Review on Advanced Practice of Provincial Spatial Planning: Case of a Western, Less Developed Province

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Abstract: Since the establishment of a unified spatial planning system was introduced at the Central Urban Work Conference, 2015, a number of cities across China have introduced “multiple-plan integration” planning practices. In 2016, the Meeting of the Central Leading Group for Deepening Overall Reform approved a proposal in Ningxia Autonomous Region, China to carry out a province-wide multiple-plan integration and spatial reform pilot. With a total territory area of 664,000 km², Ningxia is suitable for exploring a new theoretical mode for multiple-plan integration. This paper first reviews the policy from “multiple-plan integration” to the reform of the spatial planning system, which has become the principal means for conducting spatial governance and land use control. The paper will introduce the basic logic and framework of the Ningxia example based on the project study. Mainly focused on the compilation of spatial planning systems, this research derives from planning of functional zones, and key and core content of technology integration, so as to enrich the current research findings and provide new insights for the practice of spatial planning at the provincial level.

1. INTRODUCTION

During the past 15 years, as China’s urbanisation and industrialisation have entered a transitional period of development, a huge focus has been the multi-planning system integration at the state level. With passing time, the general approach has moved away from technical integration to the integration and reformation of government departments. The existing “multiple planning segregation, overlapping and contradiction” is a characteristically Chinese phenomenon, and came out of its particular historical context. Spatial planning at the provincial level is key to the integration of national and local level spatial regulation and planning. Promoting provincial spatial planning, and innovating theories and technical approaches is quite an important issue in Chinese eco-civilisation reform and spatial planning reform. It remains important for China to continue to explore appropriate mechanisms to fulfil the protection and development needs within its territory.
Multiple planning integration has been a typical topic of Chinese research since 2000. It is understood that the relationship between socioeconomic development and the regulation of land use has been changing over the past few decades, but the transformation of the planning formulation system and planning management system has not matched its pace. Ever since the 1950s, urban planners have used Western planning theories and methods, but there is a fundamental difference in the governing systems.

The term "spatial planning" is used in many countries to refer to their current planning systems. It is used to describe national and regional planning, as well as aspects of planning (Tewdwr-Jones, Gallent, & Morphet, 2010). The forms of spatial planning systems correlate broadly with the national conditions and cultural traditions of each country, where they are tied to historical development, socioeconomics, and political and cultural values (Stead & Meijers, 2009). In 1997, the Summary of the European Union Spatial Planning System proposed that spatial planning mainly be used by the public sector to influence the spatial distribution of future activities, with aims to create a more rational territorial organisation for land use and functional relations, to balance the protection of the environment and development needs, and to achieve the overall goals of social and economic development (Luxembourg: Office for Official Publications of the European Communities, 1997). Salet, Thornley, & Kreukels (2003) conclude that the three elements of spatial planning are space, function and departments, and that spatial planning can be divided into the national, regional, and metropolitan areas and regional level or local levels.

Newman & Thornley (1996), looking at different legal and administrative systems, divide the European spatial planning systems into four main types: the British system (mainly Great Britain), Nordic planning system (Denmark, etc.), the Germanic system (Germany and Austria) and Napoleonic system (Belgium, France, etc.). The British spatial planning system is a guiding system based on common law. Characterized by compromise and negotiation, it is used widely. In England, the central government has strong control and the local government also has a high degree of autonomy. The Planning and Compulsory Purchase Act was enacted in 2004, marking their formal entry into the era of spatial planning. Britain's urban and rural planning system includes land use, development strategies and action plans. After several transition rounds of centralisation and reform to decentralisation, the current planning system is divided into the National Plan, Regional Plan, Structure Plan and District Planning (Haughton et al., 2009). In accord with the intentions of the new law, British planners are reaching beyond narrow land-use regulation to develop a more coordinated and consensus-based approach to planning practice (Shaw & Lord, 2009).

The formation and evolution of western spatial planning systems is closely related to their political and economic systems, economic development stages, and other factors (Tewdwr-Jones et al., 2010). Decentralised countries usually do not have unified management of spatial planning, nor do they emphasize regional coordination (Jingquan et al., 2017). The United States is the most typical example of this decentralisation, as the federal government does not really govern the macro, regional, or state planning and local government planning. In most western countries, the planning and management system is a comparatively comprehensive structure, especially in countries with centralised
bureaucratic traditions, such as Japan, Singapore, Germany, Netherlands and France (Alterman, 2001). Land is mostly owned by the state. Even if the land is private, the state retains the right to develop and control it. These countries have relatively complete spatial planning systems. In Germany, the spatial planning system is divided at the levels of federal, state, regional and local, called bundesraumordnung, landesplanung, regional planung, and ortsplanung, where landesplanung is considered the provincial level territory planning. In 1993, the Framework of Policy Measures for Spatial Planning was established, which emphasised the following development tasks: improving the structure of national settlements, establishing a network of urban systems, expanding the links between cities and surrounding areas, protecting the diversity of ethnic cultures in agricultural areas and ensuring the sustainability of the basic natural survival territories (Bndesministerium Fuer Raumordnung, Bauwesen Und Staedtebau, 1996; Braam, 1996).

Regarding Germany, the specific name for this style of planning is not as important as the reliance on planning, and the national, central government attaching importance to the rational planning and control of the utilization of national spatial resources (Zhiqiang, 1999). The legal basis of the spatial planning system in the Netherlands is the Wet op de Ruimtelijke Ordening (WRO), which was promulgated in 1965. The law declares that spatial planning is a coordinated activity (Evers & Zonneveld, 2014). This system belongs to the hierarchy regulatory planning system and can effectively coordinate state departments to work together. Planning has been widely understood as an integrated part of Dutch society (Shetter, 1987). The international academic community defines the Dutch planning system as a "comprehensive and integrated approach" (Alexander, 1992; Bing & Yaowen, 2017). Though it is not a mandatory provision for planning to be undertaken by provincial or municipal governments, the Dutch provinces have created their own regional strategic planning (Streekplan) for the comprehensive deployment of spatial structural elements and their layout, water management, environmental protection and heritage protection (Bing et al., 2017; Faludi & Van der Valk, 1994). Most of them are instructive, and only a few specific decisions have been mandatory.

In 1974, Japan promulgated the Land Use Planning Law, which highly restricts land use planning systems from top to bottom, consisting of the three levels of government at the national, county and prefectural, and city and village level. In Japan, after 2001, the Land Department was revoked, and the Ministry of Transportation and other departments formed the Ministry of Land and Transportation. The operations for all kinds of planning were integrated into the ministry, which actually strengthened the leading position of the cabinet; additionally, with the revision of the Comprehensive Land Development Act, the planning level was reduced from three levels to two (Quanrun, 2004). In some developing Asian countries, the establishment of spatial planning regarding economic and social development is also under discussion. For example, in Indonesia, the interaction between institutional-cultural forces and globalizing neo-liberal ideas has influenced the formulation of the draft of their new Spatial Planning Act. The neo-liberal ideas fragment the system and conflict with the existing institutional-cultural forces. The idea of legislation and decentralisation, as promoted by neo-liberalism, has been encouraged in order to develop a more effective planning system (Hudalah & Woltjer, 2007).

China, traditionally, has had a centralised political system, but with a decentralised planning and government system. What is more, different
government departments each have some land development rights. China's current spatial planning and governance systems have achieved remarkable results since the Reform and Opening Up Policy in 1978, supporting the rapid growth of over 40 years with relatively scarce resources. On the other hand, China still faces many problems, especially in ecology and natural resources protection. The development is limited by such problems as the natural resource endowment constraints, inefficient use of land among local governments and industries, sharpening contradictions between construction and conservation, coexistence of regional economic isomorphism and spatial disorder, and serious environmental damage. The inherent contradictions in these mechanisms cause separation and contradiction between different planning systems. In China, even though researchers have conducted a lot of studies on planning coordination and integration (Jingquan et al., 2017; Li, Tang, & Lu, 2017; Lin, Chen, & Wei, 2011, and others), the question of how to form a spatial planning system, from regional domains to local land regulation control, is still scarcely discussed. Additionally, the question of what kind of value system should be introduced for the restructuring of the spatial planning system has still not been adequately analysed. Therefore, this paper attempts to answer the following questions: what is the appropriate structure of the spatial planning system in China, especially at the provincial level? How should the operation mechanism be incorporated in a planning scheme to allocate natural resources and space? And what is the best probable, functional and useful approach to solve multiple planning segmentation and contradictions? To answer these questions, this study contributes a basic theoretical framework for a unified provincial planning system and technical methods by introducing the case of Ningxia Hui Autonomous Region Provincial Spatial Planning (Multiple Planning Integration).

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2. METHODOLOGY

The basic framework is to figure out a feasible mechanism for implementing the central governmental spatial policy through local authorities’ spatial planning. In the following sections, a policy transformation is reviewed. The status and function of provincial spatial planning in the reform of the whole planning system is clarified. Following this is the case study of the Ningxia practice: from a problem-oriented and goal-oriented perspective, the study proposes five main highlights regarding the aspects of transitioning ecological civilisation, spatial planning system formulation, top design schemes, land use regulation, and working mechanisms for multiple planning integration.

As for technical analysis and evaluation, the database includes mainly three types of data. 1) The first type comes from a database of various plans, including regional plans, and spatial plans at the national, provincial and city-county (district) level. Provincial level spatial plans include plans such
as the Ningxia Overall Land Use Development Plan, Industry Layout Spatial Plans, the Woodland Protection and Utilization Plan, Traffic Planning, and the Zoning of Permanent Protection of Basic Farmland Red Line. Those plans are either released or still in the period of validation. 2) The second is spatial resource status and changing data: all kinds of natural resource distribution, and data reflecting the current state of its utilization, which mainly includes land use status data, the latest land use change data, cultivated land quality information, woodland and forest resources, grassland and wetland resources, degraded land (including desertification and desertification of land), hydrology and water resources, and mineral resource distribution. 3) The third type is statistical data of populations, and economic and social development. Specifically, the second type of data is mainly applied to evaluations modelling the availability of land space development suitability, as well as evaluations of environmental resource carrying capacity. The analysis of situational characteristics in Ningxia and Ningxia planning contradictions mainly use the first and third types of data.

3. POLICY REVIEW: FROM “MULTIPLE-PLAN INTEGRATION” TO THE REFORM OF THE SPATIAL PLANNING SYSTEM

3.1 Policy Transformation

In 2004, the National Development and Reform Commission (NDRC) proposed a pilot program to integrate three planning systems in six cities. The Opinion on Main Tasks of Deepening Economic System Reform in 2014 (State Council No. 18/2014), proposed by the NDRC, proposed the tasks of “implementing new national urbanisation planning, promoting the ‘integration’ of socio-economic development planning, land use planning, urban-rural planning, eco-environmental protection planning, and carrying out a pilot reform of city (county) spatial planning and boosting the integrated socio-economic development in urban and rural areas.”

While there has been a substantial response since August 2014, at that time, the NDRC, the Ministry of Land and Resources, the Ministry of Housing and Urban-Rural Development, and the Ministry of Environmental Protection, jointly issued the Notice on Conducting the pilot work for “Multi-Planning System Integration” in Cities and Counties (NDRC Plan No. 1971/2014; Jingquan & Chi, 2015). In this pilot notice file, 28 counties and cities were chosen as experimental regions. During this time period, many governments conducted bottom-up multi-planning integration, with the purpose of increasing tight restrictions over land resources for construction. Many forms of integration appeared, such as “Two-Plan Integration”, “Three-Plan Integration”, “Four-Plan Coordination” and so on. Generally speaking, all integration was done to resolve contradictions among spatial plans in a technical way, under the current framework of the political management system and operation mechanisms. Local governments enthusiastically promoted this to free up new construction land. The legal hurdles and institutional obstacles, which fundamentally influenced the outcome of the reform, were ignored.

In fact, the clear-cut promotion has been acknowledged by the Central Government since the 18th National Congress of the Communist Party of China (CPC), the Third Plenary Session of the 18th National Congress of
CPC, and the Urbanization Work Conference of the CPC Central Committee. The reform of the spatial planning system and multi-plan integration practices should be considered in the scope of the state’s reform of the ecological civilisation system to improve governance capacity. With the deepening of the state reform, the guiding ideology of dealing with contradictions among plans has changed tremendously.

In September 2015, the Integrated Reform Plan for Promoting Ecological Progress (State Council No. 18/2014) was printed and distributed by the CPC, the Central Committee, and the State Council. The plan was formulated for putting systematic and complete systems for improving the ecosystem in place more quickly, achieving faster ecological progress, and reforming ecological progress to make it more systemic, holistic and better coordinated. In this state level design, a spatial planning system was considered one of the eight systematic and complete institutional frameworks for promoting ecological progress and modernising China’s governance systems and relevant capacity for governance and ushering in a new era for socialist ecological progress. In December 2015, at the Central Urban Work Conference, based on the planning of functional zones, president Xi Jinping proposed explicitly combining different types of plans into a single spatial plan, such that gradually there would be one plan, or blueprint, per province, city or county. Thus, a clear path is proposed for promoting the planning system reform.

Other than full technical integration, spatial planning at the provincial level should take place prior to all other departmental plans, integrate the spatial policy and land use regulation of all sectors, and be easy to complement with a feasible operation mechanism.

### 3.2 National-level planning of functional zones

National-level planning of functional zones was distributed in 2007, and it is the only national level spatial plan that has been approved legally by the CPC, Central Committee and the State Council since 1949. Although NDRC, the Ministry of Land and Resources, the Ministry of Housing and Urban-Rural Development, the Ministry of Environmental Protection, the Ministry of Forestry, the Ministry of Transportation and the Ministry of Water Resources all have their own vertical planning system, this is the only legal national territory development plan since the founding of the People’s Republic of China.

As a blueprint of territorial and spatial development with emphasis on humanism and harmony with human-nature, this plan exists as a guideline for the government to implement spatial governance and a platform for integrating the related resources for spatial planning. It is also the scientific basis on which the regulatory roles of both government and market can be fully realised, regionally coordinated development can be boosted, and the whole society governed, leading to a more accurate understanding and rational construction of people’s living space.

On the basis of this plan, the national territory was divided into different major function zone types – urban areas, primary production areas for agricultural products, and key ecosystem service areas (see Figure 1). Regarding development, there is another division into four types, including development zones to be optimised, key development zones, limited development zones, and prohibited development zones. It is important to note that the smallest spatial unit at this national level is the county, which is a very strong political entity in the Chinese political hierarchy system. Since
2007, this plan has become the fundamental legal basis of regional, city and county level spatial planning, and thus affected the technological path for how spatial land regulation will be implemented.

![Figure 1. Territory spatial divisions of national level major function-oriented zoning](Source: Outline of the thirteenth-year plan for the national economy and social development in the People's Republic of China, 2016-2020)

Under the overall strategic scheme of ecological civilization reform, in December 2016, the Experimental Scheme of Spatial Planning at the Provincial Level was printed and distributed (Ministry No.51/2016). This file puts forward the main task, supporting measures and work requirements for the pilot work of provincial spatial planning in 2017. Nine provinces, including Hainan, Ningxia, Jilin, Zhejiang, Fujian, Jiangxi, Henan, Guangxi and Guizhou were chosen as experimental provinces to conduct provincial spatial planning pilot work.

### 3.3 Provincial spatial planning

Provincial spatial planning should correspond with the level of government power and the scale of provincial space. Its status and function are mainly reflected in the following aspects. As the top-level design, it is the blueprint for the sustainable development of provincial space, which is the basis of the department planning and the city and county spatial planning. At middle level territory planning, provincial spatial planning should play a key role in both implementing the national strategy in the spatial planning system and in guiding the city and county spatial planning. The coordination of resources should promote the efficient allocation of provincial space resources, optimise the spatial pattern of the whole region and guide the implementation of regional infrastructure. For effective control, it should meet the needs of macro management and the cities and counties’ micro control at the provincial level. With national spatial use control and the control index of construction, provincial spatial planning is complemented to reduce the institutional trading costs, promote national spatial governance ability, and improve the efficiency of government management.
At present, China's social and economic development situation is complex, and the resource and environmental constraints are becoming increasingly serious. Provincial spatial planning should be guided by the concept of ecological civilisation construction, focus on solving the problem of the tension between land space development and environmental preservation, and promote the modernisation of the national governance system and governance capability. The top-level design should strengthen control to form a unified pattern of spatial development and protection, and to build a community of common destiny for the whole region.

4. NINGXIA PRACTICE AND EXPERIENCES

In April 2016, the 23rd Conference of the Central Deep Reform Group discussed and approved the adoption of the Ningxia spatial planning pilot program, with the requirement that Ningxia should strengthen the leadership to boldly innovate, and that the central government departments should support the follow-up and summary experience. This means that Ningxia has become a provincial-level pilot and experimental province in reform and innovation. A new stage has begun. With almost two years of hard work, and with massive support from the Ningxia Hui autonomous Region Planning Management Committee Office, vigorous cooperation with the Guangzhou Urban Planning Survey Design Institute, technical collaboration from the Geographical Science and Resources Institute, the Chinese Academy of Sciences in Heilongjiang province, and the Geographic Information Bureau of the Surveying and Mapping Institute of Science, the Ningxia Hui Autonomous Region Provincial Spatial Planning (2017-2030) was formulated successfully. Following this, the situation characteristics and problems of Ningxia are analysed, and the main practice and key features of this experimental work explained.

4.1 Situation characteristics and problems of Ningxia

4.1.1 Situation of development and preservation

Ningxia, officially the Ningxia Hui Autonomous Region (NHAR), is an autonomous region of the People's Republic of China located in the northwest of the country. Ningxia was reconstituted as an autonomous region for the Hui people, one of the 56 officially recognised nationalities of China. 20% of China's Hui population lives in Ningxia. Ningxia is bounded by Shaanxi to the east, Gansu to the south and west, and Inner Mongolia Autonomous Region to the north. Present-day Ningxia is one of the nation's smallest provincial-level units with an area of around 66,400 km², and with a population of 6,680,000, the third lowest in the country, at the end of 2015. There are large differences between the natural environments of the northern, central and southern territories. In the north of the Yellow River flood plains is a large oasis, one of the few rich land resources in northwestern China, where urban construction conditions are much better, while the central and southern areas are relatively dry, desert-like regions, facing quite fragile ecological problems.

The ecological system is sensitive and fragile, and the pressure to protect the environment is great. Soil erosion is serious, and the difficulty of governance has increased gradually. The quality of the ecosystem and ecological system services are comparatively low. Resource constraints are
tight, and there is increasingly limited carrying capacity of water resources. The shortage of water resources and the unbalanced allocation of space, and the contradiction between supply and demand is outstanding. Ecological space is squeezed as the fragmentation intensifies.

Economic development is lagging behind and the primary pressure comes from development. The structure of industry remains unreasonable as the proportion of heavy industry is too high, and the high energy consumption industry is still the main body of growth. Innovation from science and technology ranks low in ability. Overall, the provincial domain competitiveness ranking is backward. In 2014, it ranked 27th in the national comprehensive provincial competition rankings. In the surrounding provinces of northwest China, the new state-level districts are located in the economic zone of Xi'an and Lanzhou, and there are only two national economic zones in the Ningxia autonomous region.

Spatial development features are different from north to south. Currently, Ningxia just entered the intermediate stage of industrialization, and its whole spatial development pattern also corresponds to this. In the northern area along the yellow region (including Yinchuan municipal districts, Yongning, Helan, Lingwu, Shizuishan city, Pingluo, Wuzhong city, Litong, Qingtongxia and Zhongning) are at a pivotal point in their early development, with populations accounting for 65% of the whole municipality, creating nearly 90% of the GDP in the region. This has primarily had an accumulative effect. Central and southern urban development is insufficient, with the average per capita GDP of the southern nine counties at only 36.8% of the average provincial level. Only 10.6% of the counties are financially self-sufficient. The southern area is still in the separate central scatter model, and there are some comparatively obvious polar nuclei in the southern region.

4.1.2 Present problems of planning contradictions in Ningxia

It is difficult to effectively form a joint directive because of serious planning contradictions. There are several kinds of top spatial plans for Ningxia at the provincial level (Table 1), including planning of functional zones, urban system planning, the overall plan for land utilisation, short and long term strategic development planning, environmental functional district planning, ecological protection and construction planning, forestland protection and utilisation planning, strategic planning of integrated transportation systems, planning of soil and water conservation, and so on. These are each drawn up by different departments.

The contradictions between these works and their management exist in many areas, such as different views between central authorities and localities in terms of content and planning areas. They mainly manifest in contradictions in the layout structure, in the land use regulation control zone, and in the land use. As to land use, the layout of urban construction land is mainly different between urban planning and land resource planning. The differences for non-construction land are mostly due to the contradiction between forestland and farmland grassland. The contradiction between urban-rural construction land and important ecological factors is also obvious. Plans for construction land occasionally overlap with the water source preservation areas, the ecological public welfare forests, resulting in difficulty with implementation and placing the ecology under threat. Another contributing factor is that there are discrepancies in the basic utility information for these territories between different government
systems, such as the Department of Land and Resources and the Department of Surveying and Mapping.

Table 1. Different priority plans regarding territory of Ningxia at the provincial level

| Name of plan                                                                 | Issuing institution                                      |
|------------------------------------------------------------------------------|----------------------------------------------------------|
| Planning of functional zones of the Ningxia Hui Autonomous Region (2014-2020) | Development and Reform Commission                       |
| Strategic planning of space development of Ningxia (2014-2030)               | Department of Housing and Urban Rural Development        |
| Overall plan for land utilization of the Ningxia Hui Autonomous Region (2006-2020) Urban system planning: Urban hierarchical planning of the Ningxia Hui Autonomous Region (2015-2030) | Provincial Department of Land and Resources              |
| Environmental functional district planning of Ningxia (2014-2030)            | Department of Environmental Protection                  |
| The ecological protection and construction planning of Ningxia (2015-2030)    | Department of Environmental Protection                  |
| Forestland protection and utilization planning of the Ningxia Hui Autonomous Region (2010-2020) | Department of Forestry                                  |
| Strategic planning of integrated transportation system of Ningxia (2016-2030) | Provincial Department of Transportation                 |
| Planning of soil and water conservation of the Ningxia Hui Autonomous Region (2014-2030) | Department of Water Resources                           |

These contradictions are obstacles in the process of planning legislation, which negatively impact planning directives and implementation. The main reasons for the contradictions include the following: 1) the focus of the departments’ macro specialist resources allocation and coordination is different; 2) different technical methods and standards cause different spatial layouts; 3) the planning base years and target years are different; 4) The difference of control method leads to the difference in management effectiveness, which leads to unclear management responsibilities.

4.2 Ningxia practice and key features

The spatial planning of Ningxia Hui Autonomous Region focuses on exploring the following aspects and forming key features. As a provincial spatial planning pilot approved by the central government, this program has made great efforts to formulate reform highlights and innovation, so as to form a series of replicable experiences from Ningxia.

4.2.1 Bottom-line thinking and ecological priority

Bottom-line thinking, adherence to ecological priorities and the balance between development and protection, have been considered essential. The plan aims to fulfill the comprehensive implementation of the central government's strategic requirements for Ningxia, and the reform is a major step towards coordinating the socioeconomics, ecology, population, resources and environment. Based on the scientific judgment that lack of sufficient development is still the most important problem in Ningxia, the plan aims to solve practical problems for Ningxia’s development and ecological protection, and to promote clear development goals and strategies, leading the spatial development.

In Ningxia, a new system was built based on this spatial planning, drawing on regulation as the main approach, with the purpose of ending the
over-use of quality cropland and ecological space, ecological damage, and environmental pollution caused by disorderly, excessive, and scattered development.

The goal was to protect the ecological environment to the maximum extent, delineate ecological space, and strictly observe the red line of ecological protection and the red line of permanent basic farmland protection. The demarcation of the Ningxia ecological protection red line accounts for 24.76% of the total land area. The ecological space of Ningxia occupies 65.4% of the total area. To ensure ecological and agricultural security, it is important to regulate the behaviour of all kinds of spatial development. From the earliest stages, basic evaluation, including evaluation of resource and environment carrying capacity, and land space development suitability evaluations, must be carried out for every inch of land, to ensure that all spatial development activities are supported by the resources and environment carrying capacity.

4.2.2 Proposing a two-level spatial planning system

Spatial planning systems should be coordinated according to the scale of space or administrative hierarchies, with each administrative authority having only one comprehensive spatial plan (Huien, 2004). Otherwise, it will cause problems for implementation. In Ningxia practice, to fulfil the reform goal, a spatial planning system will be designed, with the main purpose of strengthening the spatial governance and improving its structure, which is regionally unified and better connected between different departments of government, and according to which management is divided between governments at multiple levels, in an effort to eliminate overlapping and conflicting spatial plans, the overlap and duplication of responsibilities between departments, and the issue of local authorities frequently changing their plans.

In Ningxia, a two-level spatial planning system has been formed, from macroscopic to microcosmic and coordinated to a specific layout. The core content for spatial planning at all levels is set up as shown in Figure 2.

![Figure 2. Framework of local spatial planning system](image)

The plan is the blueprint to ensure the sustainable development of the autonomous region, and the top-level design with the key contents of the development goals, tasks, technology path, planning content, collaboration mechanisms, and upper and lower linkage working method, and system of laws and regulations. The provincial plan focuses much more on spatial policy, a unified spatial strategy, unified development goals, unified index
system, unified policy regulation zone partition, and unified resources allocation. The provincial plan should strengthen the protective bottom line control.

Municipal or county spatial planning should classify land use with a unified standard, and, in accordance with the relevant functional zoning and the requirements of the provincial-level spatial plan, should delineate production space, living space, and ecological space, and demarcate the development boundaries of urban construction areas, industrial areas, and rural living areas, as well as the boundaries of protected areas of arable land, woodlands, grasslands, rivers, lakes, and wetlands, and strengthen coordinated planning for urban subsurface space. More effective guidance will be given to cities and counties regarding their trials for plan integration.

4.2.3 Design of spatial resource coordination and allocation

The technical arrangement and main contents of the design of spatial resource coordination and allocation for the plan are outlined in Figure 3, below.

![Figure 3. Technical route and main contents](image)

4.2.3.1 United spatial planning for departments and cities/counties

A top-level structure of planning content was designed to solve the planning contradictions addressing the underlying causes. All types of current spatial plans formulated by different departments at the provincial level will be integrated into unified spatial plans, which will be all-encompassing. The new spatial planning will guide provincial development with spatial blueprints for sustainable development; it will be the fundamental basis for all types of development and construction programs.

Within China’s administrative framework, the relationships of China’s spatial planning system in both the vertical and horizontal dimensions are organised into a comprehensive plan for urban spatial development, which accommodates the demands of urban construction, village development, ecological protection, farmland preservation, and industrial development, and gives it a statutory status.
All-in-one innovation is embodied in the following aspects: in the content system, the core content of all kinds of planning is integrated; in the index system, the core control index of spatial class is strengthened; the construction includes the index system of 28 indicators of the four major sectors, covering the land use for economic and social development, the environment of ecological protection, and the construction of urban and rural areas. On the basis of the technical method, beginning from each inch of land, a double evaluation system is conducted, which then forms a united control line plan, and land use regulation plan.

4.2.3.2 Based on the planning of functional zones
The main national functional zoning plan identified the yellow economic zone as one of the 18 state-level key development zones. According to the requirements of the strategy of development priority zones, on the basis of national spatial analysis and evaluation, combined with administrative boundaries and natural boundaries, and using various cities and counties as the basic unit, urban farming is divided into three kinds of spatial layout and adjusted for optimisation. Finally, the overall blueprint is created for provincial development.

4.2.3.3 Guidance with strategic spatial development pattern
During the planning process, to implement the national policies effectively and differentiate the aims and values for improving territorial spatial structure, a united strategic planning structure named “One nuclear, three regions; one polarity, two poles”, is determined (see Figure 4). Throughout the spatial development strategy, there is a focus on both regional harmonious development and the required function of the cities and counties in the main body. All kinds of spatial development and layout as a whole, in the global scope of internal allocation of public resources and production factors that guide further the urban agglomeration of population and economy, maximise agglomeration and strengthen south-central radiation.

Figure 4. Spatial strategic plan of Ningxia
4.2.4 Forming the regional wide-domain land use control scheme

The main work of moving from basic double-evaluation to three zones and three lines is to carry out the basic double-evaluation, including evaluation of resources and environment carrying capacity, and land space development suitability evaluation, on the basis of the evaluation contents, indicators and standards, and then delineate the three zones and three lines (ecological zone, agricultural zone, urban zone; ecological red line, urban development boundary, and permanent basic farmland red line). This is strategically important for optimising the land space development pattern and urban-rural spatial distribution, in order to ultimately form one map for spatial planning.

According to the NDRC technical approach of Monitoring and Warning of Resource and Environment Carrying Capacity, the specialist evaluation and integrated evaluation of the basic evaluation is carried out in each county to identify the carrying capacity and to analyse the causes of overloading. Based on the land use change survey and other results, the comprehensive multi-index evaluation is carried out according to the suitability index and binding index. The evaluation result is superposed with the current surface area data, and the spatial development suitability evaluation result is formed, which is the basic premise of the Ningxia spatial planning (see Figure 5 and Figure 6). Based on the basic unit of the county administrative region, the scientific evaluation comprehensively reflects the carrying capacity and development suitability of the resource environment.

![Land space development suitability evaluation technical process](image)

*Figure 5. Land space development suitability evaluation technical process*

From the perspective of planning regulations, the three zones and three lines can take the place of current multiple spatial regulations in different plans, such as three zones (forbidden construction, limited construction, pro-construction) and four lines (blue, green, yellow, and purple lines) in the
urban plan. The three zones cover every inch of the territory of Ningxia and are not interlaced with each other. With the control and regulation principle, the development intensity and the protection boundary are determined by the spatial factors of the ground control regulations.

Figure 6. Land space development suitability evaluation of Ningxia provincial region

Figure 7. From functional zones plan to whole territory spatial use control regulation

In setting the regulation rules, control regulation and operation mechanisms cannot be underestimated. Following target, strategy, spatial regulation, and policy logic, the target strategic spatial integration is integrated with policy coordination (see Figure 7). Thus, provincial spatial planning is an important measure and tool for urban spatial governance in Ningxia.
the future. To deal with conflicts and problems of land property in current various kinds of planning, the study formulates measures to deal with the differences in construction land and non-construction land, determine unique properties of the land, and clarify the planning and management of each plot.

Contradiction in technological standards is one of the most critical causes of planning contradictions. In practice, the root cause is the focus, and 10 technical standards are formulated from the range of provincial spatial plan content, classification of land use, space management and control mode, and the examination and approval system. In this way, a systematic set of technical regulations for a provincial spatial plan to strongly promote pilot work and enrich the theory of spatial planning is formed.

4.2.5 Top-bottom combined coordination and working mechanism

A shared work path is configured, combining top to bottom and bottom up. While conducting the provincial spatial planning, all counties in the five cities of Ningxia began local level spatial plan making. Cities and counties are an important foundation for spatial planning at the provincial level. There is no one-way, top-down decomposition or split relationship from bottom to top; they are unified.

For autonomous regional planning in counties and cities as units, based on basic evaluation results and measurement of autonomous regional spatial development control indicators, three lines of three counties are drawn according to the actual development. This demonstrates the content of the autonomous region through checks and feedback by mutual checking between the upper and lower linkages, with superpositions forming autonomous regional spatial development and protection controls, with a general layout across the upper-to-lower linkage. The provinces exercise macro and micro control of provincial cities and counties through overall coordination with specific requirements and do this organically with cities and counties.

5. CONCLUSIONS AND SUGGESTIONS

After nearly two years of exploration and practice, the pilot project of Ningxia has achieved a series of staged achievements, which has provided theoretical research and practical exploration for the reform of China's spatial planning system, and accumulated experience. On August 29th, 2017, the General Secretary of the CPC central committee chaired the 38th Meeting of the Leading Group on Comprehensively Deepening Reform, and the report on the pilot work of the Ningxia Hui Autonomous Region on spatial planning (multi-level integration) was considered. The meeting pointed out that Ningxia has explored a series of experiences that can be copied and promoted for aspects of the formulation of spatial planning, clear protective development patterns, exploration of land and resource regulation systems, building spatial management information platforms, etc. Next, Ningxia should continue to formulate and improve spatial planning, deepen institutional reform, and ensure the implementation of its spatial planning.

A pilot project of spatial planning reform promoted at the provincial level is a regional exploration of the Central Government’s “authorized reform” to deepen the institutional reform of planning and upgrade the
efficiency of governmental administration. To promote the pilot work of provincial-level spatial planning, the reform of institutional innovation must be carried out, and the spatial plan implemented through system design. With respect to planning reform and multi-plan integration, this paper puts forward reform experiences and suggestions from Ningxia practice at each level of planning and governance, guiding ideology, evaluation methods, technical routes and depth, land use control regulation of spatial resources, and provincial-local government coordination mechanisms. This reform also offers recommendations on the reform of provincial spatial planning systems, the legislation of relevant laws and the integration of supporting institutions.

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