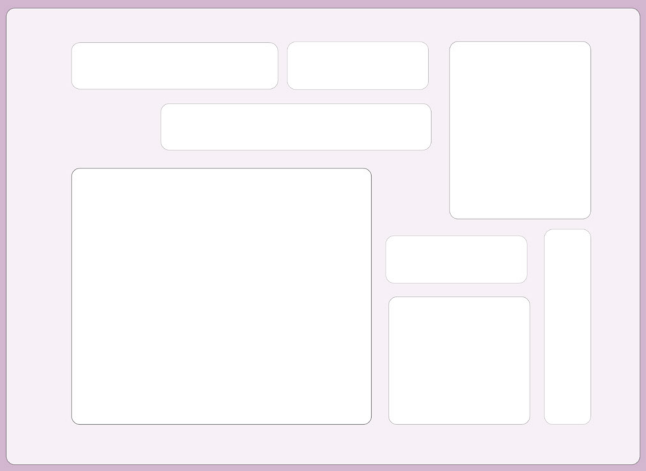
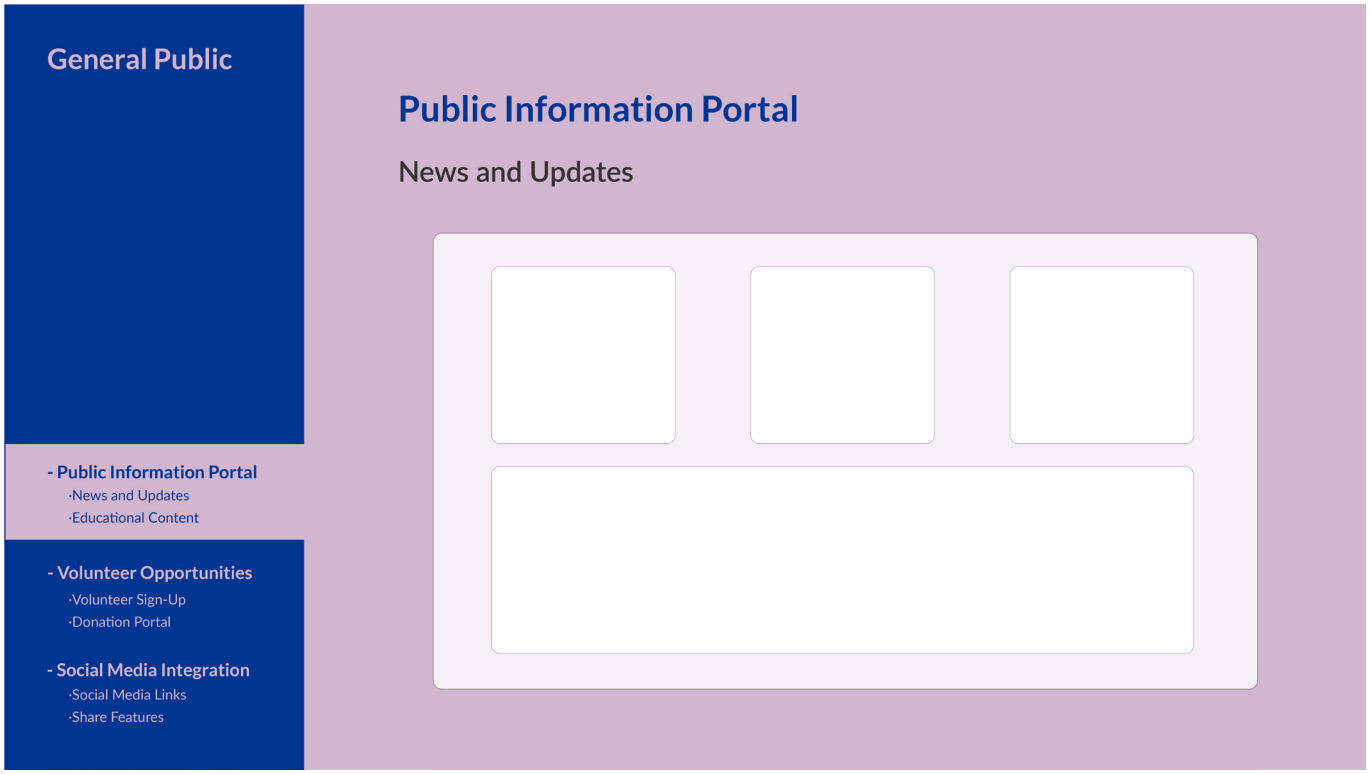
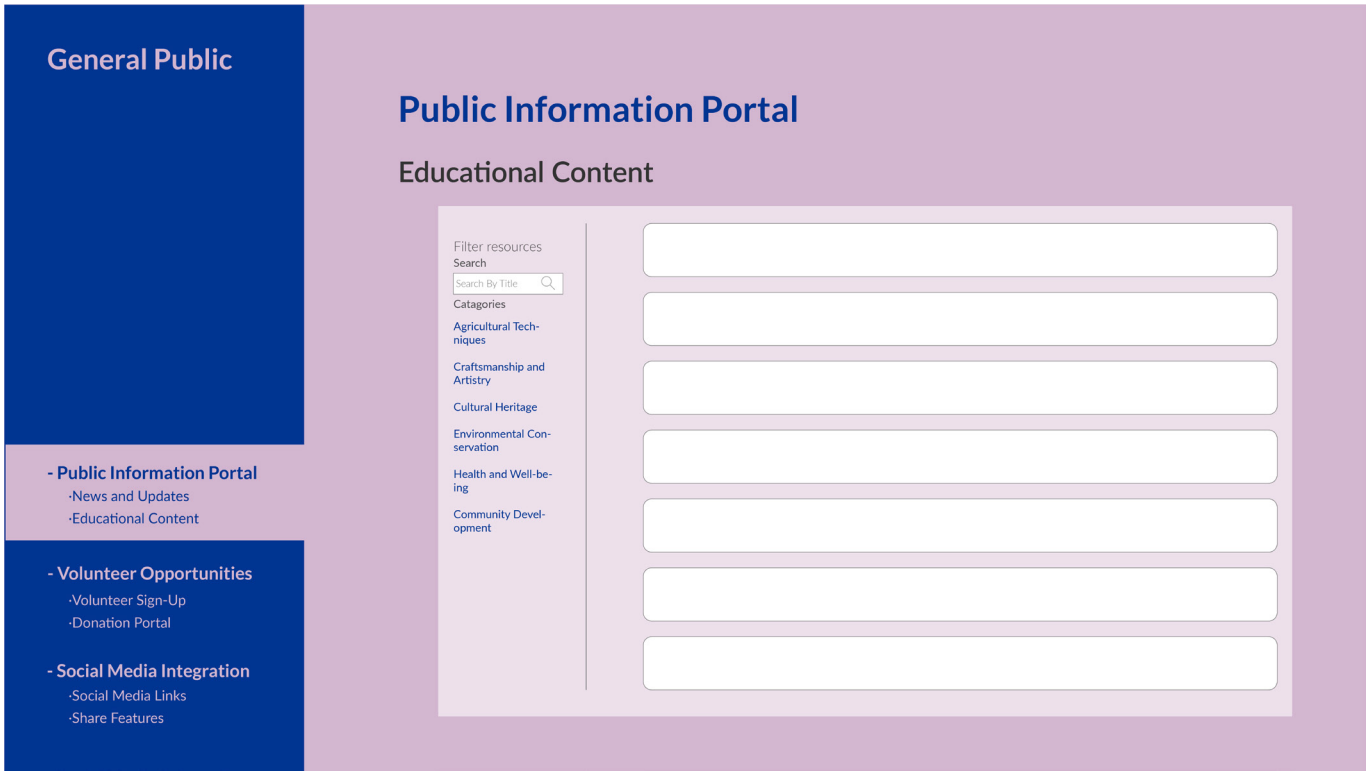
  - ·Findings Sharing

Collaborative Research Projects

Findings Sharing




General Public
- Public Information Portal
·News and Updates
·Educational Content
- Volunteer Opportunities
·Volunteer Sign-Up
·Donation Portal
- Social Media Integration
·Social Media Links
·Share Features
Public Information Portal
News and Updates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Public Information Portal
Educational Content
Filter resources
Search
Search By Title
Catagories
Agricultural Tech-niques
Craftsmanship and Artistry
Cultural Heritage
Environmental Con-servation
Health and Well-be-ing
Community Devel-opment

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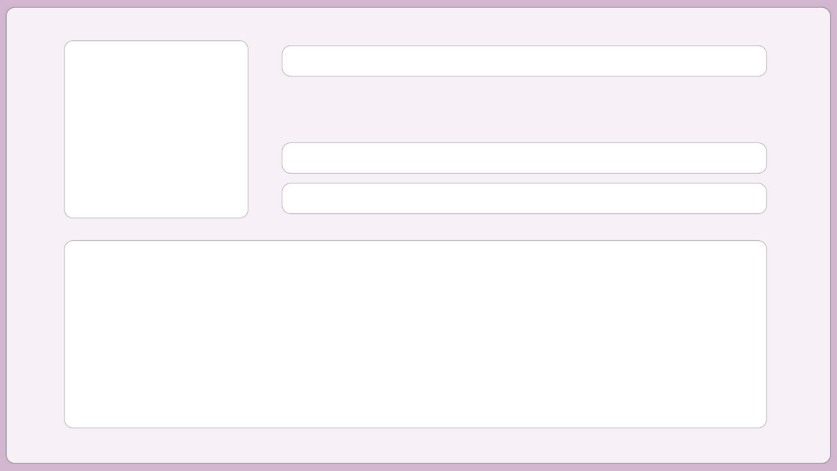
Volunteer Opportunities

Volunteer Sign-Up



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Social Media Integration

Social Media Links