Evaluation on Science and Technology Promoting Sustainable Development of China West Region

Prof. Yan FANG

Abstract

The west region development strategy, scheduled by China government at the beginning of new century, has gone on stage. As the most active factor in the world economy development, the science and technology (as S & T below) will definitely be able to pay important contribution to the sustainable development of west China.

This article, based on S & T evaluation and especially with consideration of existing practice, has discussed the creation of evaluation indicator for the influence of S & T on the sustainable development of west China. The significance is to improve the development of west China, utilize S & T to increase the economic benefits, protect the ecological environment and strengthen the system innovation and capability construction. It is not only the key section for the sustainable development of west region (as SDWR below) but also the unavoidable choice under the present environment pressure.

Through the analysis of the west ecological environment, existing resources, S & T potentials, economic structure and industry status and with respect to the general target for SDWR, this article has analyzed the possible influence of S & T on the sustainable development, created the structure of evaluation indicator for such influence, method and principle for defining the indicator structure as well as the application scope.

This article has also made efforts to combine the concept and method of S & T evaluation and impact assessment together, and introduce their advantages into the evaluation of regional development, environment plan and large S & T project as an evaluation tool.

Key Words:

Evaluation, Science and Technology, Sustainable Development,

China West Region

The author is the director of Evaluation Department of
National Center for Science and Technology Evaluation
The Ministry of Science and Technology of China

1．Opportunities and Challenges in the Development of West China

1.1 China has made the important decision to develop its west region. Premier Zhu Rongji has pointed out that the base of west region development is to speed up the infrastructure construction, its foundation is to strengthen the ecological environment protection and construction, its core is to positively adjust the industry structure and its key conditions are to develop the science, technology and education.

1.2 The central government and local governments have made several favorable policies toward the west region. The state has planned to invest 70% of the national debt investment, national appropriations, foreign government loans and international financial organization loans in the middle and west region to construct 10 large projects, mainly the infrastructure. The national financial authority has promised to allocate RMB 12 billion in this year, to support the ecological project construction in the west region and is planning to invest at least RMB 100 billion for the ecological construction of west China in future 10 years. The national S & T departments will invest RMB 50 million to execute the “Special S & T Project in West Development”. The national forestry department has decided to promote 100 forestry construction and management methods in the west region. Besides, the eastern provinces have also made certain guideline, concerning the human resource aid, high & new technology industry development and project investment cooperation, to support the development of western region. In short, the strategy of developing the west China has attracted the attention of governments at various levels and the great business opportunities rising during this course have also attracted many Chinese and foreign enterprises.

1.3 The governments and enterprises in west region have been ready for action to catch the valuable opportunity. For instance, the governor of Shaanxi Province has suggested that the west development should lay much weight on the high & new technology, especially the development of technology, information, education, market and other soft factors. According to the policies of central government and based on local conditions, Gansu Province has fully carried out the strategy of returning the grain plots to forestry. All the west provincial and regional governments and enterprises have convened many theoretical and commercial discussion meetings, planned the development, applied for projects and used all media for business invitation and capital introduce. The great west development has predicted the promising future of west China.

1.4 But what needs prudent consideration is that the great development of west region shall be a sustainable course. An important issue of SDWR is how to balance the interactive factors of regional development, environment protection and full employment, i.e. basing the development on the well-protected “environment”. If it is

to result in the rushed investment, rushed exploration or rushed mining due to careless decision, it will be a disaster. The beautiful environment and promising future of west region will turn to be a nightmare.

2．Existing Situation and possible Choices for SDWR

2.1 The west region has rich resources: the west region of China is not only a concept for economic zoning. Geologically, it mainly includes ten provinces, autonomous regions and municipality, i.e. Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang, Sichuan, Chongqing, Yunnan, Guizhou and Xizhang. The total land area is 538 square kilometers, taking 56% of national land area. The west region is abundant in natural resources and its mineral reserves are remarkable. The coal reserves of west region holds 36% of total national reserves, 12% for oil and 53% for natural gas. Among more than 140 kinds of mineral resources surveyed, the west region owns 120 kinds. The reserves of some rare metals hold the leading place in the whole country, and even in the whole world. The water resource of west region is mainly distributed in the southwest region but the exploration and usage are less than 1%. The northwest region has less water reserves, only about 6% of that of whole country. The agricultural water consumption is the main part and it holds 95% of total water consumption. The west region has also abundant animal and plant resources.

2.2 The west environment has already been ruined: the loess plateau was the land covered with green plants and trees. In Xizhou dynasty, the rate of forestry coverage reached 45% in Shaanxi area. But today, what is left there is only the naked crossing valley. The soil erosion is very serious. It sends 1.6 billion tons of silt into the Yellow River annually. At present, the forestry coverage rate in the Yellow River basin is only 5.85%, in which only 0.35%, 4.33% and 1.54% respectively for Qinghai, Gansu and Ningxia. Shaanxi, which is at the middle of the Yellow River, is 24.15%. According to statistics, there is about 0.6 billion tons of silt, from Guizhou, Sichuan and Chongqin, flowing into the Yangtse River annually, holding 60% of total quantity of silt at the upstream area. The erosion area of the Yangtse River basin has increased from the 360,000 square kilometers in 1950s to the 560,000 square kilometers in 1990s. Due to the vast area of soil erosion, the organic soil has been seriously destroyed and it has caused the apparent shrinkage of lakes along the Yangtse River. It results in the increasing water disasters of the Yangtse River.

The Ejina County, which is in the west of Inner Mongolia, was the natural oasis in the past. During the past 40 years, the area of its forestry has reduced by 850,000mu. The 130 kinds of original edible pastures have been reduced to over 10 kinds. The largest fresh water lake in this region has dried up. The desert is invading this oasis by 20,000mu per year. It is not the only case for the west region. In the whole country, the forests are been cutting off. The pastures are being explored and the lakes are being filled for farmland. The human being is drawing and consuming

the natural resources for the improvement of living standard. But this course is causing the living environment no more suitable for ourselves.

2.3 The economic base of west region is underdeveloped: at present, the population of west China is about 0.287 billion, 23% of total national population. Most of our population without ample food and clothing is distributed in this region. The science, technology and economy of west provinces have not been well developed. The average education level is relatively low. It has seriously affected the economic development of west China. The GNP of west provinces only holds 14% of that of the whole country. The average GDP reaches only about 60% of national average and lags far behind the east coastal region. The experiences show that the region with intensive dependency on natural resources and low degree for opening up will have slow development and be weak for the sustainability.

2.4 The main factors that limit SDWR include the following several aspects. The first factor is that the ecological environment degradation interacts with the rural poverty and they cause the vicious circle. The second is that the information of S & T and intelligence, taking the human being as the carrier, are poorly propagated, there is seriously lack of the technical human resources and the idea is old fashioned. The third is that it still needs more system innovations. It cannot mention S & T innovation without the system innovation, and without the technical human resources, it is no way to keep SDWR.

2.5 The main goals of SDWR are to use the human resource as key factor for the development, to consider the improvement of ecological environment as the core in the development, and with the guarantee of system innovation, to take S & T capability building as the breakpoint for SDWR. This is the scientific and realistic decision and also the necessity for the development of west region. Otherwise, no matter how large the investment and great the construct is, they will definitely become vanish like soap bubbles. All the development activities will be deemed short-term and invalid.

For main aspects of SDWR, please see Table 1.

Table 1 Main Aspect of Realization of SDWR

Content of Sustainable development	Existing Situation and Pressure	Science & Technology Development Goal
S & T capability building	Underdeveloped S & T culture and education Inadequate effective human resources Poor propagation of information and knowledge Low efficiency of S & T input	Develop the human resources on base of people Intensively promote the applicable technologies Cultivate S & T sense in public Strengthen the popularization and propagation of S & T knowledge
Economic structure adjustment	Weak infrastructure Unreasonable industry structure Much lower of GDP than the average national level Reducing the dependence on the resources	Utilize the high & new technology to reform the traditional industries Increase the proportion of high & new technology industry Increase the operation efficiency of enterprises Transformation of large quantity of military technology enterprises
Management and protection of ecological environment	Serious industrial pollution Exhausted land force and serious soil erosion Wind erosion and water erosion of natural ecology Abuse of resources	Promote applicable environment protection technologies Establish ecological monitoring system Combination of utilization and regeneration of ecology Use the market price to show the environment cost
System innovation and policy guarantee	Inadequate concept for market economy development Strengthening the decision-making system in the development Deepening the opening up policy to the outside world	Establish fair competition mechanism of market More favorable opening up policy to the outside world Establish Scientific evaluation and decision-making system Introduce foreign technology and make cooperation with foreign party

3．Acceleration of S & T to Sustainable Development and Evaluation of S & T

3.1 The progress of S & T is an important base for realizing the sustainable development. 1997 UN Environment Conference pointed out that for many main environment and development issues, S & T plays an important role for probing and analyzing the problems, finding out settlements and ensuring the adoption of scientific actions. The American economists have considered that there are three main factors to realize the sustainable development of China, namely the population scale, total social efficiency and total S & T level. Among them, S & T progress is a lever overall for keeping the sustainable development and it can balance and counteract the negative

affect produced by the population growth and low social efficiency.

3.2 The practice of accelerating the sustainable development with S & T is the base for S & T evaluation. The national S & T department has arranged following tasks in the development of west region:

- Preparing the scientific planning and key policy for “West Development” to provide support and policy direction.
- For the status of human resource shortage, strengthening the construction of western training bases, executing “the talent training project for introduce of S & T to the west China” and strengthening S & T training of cadres for western region.
- For improving S & T capability of west region, constructing some national main laboratories and engineering technology research centers in the scientific research institutes and colleges and supporting the field observation stations for important domains.
- Strengthening the technical promotion and coverage. Strengthening the construction of technology market and other S & T agency service systems.
- Constructing a batch of S & T demo projects and ecological industries, including the agricultural information network, e-commerce, solar energy and wind energy, new materials, biological medicine and other high & new technology industries. Utilizing the advanced information technology to monitor and early warn the ecological environment of main regions of west China. Developing and promoting the ecological management technologies suitable for different ecological environments in the west and middle region of China. Developing the survey and research of optimized arrangement of trans-regional water resources in the west and middle region and developing the water-saving agricultural technology demo projects.
- Supporting the west and middle region to participate in the international S & T cooperation projects. Expanding the cooperation space for the international society in S & T poverty support, agricultural product processing and water-saving agriculture of west region.

3.3 The consistency of S & T evaluation and environment impact assessment in keeping the sustainable development. S & T evaluation refers to the professional evaluation and judgement actions on the relevant S & T activities, including S & T planning, project, policy, industry, investment and achievements, etc. The common environment impact assessment is to point out the negative affect and its degree of construction project and regional development on the environment. For the evaluation of acceleration of S & T to SDWR, S & T evaluation is to evaluate what negative affects rising during the sustainable development can be solved through S & T or the solving degree. Therefore, one is to find out the existence of negative

affect and the another is to compensate and settle the negative affect produced. So both are consistent with each other and can compensate each other for the target of accelerating the sustainable development.

3.4 The evaluation indicator discussed in this article takes the impact of S & T on SDWR as the premise, instead of the entire indicator system of sustainable development. There have been many research achievements and evaluation models for how to establish the indicator system of sustainable development in China and other countries. These indicator systems have much different structures and different people have different viewpoints. They commonly include the harmonious development of society, economy and resource environment. In consideration of that the indicators described in this article need more practices and dynamic procedures and to make them supplementary to the existing sustainable development indicator system, I call it a short indicator frame not the indicator system. For the scope defined by its evaluation indicator, see Figure 1.

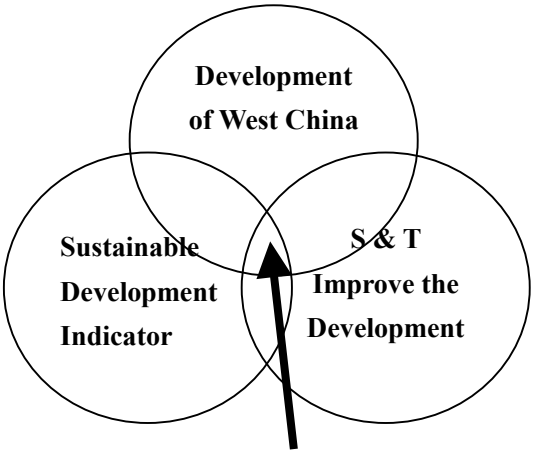

Figure 1: Evaluation Indicator Scope of Acceleration of S & T to SDWR

3.5 Principle for Establishment of Short Indicator Frame:

- *Target principle*: the evaluation of sustainable development is not only a theoretical concern but also an issue of practice. Therefore, the establishment of evaluation indicator should combine the execution target and S & T work scope in the great development of west region. The decision of evaluation indicator can be helpful for guiding the execution of S & T in the development of west region.
- *Dynamic principle*: S & T progress can affect the capability of human being to understand and transform the reality. The development of west region involves many aspects, has long period, need gradual effort and step by step execution. The affect of S & T on west development should be long-term with lagging effects. The dynamic selection of indicator is to meet the integrity requirement of

evaluation.

- *Principle of effectiveness*: the indicator system for sustainable development has rich content and the affecting factors are complex. In addition to that S & T and the development of west region concern many aspects, they make up the ternary evaluation targets. Therefore, for the selection of evaluation indicator, it has to select the key indicators according to the key issues in the general target. The indicator should be simple, concise, effective and comprehensive to ensure the validity and manageability of evaluation actions.
- *Principle of policy*: the great development of west region not only involves large quantity laws and regulations but also many new policies guiding the west development. The evaluation indicator should follow these policies and reflect the validity of these policies for the realization of development target.
- *Principle of opening*: the evaluation indicator system for the acceleration of S & T to SDWR cannot be completed at one time. Therefore, the establishment of indicator system should be expandable, so as to provide some expansion place for the change of indicator. At the same time, it is necessary to pay attention to the internal relation of indicators to make convenient of detailed analysis.
- *Principle of innovation*: the great development of west region is an important activity in the economic development of China. It is necessary to establish new evaluation indicators with the principle of innovation based on the evolution rule of market economy. The established indicator may be the non-statistics evaluation indicator or cannot meet the requirements of quantization. But they can be used as the descriptive indicators for supplementation and reference in the evaluation.

3.6 Difficulties in the evaluation of acceleration of S & T to SDWR. First of all, it is an issue of unification of understanding. If the idea of making sustainable development with S & T has not been established and people still base the development of west region on great exploration and large investment in west region, there is no point to establish any evaluation indicator. Second, it is the practice. Because the west region covers 10 provinces, there is great variety for resource environment, S & T capability and economic foundation. The selection and weighing expression of indicator are also different. Moreover, the present statistics indicators cannot meet the requirements of evaluation and it is inadequate of samples for new indicators surveyed and collected. It still needs large quantity of research to process the data and establish evaluation model and they should gradually be perfected in the practice.

3.7 The evaluation target frame discussed in this article refers to three innermost core subsystems of society, economy and resource environment in the research of sustainable development as the base and establishes the evaluation indicators with respect to key factors affecting SDWR. These key factors include the economic

system-industry optimization and high-efficient production, social system-labor capital and system innovation, resource environment-ecological construction and water resource. For this target frame, see Figure 2.

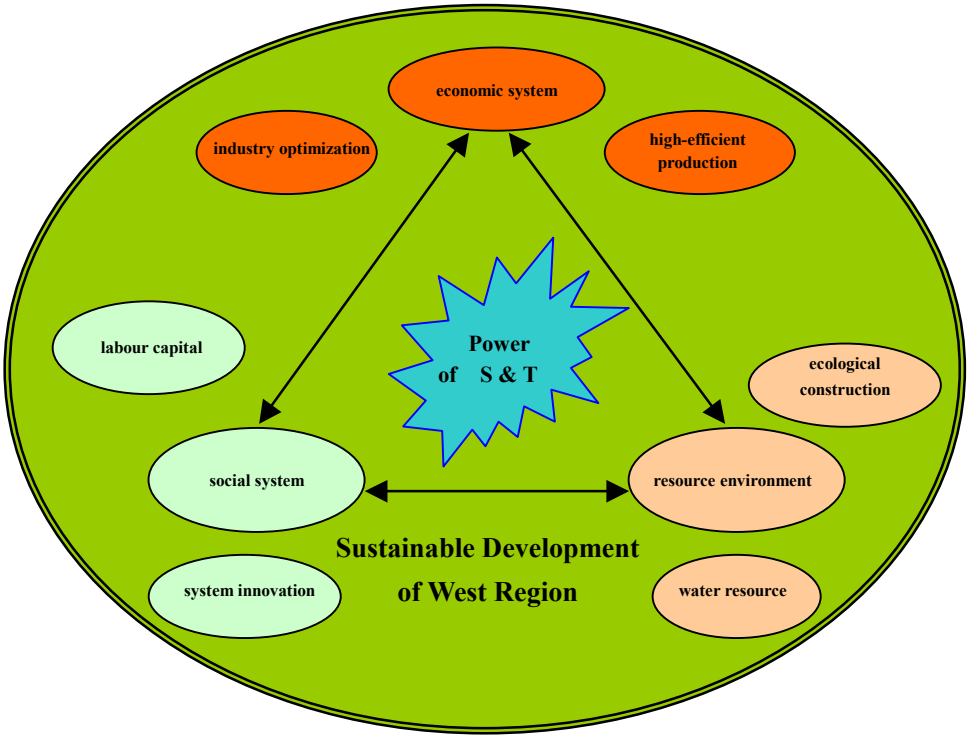

Figure 2:
Target Frame for Acceleration of S & T to Sustainable Development of West Region

4．Analysis and Discussion on Short Indicator Frame of Evaluation

To further describe the detailed concept of short evaluation indicator and thoughts in indicator design, it is to provide several indicator samples.

4.1 *Labor capital development indicator*: the labor capital development is the core of sustainable development. The establishment of this indicator concerns both the existing policies and the innovation of system. The existing static statistics indicators, such as “proportion of technicians in per 10 thousand persons” and “proportion of technicians in enterprises personnel”, is not adequate to reflect the intellectual development strategy of “on base of human being”. The labor capital development is not simply the quantity proportion, technical suitability, favorable treatment and individual capability. It includes also the comprehensive standard of age advantage, technical advancement, knowledge structure, team gradient, experience and values. In the design of indicators, much attention should be paid, on top of focusing on the obtaining of talents, on the appropriate utilization of talents, to place the talents to the right enterprise level, increase the “marginal” level, explore the value of “brain in stock” and pay attention to the long-term cultivation of human resource. Therefore, the measuring indicators for labor capital development should include the number of

talents with Doctor degree or higher level/oversea students attracted annually, number of professional managers employed by private sector, senior talents with age of 35 or lower in state-owned large or intermediate enterprises, part-time job proportion of professional technicians, number of senior talents going to other provinces and regions, number of professional technicians receiving continuous education, public S & T idea and innovation capability of S & T talents, etc.

4.2 *Indicator of high efficiency of S & T*: according to the national policy, 5000mu of land in west region should be executed for the "returning farmland to the forestry, pasture and grassland", to keep the sustainable utilization of land resource. To ensure the economic income of farmers after the returning of farmland, it is necessary to develop high-efficient agriculture and husbandry on base of S & T. Taking the milk cow breeding as the example, the highest milk production record in U.S. is 24,000kg milk per cow/year. But in China, the Mongolia cow can only produce about 800kg mild per year, in which a half is fed to the calves so that only 400kg fresh milk can be provided to the market. To produce the same quantity of milk as the mentioned high-production milk cow, there should be 60 Mongolia milk cows. The reproduction rate of Mongolia cow is 50%. Namely, it produces milk every two years. Therefore, there should be 120 cows. If the milk cow is rejected after 5 years' production, to keep 120 cows, it is necessary to breed 120 male and female cows with age of 1~3 as back-up. The resource consumption comparison of two systems as follows. One cow will consume 60mu of common meadow and it is 14,400mu for 240 cows. If breading a high-production milk cow to produce same quantity of milk, it only needs 100mu of land for planting grass and grain. It can also save half of laborers. The high-efficient production method can save the supporting energy for 239 cows and save 14,300mu of land, so as to be able to solve the problem of grassland degradation and over-burden. Therefore, after the returning of farmland, the farmers can ensure their economic income and the left laborers can also develop new industries. Even without the comparison with the American high-production milk cow with 24 tons of annual production, it will be significant to use 3 Beijing milk cows with 8,000kg milk of annual production as the displacements. So, the high-efficient transformation of S & T can be used as one of evaluation indicators on the policy of "returning farmland to forestry", such as grassland area for producing 1 ton of milk and the upgrade rate of fine milk cow variety, etc. But the stock rate (0.13 billion cows), used as the positive indicator in the past, can only produce negative affect on the sustainable development.

4.3 *Indicator for S & T promotion*: the demonstration and promotion of agricultural technologies are, no doubt, important and in great quantity of work. Whether the promotion is effective doesn't depend on the quantity of technologies promoted and the advancement of technologies but on the real acceptance degree at the existing education background of farmers. If a technology is simple enough to be promoted, farmers can adopt the new technology, product, material or process simply by the

instruction manuals. The promotion efficiency will be greatly improved, so as to the production efficiency, plus the farmers' confidence in S & T. These farmer will become the "assemblers" of modern agricultural technology. For S & T promotion indicator, it uses the "proportion of simple promotion methods in the promoted technologies" to make evaluation. This indicator represents the wide scope able to be accepted by the farmers. Of course, it needs to make statistics definition of the so-called "simple method". But this indicator has guiding function for S & T promotion method.

4.4 *System innovation indicator*: the system innovation is the guarantee for SDWR. Although it may not directly involve the detailed technologies, it will create fine external environment for S & T innovation and construction of S & T capability. For example, the building of evaluation decision-making system is an important rule in the development of west region. There are so many lessons for the wrong decision making and there is not any chance for "paying schooling". The environment impact assessment and S & T evaluation are both the main steps for making decision. The system innovation should create open environment, to open up the domestic market to the foreign investors, to provide national treatment to all producers. It would also be helpful to transfer the labor resource, knowledge and technologies accumulated in advanced countries for decades to the west China on the basis of equality, publicity and right competition. For the development policies, it is necessary to form the stimulation mechanism with the soft factors of S & T, education, information and market, to use the market force to promote the non-governmental investment on technologies, use the market mechanism to control the pollution and reflect the resource and environment cost in the market price. As to the system innovation indicators, which are hard to be quantized, they can be supplemented with the descriptive indicators. E. g. quantity and growth rate of foreign capital introduced annually, number of evaluation institute and their revenue, annual sales in technical market, quantity of PCs, number of Internet users among 10 thousand persons, number of projects over RMB 50 million in technical and economic cooperation with other provinces and foreign countries, etc.

4.5 *Resource environment indicator*: the effect of S & T on resource environment lies in following aspects. One is to use the ecological capital as the production element, increase the investment benefit and make scientific utilization and fundamentally development the productivity. Another is to construct the ecology and regenerate the ecology, to stop the worsening ecological environment and make it better. The main problems faced by the west region are the abuse of forestry resources, shortage of water resource and industrial pollution. The evaluation indicators for such problems concerning S & T include projects/investment concerning S & T in various ecological environment projects, promotion indicator of displacement technology for non-regenerated resources mainly in the wood, growth rate of grain production per cubic meter of water, promotion area of agricultural water saving project, proportion

of enterprises executing clean production and end treatment in similar enterprises, annual business income of environment protection technology industry, capital investment in introducing foreign advanced environment protection technologies. During the evaluation, it also needs to combine the environment evaluation inspection indicators for detailed environment type.

4.6 *Industry optimization indicator*: the industry structure optimization is the necessity for the challenges of economic growth, environment protection and full employment in west region. The industry optimization model of sustainable development shows that according to 7% growth rate in the future 20 years, it will become very sharp of the contradiction of pollution control and employment pressure. The negative affect produced by the slowing down of growth rate can further hinder the progress of sustainable development. Therefore, to keep certain economic growth and continuously increase the average individual income, it needs to develop the high & new technology industry with high added value, low pollution and low dependence on resources. The industry structure optimization is unavoidably the breakpoint for the bottleneck of economic development of west region. The information shows that except the case in Shaanxi and Sichuan, the economic indicator of high & new technology industry in other west province is at last place. The existing high & new industry statistics indicators can be used as a part of this short indicator frame, including the gross industry production of high tech industry, product sale value, export foreign exchange income, foreign capital, domestic loans, number of high & new technology projects, etc. In addition, the participation of large quantity of military enterprise with strong force in the development of west region is also an important factor. The indicators include the quantity of military enterprises entering into the high tech zone, contribution indicator of high & new technology to the environment protection industry, market sale value of new products, quantity of high tech enterprises listed or being listed.

5．Description and Schedule of Short Indicator of Evaluation

5.1 Some of the short indicators defined in this article are the non-statistics indicators. They are difficult for data collection and can increase the cost. For the data statistics, survey and collection, it is necessary to first make trial in one enterprise or region via questionnaires, to optimize the indicators further. The processing methods and evaluation models of data need to be perfected in the future practice and will not be discussed here.

5.2 For the conclusion of short evaluation indicators, see Table 2.

Table 2 Short Indicator Frame for Evaluation of S & T in Promoting SDWR

Key target level		Main indicator	Expandable sub-indicator
Social system	Development of S & T human resource	Indicator for attracting senior technical human resource Indicator for exploring existing human resource potential Indicator for long-term training of S & T human resource	Number of human resource with Doctor degree or higher attracted annually from other regions; Number of main leaders with age of 35 or younger in the large or intermediate enterprises; Proportion of senior enterprise technical coming/going annually; Number of technicians initiating the establishment of scientific and technological enterprises;
	Innovation of S & T promotion system	Indicator of favorable policy for S & T human resource of west region Indicator for ensuring the market fair competition mechanism Indicator for establishing scientific decision-making system	Proportion of evaluated projects in total incremental projects in development of west region; Number/annual growth rate/product sales of incremental FIEs Number and production value of projects with investment of 50 M RMB and above in economic and technical cooperation with east region;
	Science & technology capability construction	Indicator for occupying S & T knowledge information Indicator representing the technical innovation capability Indicator for the improvement of public S & T concept	Proportion of practically promoted technologies and patents in the surveyed quantity; Average individual annual hours per technician to use Internet; Annual change rate of number of people visiting the scientific and technological exhibitions and museums; Proportion of technicians receiving continuous education/part-time job in the surveyed number;
Economic System	Science & technology promote the optimization of industries	Indicator for high & new technology industrialization Indicator for the optimization of industry structure Indicator for transformation of military enterprise to civil use	Total production/sales/export income of high & new technology industries; Number of listed enterprises in west region; Number of military technology enterprises entering into the high & new technology zone; Sales of new products;

Table 2 (continued)

Economic System	Science & technology promote high-efficien t production	Indicator for returning farmland to forestry with S & T Indicator for the high efficiency achieved in industries with S & T Indicator for the promotion and application of S & T Indicator for the benefit improvement by the technical transformation	Pasture area consumed by per ton of dairy; Upgrade rate of new agricultural and pastoral products; Proportion of promoted feasible and simple technologies in the total promoted technologies; Annual transaction/quantity of promotion organizations of technical market and market income change rate;
Resource environme nt system	S & T promote the ecological construction	Indicator for ecological regeneration and utilization Indicator for the contribution of S & T to the ecological construction Indicator for the application of technology in treating pollution Indicator for living standard improvement made by the environment protection	Capital investment intensity for S & T project in ecological environment projects; Number of organizations for ecological monitoring and evaluation; Proportion of adoption of clean production and end treatment; Variation rate of business income from environment protection industries; Satisfaction of local residents to the improvement of ecological environment
	Science & technology promote the resource utilization	Indicator for promotion and application of water-saving technology Indicator for efficiency improvement in resource industry Indicator for reasonable utilization of resource with S & T Indicator for the utilization of displacements of non-regenerated resources	Grain production per cubic meter of water Practical promotion area in water saving irrigation Fertilizer/pesticide usage per unit production Introduce rate of draught-enduring forest and plants Indicator for promoting the displacement of wood resources