

9. China: Practices and Insights on Innovation and Evaluation for the SDGs

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CHINA'S EFFORT TO IMPLEMENT THE SDGs

On 28 September 2015, Chinese President Xi Jinping in his first address to the United Nations endorsed together with other Heads of State, *Transforming Our World: the 2030 Agenda for Sustainable Development*. He referenced three Chinese obligations: to continue participation in building world peace, to contribute to global development and to commit to the implementation of the Sustainable Development Goals (SDGs). In fact, China attaches great importance to the 2030 Agenda for Sustainable Development, integrating it into the 13th Five-Year Plan for Economic and Social Development and other mid- and long-term development strategies. In addition, China's National Plan on Implementation of the 2030 Agenda for Sustainable Development has also been released. With the concept of innovative, coordinated, green, open and shared development, China has worked vigorously to promote all-round

economic, political, cultural, social and ecological progress through alignment of strategies, institutional guarantees, social mobilization, resource input, risk management, international cooperation and oversight and review. On the benefits of implementing the 2030 Agenda for Sustainable Development, noticeable progress has been achieved in all sectors.

In the economic field, China's gross domestic product (GDP) reached 74.4 trillion yuan, boasting an increase of 6.7 percent; and contributed to more than 30 percent of global growth in 2016. With the background of great economic progress, a total of 13.14 million additional urban jobs were created and the registered urban unemployment rate stood at 4.02 percent at the end of the year, the lowest level in years.

People's living conditions have been improved as along with the excellent economic performance. In 2016, per capita disposable income increased by 6.3 percent in real terms; the number of rural people living in poverty was reduced by 12.4 million; the maternal mortality ratio was reduced to 19.9 per 100,000 live births; and the infant mortality rate and under-five mortality rate were reduced to 7.5 and 10.2 per 1,000 live births respectively, reaching the relevant SDG targets ahead of schedule.

All-round progress has been made in green development. China has implemented three major action plans on tackling air, water and soil pollution in an effort to strengthen prevention and control of pollution. In 2016, China's energy consumption and carbon dioxide emissions per unit of GDP fell by 5 percent and 6.6 percent respectively, over-fulfilling the yearly targets; water consumption per 10,000 yuan of GDP dropped by 5.6 percent; commercial logging of natural forests was fully banned; and a wetland protection system was put in place.


















In 2016, remarkable achievements were made in deepening international development cooperation. The Chinese Government provided foreign aid for about 250 engineering and materials projects of various types, and dispatched approximately 5,000 managerial and technical personnel, medical team members, volunteers and other foreign aid experts, benefiting 156 countries, regions and international organizations. In addition, China's international activities such as the G20 Hangzhou Summit, Belt and Road Forum, South-South Cooperation and China's Symposium on the 2030 Agenda for Sustainable Development at United Nations Headquarters (19 September 2016) shared China's wisdom and contributed solutions to global implementation of the 2030 Agenda.²⁴

SCIENCE, TECHNOLOGY AND INNOVATION FOR SUSTAINABLE DEVELOPMENT IN CHINA

Sustainable development has become an important part of China's national Science, Technology and Innovation Plan. In July 2016, China issued the 13th Five-Year Plan for Science, Technology and Innovation, which mainly included the measures shown in Figure 1.

24 Ministry of Foreign Affairs of the People's Republic of China, 'China's Progress Report on Implementation of the 2030 Agenda for Sustainable Development', August 2017.

FIGURE 1. CHINA'S SCIENCE, TECHNOLOGY AND INNOVATION FOR THE SDGs

17 SDGs	THE 13TH FIVE-YEAR PLAN FOR SCIENCE, TECHNOLOGY AND INNOVATION
 	<p>To establish a sustainable modern agriculture system by 2020 to develop an environment-friendly modernization production with high output efficiency, promising product safety, and resource saving.</p>
   	<p>To establish and improve technological system for livelihood improvement and sustainable development including:</p> <ul style="list-style-type: none"> • Ecological and environmental protection, • Highly efficient resource mobilization and recycling, • Public health, • New urbanization, • Public security and social governance.
   	<p>To promote sustainable regional development:</p> <ul style="list-style-type: none"> • 156 national sustainable development experimental zones • SDG innovation demonstration area for 2030 Agenda • Shenzhen, Guangdong province • Guilin, Guangxi Zhuang Autonomous region • Taiyuan, Shanxi Province • Cluster of 5 cities in northern Jiangsu province
 	<p>National Science and Technology:</p> <ul style="list-style-type: none"> • Water pollution control and treatment • New medicine research and development • Prevention and control of infectious diseases
   	<p>National Key R&D Programs:</p> <ul style="list-style-type: none"> • The Ministry of Science and Technology has launched 14 programmes in the field of social development, seven of which are in the field of resource and environment.
	<p>Green Technology Bank:</p> <ul style="list-style-type: none"> • Established in 2015 an important platform for implementing the 2030 Agenda in the green development area.

Establish a Sustainable Modern Agriculture System

China will establish leading information and prioritize biological technology, intelligent production and sustainable development in a modern agricultural technology system by 2020, supporting the agricultural industry to develop in an environmentally friendly modernization process with high output efficiency, promising product safety and resource-saving strategies. This includes specific goals such as raising wheat, rice and maize yields by 5 percent, reducing loss by more than 5 percent, improving fertilizer water efficiency by more than 10 percent, improving the efficiency of light and temperature resource use by 15 percent, improving production efficiency by 20 percent and improving the efficiency of agricultural biomass use to 80 percent.²⁵

Establish and Improve Technological Systems for Livelihood Improvement and Sustainable Development

Focusing on the urgent demand for improving livelihoods and promoting sustainable development, China is improving the core technology research and application process in the areas of resources and environment, population health, new urbanization and public security, in order to promote a green development strategy and living habits, thus providing technological support for improving people's quality of life in all aspects. The core technologies include the ecological environmental protection technology, resource efficient recycling technology, population health technology, new urbanization technology and reliable and efficient public safety and social governance technology.²⁶

Promote Regional Sustainable Development

Because of the imbalance of regional development, China has initiated the following measures to promote regional sustainable development: improve the cross-regional collaborative innovation mechanism; guide the accumulation and flow of innovative elements; build a trans-regional innovation network; focus on improving the development of science and technology for poverty alleviation; and fully stimulate innovation at the grass-roots level. To implement the idea of green development as the core of all development strategies, the Government has planned to establish national innovation demonstration areas of sustainable development, striving to form innovation models and mechanisms at the regional level on modern green agriculture, resource saving and recycling, new energy development and utilization, pollution control and ecological restoration, green urbanization, population health, public safety, disaster prevention and mitigation and social governance.²⁷

25 Ministry of Science and Technology of China, 'The national plan for science and technology innovations as part of the China's 13th 5-year National Development Plan'.

26 Ibid.

27 Ibid.

Initiate SDG Innovation Demonstration Areas for the 2030 Agenda

During the 13th five-year plan period, 10 innovation demonstration zones are to be established, many sustainable development plans formulated and the constraints of sustainable development (communicable diseases, energy, environment, etc.) addressed.²⁸ The Chinese Government will explore new mechanisms for the integration of science, technology and innovation and social undertakings, and share the experience of sustainable development of science and technology innovation services.²⁹ So far, four regions (Guilin, Taiyuan, Shenzhen and northern Jiangsu) have achieved short-term achievements in the construction of demonstration zones.³⁰

Implementation of “Three Action Plans” for the Atmosphere, Water and Soil Pollution Control

The in-depth implementation of the “three action plans” will strengthen pollution control and resource conservation. By 2020, the amounts of water consumption, energy consumption and carbon dioxide emissions per unit of GDP will fall by 23 percent, 15 percent and 18 percent respectively, and the forest coverage rate will reach 23.04 percent. The efficiency of energy and resources exploitation and utilization will be greatly improved, and the ecological environment quality will be improved overall. In particular, the improvement of air quality targeting atmospheric smog will be achieved, and the proportion of days with healthy air quality in the prefecture-level cities is over 80 percent.³¹

Major National Science and Technology Projects

Since 2006, China has set up three major projects attracting the country’s leading scientific research teams to tackle the scientific and technological needs and issues in these areas. One project is “control and treatment of water pollution”, aiming to develop a technical system for water pollution through major projects, which can lead to the construction of a large data platform for water condition monitoring and governance. Another project is “research and development of significant new drugs”, the purpose of which is to build a world-class national drug innovation system. The last one is “prevention and control of major infectious diseases”, aiming to make breakthroughs in technology for prevention and control of sudden acute infectious diseases and enhance the level of prevention and treatment of infectious diseases in China.³²

28 The State Council of China, ‘Program for establishing the innovation demonstration zones to implement the 2030 Sustainable Development Agenda’.

29 The State Council of China, ‘China implements the 2030 Agenda for Sustainable Development’, 13 December 2016.

30 Sai-Nan Zhang, Pengpai News, ‘Five cities from the North of Jiangsu Province jointly apply to establish the innovation demonstration zones: 10% reduction in total fuel consumption’, 15 August 2017.

31 Ke-Qiang Li, ‘Plan to further implement actions to prevent air, weather and soil pollution’ (<http://finance.sina.com.cn/stock/t/2016-03-05/doc-ifxqafm6966938.shtml>).

32 Ministry of Science and Technology of China, op. cit.

National Key Research and Development Programme

The Ministry of Science and Technology has 14 major ongoing projects in the field of social development, seven of which are in the field of resource and environment, including: key deep sea technology and equipment; marine environmental security protection; deep resources exploration and mining; research on the causes of and technology to control air pollution; typical fragile ecosystem restoration and protection research; efficient development and utilization of water resources; and monitoring, early warning and prevention of major natural disasters. Currently, 393 projects have been approved, with a total funding of 8.34 billion yuan. These special projects will play an important role in the sustainable development of the country's marine, ecological and other environment-related fields.³³

Green Technology Bank

The Green Technology Bank was established in 2015 to promote green technology industrialization and transfer and to promote social development. It has become an important platform for implementing the 2030 Agenda in the green development area. The Green Technology Bank serves as an integrated service platform for gathering leading practical technology in three key areas of sustainable development: first, strengthen the integration of technology and finance to promote capitalization of the implementation of scientific and technological achievements; second, speed up the transfer of scientific and technological achievements; and third, promote cooperation in the field of national sustainable development and green technology.

TWO CASES OF EVALUATION OF SCIENCE, TECHNOLOGY AND INNOVATION FOR THE SDGs IN CHINA

Evaluation of National Precision Poverty Alleviation Action

China has an uneven regional development and the central Government has the objective of reducing the number of people in poverty by 70 million from 2015 to 2020. The National Precision Poverty Alleviation Action was established to achieve the objective. During his visit to Southwest China's Guizhou province in June 2015, President Xi Jinping stressed the importance of poverty alleviation and development and said the key to successful poverty alleviation is to ensure it helps those that need to be helped. As a result, "targeted poverty alleviation" has become a hot phrase. These people are the key group China should show concern for in building an overall well-off society.

Although China has made great economic achievements in the more than three decades since the reform and opening-up policy was initiated, it still faces great challenges in lifting people out of poverty. There are around 82 million people living in poverty in China. New and effective measures are required to help this impoverished population shake off poverty.

33 Relevant materials provided to the Second Committee of the United Nations General Assembly agenda item 22 (b) Science, Technology and Innovation for Development.

Since Xi's comments about poverty alleviation in June 2015, 16 provincial Party leaders have said they are paying great attention to helping people living in poverty in their provinces, and "targeted poverty alleviation" has become a popular phrase in their statements.

Most of poverty-stricken counties and impoverished villages are in remote locations with poor natural conditions and poor public services. The local governments should tackle these issues and focus their poverty alleviation efforts on establishing a long-term mechanism to eliminate poverty. Local governments need to merge poverty alleviation resources to make better use of them and take targeted measures to ensure that assistance reaches poverty-stricken villages and households.

To ensure the realization of the objective, an evaluation of the National Precision Poverty Alleviation Action was implemented by the Center for Assessment and Research on Targeted Poverty Alleviation. The evaluation took place from June 2016 to August 2017. It used big data and remote sensing to accurately target the poor and used a geographic information system to follow the alleviation process. The big data platform for evaluating the National Precision Poverty Alleviation Action was built. It not only used remote sensing to locate the target poor group, tracking related files but also to monitor and update data on the new roads, schools, and facilities related to poverty alleviation.

Evaluation of National Sustainable Development Experimental Zone

Started in 1986, the National Sustainable Development Experimental Zones are local pilot initiatives jointly pushed forward by 19 governmental bodies, including the Ministry of Science and Technology, the National Development and Reform Commission and the Ministry of Environmental Protection. Over the past 30 years, the zones have used public education, science and technology support and institutional innovation to promote the popularization of the sustainable development concept; push forward the local application of a large number of advanced and applicable technologies in the fields of energy conservation, emission reduction and public health; explore a number of innovative regional models in the areas of industrial transformation and upgrading and coordinated urban and rural development; and play an active role in pushing forward China's implementation of its sustainable development strategy. Currently, China has established 189 experimental zones in 31 provinces (autonomous regions and municipalities) around the country.

The evaluation of the zones took place from February 2014 to March 2015, covering 156 national sustainable development experimental zones, distributed across 30 provinces in the nation, with administrative levels across prefecture-level cities, urban areas (or suburbs), county level and township levels.

The evaluators carried out 5,860 interviews with structured questionnaires on the street and 3,046 valid questionnaires were returned, which covered 22 provinces and 41 cities and districts. Statistics showed that the interviewees were 65.3 percent male and 34.7 percent female, ranged in age from 18 to 70 years old and held a variety of jobs.³⁴

34 Assessment of progress with constructing sustainable development pilot areas, 2015.

TABLE 2. EVALUATION OF NATIONAL SUSTAINABLE DEVELOPMENT EXPERIMENTAL ZONES

PROVINCE	NAME OF EXPERIMENTAL ZONE	ADMINISTRATIVE LEVEL	STREET VISIT	ONLINE SURVEY	TOTAL
Jiangsu	Jiangyin city (county), Wuxi	county-level	150	57	207
Shanghai	Xuhui	prefecture-level	72	133	205
Zhejiang	Wenling city (county) Taizhou	county-level	137	104	241
	Yangxunqiao town, Shaoxing	township-level	160	100	260
	Hengdian town, Dongyang, Jinhua city	township-level	177	84	261
Beijing	Huairou district	county-level	165	101	266
	Xicheng district	prefecture-level	82	177	259
Hebei	Zhengding county, Shijiazhuang	county-level	68	143	211
Henan	Linzhou, Anyang city	county-level	173	35	208
	Mengzhuang town, Huixian, Xinxiang city	township-level	163	38	201
	Zhulin town, Gongyl, Zhengzhou city	township-level	128	74	202
Shanxi	Zenzhou county, Jinzhou city	county-level	125	84	209
Anhui	Maoji Sustainable Development Experimental Zone	county-level	193	37	230
	Baohe District, Hefei city	prefecture-level	196	54	250
Hubei	Zhongxiang city (county), Jingmen city	county-level	177	26	203
	Jiangan District, Wuhan city	prefecture-level	73	142	215
Shaanxi	Huayin city (county), Weinan city	county-level	173	30	203
	Weibin district, Baoji city	prefecture-level	172	32	204
Sichuan	Deyang city (county), Guanghan city	county-level	166	36	202
	Jinniu district, Chengdu city	prefecture-level	67	136	203

The experimental zones provide theoretical and practical support for the implementation of the national development strategy and the formation of development goals in different stages. The construction work of the experimental zone actively explores the implementation mechanism of local sustainable development in China. The construction of experimental zones has promoted regional sustainable development, economic development and social harmony, and generated social and economic benefits for local residents.

The evaluation team has put forward 18 specific suggestions from four aspects. For example, the zones should strengthen the overall design, coordinate innovation resources, promote the tilt of the science and technology plan to the experimental area, promote the government and the market mechanism of organic integration, actively expand the funding security channels, make clear summary requirements and strengthen information exchange and process accumulation.

China's construction of innovation demonstration zones (IDZs) for the implementation of the 2030 Agenda for Sustainable Development ("IDZs for 2030") does not start from scratch. These demonstration zones are created based on existing National Sustainable Development Experimental Zones. China's IDZs for 2030 will grant a more important mission to those regions which have accomplished great achievements in building national sustainable development experimental zones. They are the upgraded versions of the national sustainable development experimental zones. In the future, the demonstration zones and the experimental zones will go hand in hand to support mutual development.³⁵

CHALLENGES OF SDG EVALUATION

Although the SDGs have been given enough attention in national strategy and policies, and reflected in the actions, the evaluation of the SDGs is still a challenge for the Chinese evaluation community.

Insufficient Evaluation Capacity

The SDGs, including 17 Goals and 169 indicators, are much more extensive than any of those in China's strategies or programmes. The Chinese evaluation community needs time to fully understand them. Second, despite the fact that China's evaluation practice has made considerable progress over the past 20 years, the evaluation capacity, especially the number of qualified evaluation organizations and professional evaluators, is relatively inadequate.³⁶ There is no evaluation course in Chinese colleges or universities, and there are very few training courses and unified standards regarding evaluation.³⁷

Lack of a Comprehensive Data Collection System

Since the 17 Goals and 169 indicators are involved in all aspects of Chinese development, a synthesized and synergistic data collection system is needed. China's current data collection

35 Ministry of Science and Technology, background materials for 'Program for establishing the innovation demonstration zones to implement the 2030 Sustainable Development Agenda', 2016 http://www.china.com.cn/zhibo/zhuantu/ch-xinwen/2016-12/21/content_39956777.htm.

36 Chen Qiang, Hu Huanhuan, and Bao Yuehua, 'Evaluation Criteria of Science and Technology: Foreign Experience and its Enlightenment'. Forum on Science and Technology in China, 2012(5).

37 Chun-Ge Xu, 'Analysis of progress made with the evaluation function since China joined WTO', *Guide for Trade and Commerce*, vol. 5, 2010.

system has not been able to support such a huge evaluation exercise.³⁸ In the Chinese system, there are two main ways to collect data. One is through the national statistical system. The other is the reporting system. However, many SDG indicators are not in the existing statistical system. Also, many data need to be reported from the village level to the central level, which results in high cost and poor timeliness of data collection.³⁹

Challenges for Quantitative Evaluation

Comparing the SDG targets with SMART standards, that is specific, measurable, achievable, realistic and time-based and efficiency-oriented,⁴⁰ it is reported that more than 50 percent of the indicators are not in line with the SMART standards,⁴¹ thus posing great challenges for their evaluation. For example, SDG 7 is to ensure access to affordable, reliable, sustainable and modern energy for all. Because there is a lack of specific evaluation indicators for this goal, it is hard to measure its activity.

SUGGESTIONS AND WAYS FORWARD

Joint Policy Evaluation is Essential

Since sustainable development has become an important global issue and the areas involved, such as environment and health, are common problems facing the world, realization of the SDGs by developing countries, including China, will be the key to the successful implementation of 2030 Agenda. The 2030 Agenda sets the course for national development endeavours and international development cooperation.

In order to achieve the SDGs, policy support is one of the most important aspects and evaluations will greatly improve the effectiveness of policies, thus contributing to the achievement of the SDGs.^{42 43 44} In many cases, joint evaluations from different countries will be more useful. For instance, joint evaluation of finance and talent management policies could promote mutual coordination and references. An in-depth joint impact evaluation on efficiency, effectiveness and impact of innovation policies of all countries would also be useful. A successful policy will be beneficial to the innovation development of all countries;

38 Zhu Yanhua, Sun Liran, Hu Lianglin, and dLi Jianhui, 'Searching after Estimate of S&T Data Management and Sharing Service Effect', *China Science & Technology Resources Review*, (4): 12-17, 2013.

39 Jing Tian, 'Reflections on data quality', *Statistics and policies*, vol. 11, 2005.

40 Liu Sheng, Sun Zong-Rui, Yang Yu, and Zhao Xiao-Hua, 'Based on the SMART principle of scientific and technological achievements assessment index system research', *Machinery*, 38(7), 2011.

41 Chinese Journal of Science, Scientists critiqued that the sustainable development goals are too vague. <http://news.sciencenet.cn/htmlnews/2015/2/313633.shtm>.

42 Shapira, Philip and Stefan Kuhlmann, 'Learning from Science and Technology Policy Evaluation: Experiences from the United States and Europe', Scientific and Technical Documents Publishing House.

43 Fischer, Frank, *Evaluating Public Policy*, China Renmin University Press, 2003.

44 Li Ying, Kang De-Yan, Qi Er-Shi, 'The model and application of stakeholder to policy evaluation', *Science Research Management*. 2006, 27(2).

a medium policy will benefit only its own country; and an unsuccessful policy will benefit no countries and need to be altered or stop immediately.

International Cooperation is Necessary

It is necessary to carry out international cooperation and promote the coordination and information exchange in achieving the SDGs. Three approaches could be used. First, set up an international cooperation network and working mechanism for evaluation of science, technology and innovation, provide decision-making advice to national Governments, based on international vision and national conditions. Second, conduct joint evaluations of existing bilateral and multilateral cooperation mechanisms and actions. Summarize experience, find deficiencies, make recommendations and promote the quality and efficiency of cooperation. Third, conduct evaluations on issues of international common interest, present evidence-based and practical solutions.

Evaluation Capacity-Building and the Use of Technology Tools

In order to overcome the challenges of evaluation of the SDGs, we have several suggestions. First, strengthen evaluation capacity-building, share best practice of evaluation of the SDGs and help national evaluators to understand the SDGs better. Second, make full use of information and communication technology tools to develop infrastructure for big data analysis. This could solve the data problems of SDG evaluation. This could be a long process but will be of great use once done. Third, countries could develop specific quantitative indicators about the SDGs, which should reflect a country's context as well as be accepted by common international standards.