The Annual Report for World Sustainable Development 2015: Voice from the Chinese School of Sustainability Science

The human society has shown sustained concern about the issue of sustainable development since the release of the Brundtland Report by UN in 1987. To address this critical issue, UN mandated two years ago a special working group, namely the "UNGA Open Working Group on Sustainable Development Goals" to protocol the "Post-2015 UN Development Agenda", and a special summit is to convene in September this year to discuss and approve this set of goals. To contribute their thoughts to this common cause, a group of CAS scientists released on August 26 a report titled *The Annual Report for World Sustainable Development 2015* to give a systematic review of the Agenda, based on their three-year-long research on this issue, voicing opinions from the Chinese School of Sustainability Science.

Notably, the group, led by Prof. NIU Wenyuan from the CAS Institute of Policy and Management, creatively proposed the concept of "Lagrange Point of Sustainability" to balance three crucial elements in their research, borrowing from physics the idea of equilibrium point between gravitation fields from major planets. Moreover, to set a politically neutral framework for discussion, the group based their research on systematics theory, and developed a complete set of indexes to measure the capacity of sustainable development for a total of 192 nations across the world. Starting from there they established a sustainability Assets-Liabilities balance sheet for each of the nations, and finally gave their predictions of the time around which the involved nations would achieve sustainable development.

The release of the Report marks the first time ever for Chinese scientists to give advice and predictions for the world in terms of sustainable development. The report for 2015 comes as the first of the series and will be followed by annual updates.

Here as follows we present the summary of the Report 2015.

Prof. NIU Wenyuan, leader of the team and a founder of research in sustainable development in China, explains to the audience the ideas of the Report at the news release held on August 26.

The Annual Report for World Sustainable Development 2015 Summary

The Annual Report for World Sustainable Development 2015 is the first academic report in the field of sustainability from a worldwide lens. The report has been compiled by a team from the Chinese Academy of Sciences named the "Sustainable Development Research Group" headed by Prof. NIU Wenyuan, a founder of sustainability science in China, who works as the Editor-in-Chief of the Report. Based on the results from their research in sustainability science, the team aims to systematically review the UN Post-2015 Development Agenda in the Report.

Since the publication of "*Our Common Future*" (also known as the "Brundtland Report") in 1987 by the UN, several countries have made many notable achievements in the research of sustainable development, at a quite steady pace. The scientific connotations of the concept of sustainable development can be summarized as three main points, on which scientists have reached an agreement. First, overcoming the diminishing marginal benefits of economic growth by technological innovation (in other words, seeking the "drivers for development"). Second, growing wealth without causing any harm to the environment (maintaining the "quality of development"). Third, improving the social governance system to increase management rationality (embodying the "fairness of development"). When these three key points are carefully considered throughout the sustainable development process, the countries that implement them will benefit considerably. The scholars, policymakers, and other rational thinkers agree that maximizing the intersection of these three sets is the most rational approach to sustainable development.

To mark the importance of this issue, the year 2015 has been named "the year of sustainable development" by UN, and the "Post-2015 UN Development Agenda" set its core mission. Two years ago, the UN specially mandated the "UNGA Open Working Group on Sustainable Development Goals" to protocol the "Post-2015 UN Development Agenda"; on the other hand, Secretary-General Ban Ki-Moon called for a special summit on the UNGA goals to convene in September 2015. In May this year, the Permanent Mission of China to the United Nations proposed "China's Position Paper on the Post-Development Agenda Beyond 2015" for the summit, and the action roadmap and expected results of China's sustainable development over the next 15 years have drawn global attention.

As early as 2012, to commemorate the 20th anniversary of the United Nations Conference on Environment and Development Concerns, our team began planning to compile and publish the first global sustainable development report in the world. As the result from the joint efforts of the team, the report was completed as scheduled.

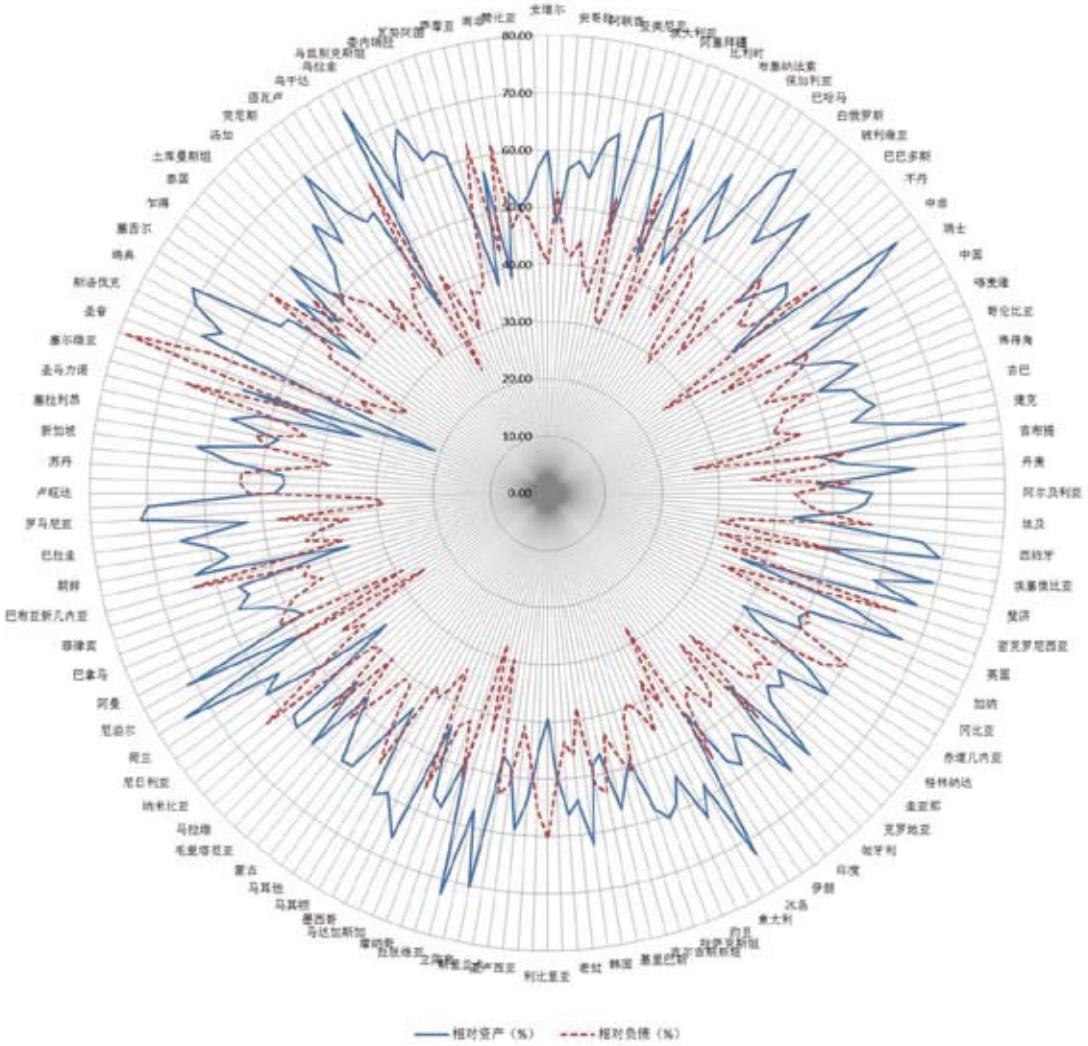
The Annual Report for World Sustainable Development 2015 was compiled based on several years of research on sustainable development at the Chinese Academy of Sciences, applying the systematics theory and its methods, and focusing on both global and regional challenges. As shown in the Report, positive results were achieved in the following six aspects:

1. We introduced a comprehensive sustainability system, using Sustainability Science of Chinese Schools, to give a complete interpretation.

2. In the Report, a novel, quantitative timetable was provided for countries (regions) across the world, predicting the time for each of them to achieve sustainable development goals, based on the original "Theory of Lagrange Point" proposed by the team.

3. *The Annual Report for World Sustainable Development 2015* lends its own opinions on the UNGA Open Working Group's Sustainable Development Goals (17 goals and 169 sub-goals) As detailed in our report, we assert that the UNGA goals failed to give due attention to the worldwide diversity across nations, in terms of stages of development, priority selectivity, and other relevant factors affecting sustainable development. In our report, all involved countries are divided into five groups: developed countries, emerging-economy countries, developing countries, least-developed countries, and small island countries. Based on the division, we proposed a more targeted, practical, and ordered combination of goals for different countries, hoping it would be helpful for the discussion regarding the "Post-2015 UN Development Agenda".

Ranking	Country	Per Capita GDP	Unit GDP water	Carbon dioxide emissions	Human development index	Life expectancy	Poverty rate	Year to realize sustainable development
1	Norway	2013	2013	2040	2015	2013	2025	2040
2	Switzerland	2013	2013	2045	2013	2013	2026	2045
3	Canada	2013	2025	2053	2013	2013	2026	2053
4	Finland	2014	2013	2054	2024	2013	2028	2054
5	Austria	2013	2013	2056	2023	2013	2028	2056
6	Germany	2015	2013	2061	2013	2013	2029	2061
7	Australia	2013	2020	2064	2013	2013	2026	2064
8	New Zealand	2016	2035	2067	2013	2013	2030	2067
9	US	2013	2052	2068	2013	2020	2027	2068
10	France	2017	2022	2069	2021	2013	2026	2069
10	Japan	2054	2047	2069	2018	2013	2030	2069
10	Republic of Korea	2024	2022	2069	2018	2013	2031	2069
13	UK	2018	2013	2070	2018	2013	2030	2070
14	Italy	2020	2025	2072	2027	2013	2031	2072
15	Argentina	2027	2065	2073	2060	2035	2045	2073
16	Brazil	2029	2062	2023	2074	2040	2040	2074
17	Peru	2034	2070	2010	2076	2035	2040	2076
18	Mexico	2055	2070	2079	2071	2025	2052	2079
18	China	2027	2032	2076	2079	2050	2036	2079
20	Venezuela	2026	2042	2080	2071	2045	2037	2080
20	Turkey	2031	2037	2080	2072	2030	2030	2080
20	Jamaica	2080	2070	2062	2079	2065	2039	2080
23	Columbia	2033	2040	2010	2082	2045	2038	2082
24	Chile	2026	2067	2085	2053	2015	2020	2085
25	Indonesia	2036	2070	2010	2086	2065	2043	2086
26	Philippines	2051	2088	2010	2089	2090	2045	2090
26	Iran	2038	2090	2088	2073	2035	2031	2090
28	Honduras	2070	2075	2010	2096	2035	2045	2096
29	Morocco	2053	2097	2010	2096	2070	2044	2097
30	South Africa	2041	2032	2076	2089	2100	2036	2100
31	Kenya	2055	2040	2010	2114	2100	2045	2114
32	Algeria	2037	2118	2068	2080	2095	2041	2118
33	Nigeria	2029	2022	2010	2119	2100	2039	2119
34	Cameroon	2121	2045	2010	2117	2100	2042	2121
35	Mozambique	2070	2042	2010	2141	2100	2041	2141
	World as a whole	2121	2118	2088	2141	2100	2052	2141



(Above) In the Report the research group measures different countries' levels of sustainability in the form of a sustainability Assets-Liabilities balance sheet for each country. Based on the balance sheet, each country's strengths and weaknesses are plotted in a radar map.

(Left) Timetable for Sustainable Development

The research group gives their predictions of the time around which each country achieves their respective sustainable development goals, based on the "Theory of Lagrange Point" proposed by themselves.

The Report points out that crossing the sustainable development global threshold and maintaining the sustainable development state is the most anticipated event in human history, and therefore it is important to predict the timetable of crossing the global threshold of sustainable development, making it as the biggest objective function of global sustainable development. In line with the Lagrangian point theory put forth by Chinese scholars, the Report managed to produce the above timetable under some preconditions.

The preconditions are "without the occurrence of any global war, any global economic crisis, any failure of international governance structure, any global network disaster or other global uncontrollable incident."

Under such preconditions, researchers of this report took a closer look at countries in the world, from the most developed countries to the least developed countries, using the pre-determined assessment criteria and internationally recognized data, and succeeded in predicting these countries' projected timetable of achieving their sustainable development goals.

According to the projected timetable, Norway is expected to realize its sustainable development goals in 25 years (in 2040), making it the country to reach the sustainable development goals at the earliest possible time.

The US, the world's largest developed country, is expected to cross the sustainable development threshold in 53 years at 2068.

China, the world's largest developing country, is expected to cross the sustainable development threshold in 64 years (in 2079).

Mozambique, however, will only cross the sustainable development threshold in 126 years (in 2141), making it the world's last country to reach the sustainable development goals.

It can be told from these projected timetables that time difference in achieving the pre-determined sustainable goals is as big as 101 years, which is about a century.

4. For the first time, by studying sustainable development through the lens of systematics theory, a scientific index set was developed and internationally recognized data applied to quantitatively calculate the sustainable development capability of 192 countries in the whole world.

5. For the first time again, our report details a balance sheet which measures different countries' levels of sustainability (called the sustainability Assets-Liabilities table). Based on the balance sheet, each country's strengths and weaknesses are plotted on a radar map. This might offer the involved nations a tool to setting their priority goals for development.

6. The report also projects important challenges in addressing the sustainable development issue after 2015.

In the beginning of this century, statements made by the ICSU (International Council of Scientific Unions), IGBP (International Geosphere-Biosphere Program), IHDP (International Human Dimensions Programme), and WCRP (World Climate Research Program) called "the Birth Statement of Sustainability Science" have helped shift the world consciousness of sustainable development from action-based to science-based. The scientific system of sustainable development includes both the utilitarian requirements of economic growth, social governance, and environmental safety, as well as a rational approach to differences in spirituality, philosophy, and other civilization structures. It is a complex and wide-reaching system that covers "natural, economic, and societal" rules and a four-in-one harmonious, dialectical relationship among population, resources, environment, and development. The evolution of sustainable development into a scientific level also involves containing these rules and relationships as they affect overall trends.

Chinese scholars emphasize that sustainability science shall focus its attention on the three balances: the Nature Balance (the equilibrium between human activities and nature bearing capacity), the Economical Balance (the equilibrium between environment and development), and the Social Balance (the equilibrium between efficiency and fairness). Also, we put forward that "the three elements" (the motive, quality and equality) constitute the essence of sustainability. For this, the group at the Chinese Academy of Sciences creatively proposed "The Lagrange Point of Sustainability", and started from it to calculate the 'Time Table' for each nation to arrive at sustainable development goals.

After scientific reviews and comprehensive action planning, successful world sustainable development goals must not only possess solid theoretical basis and philosophical connotations, but also make careful consideration of national conditions, development stages, and cultural backgrounds. An enforceable roadmap should be compiled and scheduled to form a strategic action plan in order to achieve satisfactory results both theoretically and practically.

The Annual Report for World Sustainable Development 2015 is the first annual report to apply sustainability science to the explanation of post-development agenda. The report contains four sections: Theories, Issues, Indexes, and Statistics. It is divided into seven chapters and contains 158 charts and tables.

Chinese scholars have invested a great deal of efforts in this field since 1983 (the same year as the establishment of UN Brundtland's Committee). Their research consistently sticks to sustainability science as the orientation of the world's sustainable development. *The Annual Report for World Sustainable Development 2015* will become a consecutive, theoretical report series which concerns actions, planning trends and progress of sustainable development throughout the world. We are willing to work with international researchers and managers in the field to make valuable contributions to securing the future of sustainable development.