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# **The Overview of China's Sustainable Development**

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**Niu Wenyuan**



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**Responsible Editors: Li Min   Liu Chao**

**Brief Introduction**

*The Overview of China's Sustainable Development* contains the basic contents in China's sustainable development strategy. By following the track record of human civilizations and focusing on the blueprint of China's development in the 21<sup>st</sup> century, the book, in a systematic way, explains the strategic background, establishment, targets, key points and actions of China's sustainable development. It reveals the 2 major lines, 3-dimensional identification, 5 sub-systems, theories and practices of building a sustainable society in China. The book, by absorbing the latest Chinese and overseas research results on sustainable development, has established the distinctive theoretical system, methodology system and evidence system of sustainable development.

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**The book is dedicated to the 20th  
Anniversary of United Nations Conference on  
Environment and Development ( 1992—2012 )**

## About author



Niu Wenyuan ( Nov. 7, 1939 ), professor of Chinese Academy of Sciences ( CAS). In 2001, he was selected to be the member of The World Academy of Sciences ( TWAS). In 2003, he has been appointed to be The Counselor of The State Council of The People's Republic of China by the Chinese Premier Mr. Wen Jia Bao. In 2004, the Senior Advisor, Institute of Policy & Management, CAS.

Prof. Niu has been the founder of China's sustainability sciences. In 1984, he was as Chinese specialist to involve in the drafting of The Brundtland

Report *Our Common Future*. In 1994, he published the first theoretical work *An Introduction to Sustainable Development* in China. Up to now, the book has still been a major contribution to Chinese sustainability, and as the textbook or/and major reference of sustainability field in universities. Prof. Niu has been the director and chief scientist of national sustainable development strategy program of China since 1992. He has led to study and edit annual report "China's Sustainable Development Report" which is the first national sustainability strategic report in China from 1999 to now. He is the executive editor-in-chief of *The Overview of China's Sustainable Development* ( It has been called "National encyclopedia of China's sustainability science" included 20-volume). The great work won the authoritative "2010 Chinese Government Publication Prize".

In Sept. 19, 2007, both of Prof. Niu and Former President of Italy Mr. Ciampi together became the winners of "2007 International Environment Prize" ( 2007, Assiss, Italy ). The award's single sentence to describe NIU's achievement is: "Prof. Niu Wenyuan has been founder of Chinese environmental monitoring and warning system and responsible for China's national sustainable development strategy programme since 1988, he created theoretical systems of Chinese sustainable development, designated sustainable development strategic frameworks and discovered basic regulations of development behaviour. "

Prof. Niu created a conceptual framework to estimate sustainability using Systems Science. The theoretical systems can be applied to estimate development ability, development cost, and development quality under the sustainable development principles. Niu established a sophisticated

index to quantitatively assess sustainability. The index includes 5 categories, 19 models, 42 indicators, and 235 elements. Using the index to rank 31 provinces of China each year and monitor sustainability variation of the regions. And he is as the first person to put forward “GDP Quality Index” (in 2010) to quantitatively evaluate the green degree, ecological deficit, and true wealth of a country or a region. Up to now, he published more than 20 books and 180 papers about resources, environment, and sustainable development in China and abroad.

# Foreword

The history and laws of human evolution have shown evidently that the productivity development is the final decisive force determining the social progress. Only by centering on economic growth, keeping emancipating and innovating productivity can we provide the solid material foundation for overall development of individuals. The specific material foundations are always related to the corresponding forms and contents of political civilization and ethic civilization, which in turn will promote the development of advanced productivity.

By 2050, China will inevitably encounter the following 6 fundamental challenges in its process of development: the upcoming 3 population-related peaks (namely, population peak, employed population peak and elderly population peak), the supernormal use of energy and natural resources, the “right reverse” that facilitates the inverted U-curve of overall ecological environment quality; the great pressure on urbanization, the need to narrow the regional income gaps to achieve social fairness, and the necessity of building the capacity of sustainable development and improving international competitiveness. The above-mentioned challenges, which seriously halter China’s future development, can only be effectively addressed when and if China adopts the comprehensive, balanced and sustainable development strategies.

The core of sustainable development theory is closely themed on 2 points: first, keep the balance between man and nature, seek coordinated evolution of man and nature, and work for the rational existence of “man and nature” phase. At the same time, we must relate human survival and development to consumption of resources, degradation of environment and ecological stress. In essence, the point is the sustainable development and balance between man and nature. Second, achieve the genuine balance of inter-personal relationship. Through the means of media education, ethic norms, moral education and other awareness-building activities trying to awaken the rational thinking of human, and by effectively organizing the human behaviors such as law enforcement, social management and policy implementation, the purpose is to reach balance, harmony and justice in the inter-personal relations (including the inter-generation relations). To sum up, the topic of “sustainable development” faced by the whole world, in a most fundamental way, represents the profound cognition of relations between man and nature and among human beings themselves. To correctly perceive the relations between man and nature is the material foundation to ensure sustainable development; and to properly handle the inter-person relations is the social key to achieving the sustainable development.

It is the intuitive motive of human beings to pursue the sustainable development in the process of evolution as a whole. In essence, the pursuit of sustainable development is just the same as the efforts to meet the individuals’ rational needs, improve their performance, build up their capacity

and realize their ideals. Based on such perception, we can conclude that, in the entire process of human evolution, the creation and accumulation of material and spiritual civilizations, the national prosperity and improvement of people's welfare, the continuation and advanced cultures and philosophies, and the evolution and innovations in political regimes and social customs are nothing but the comprehensive representations of connotations and reflections of sustainable development.

In the 21<sup>st</sup> century when the whole world is experiencing economic globalization and social networking, and pursuing the sustainable development, these concepts are not only determining the orientation of how resources, ecology and environment evolve, but also guide the innovations and reforms in economic, social and humanistic foundations. Both people's concern about degrading ecological environment and desire for innovations in humanistic foundations can be fully represented in the process of implementing the strategy of sustainable development.

Based on the above discussions, we can reach the overall concept of national development strategy, which should be aimed at such utilitarian targets such as economic growth, social progress and safety of ecological environment, but also at those rational objectives including the upgrading of philosophies and progress in human civilizations. The concept, in a comprehensive way, covers the operating rules of complicated systems of "nature, economy and society" while giving the profound perception of the dialectical relations among "population, resources, ecological environment and development". Furthermore, it also integrates the differentiating expressions of such "rules" and "relations" in different times and territories into the trend of time evolution. The national development strategy based on sustainable development should have solid theoretical foundation and rich philosophical connotations. To accomplish the detailed targets outlined in the sustainable development strategy, the countries and regions have to, based on their own conditions and situations, make the plans and program to realize their strategic goals. These plans and programs should constitute a complete strategic system that is able to reach the "satisfactory solution" in both theory and practice while implementing the national strategy.

When we talk about the systematic nature of sustainable development, we often mention its 3 evident features. First, it should be able to measure the "development degree" of a country or region (also known as Quantitative Dimension). The development degree highlights the dynamic feature of productivity improvement and social progress. It is often used to judge whether a country or a region is genuinely making progress in a healthy and rational way. And it is applied to find out whether country or region is keeping making progress while the quality of life and survival space are secured. The second feature is the "coordination degree" of a country or region (also known as the "qualitative dimension"). The coordination degree highlights the ability of efficiency transformation and factor combination. To be specific, it refers to rational optimizing the source, accumulation and allocation of wealth and the code of conduct while the wealth is being used to satisfy the needs of human beings. Can the balance between environment and development be maintained? Can the balance between efficiency and fairness be secured? Can the balance between the market dynamics and government regulations be ensured? The third feature is the "continuation



degree” of a country or region (also known as “time dimension”). To be specific, it means the continual rationality of the development in a country or region. Can the country or region balance the allocation of benefits between the existing generation and future generations? The continuation degree focuses more on attaining the development degree and coordination degree from the perspective of sustainable development. As a result, the perfect measurement of sustainable development is represented by identifying the three features of sustainable development system, namely, quantitative dimension (development degree), qualitative dimension (coordination degree) and time dimension (continuation degree) and the effort to maximize the shared part of these three dimensions.

If we continue to study the characteristics of sustainable development connotations, we can find out the 3 real reflections and macro identifications that are integrated together.

First, the characteristic of sustainable development: the dynamic characteristics of a country or region often consist of its sustainable “development capacity”, “development potential”, “innovating capability” and “competitiveness”. These characteristics include the abilities to coordinate and optimally configuring the natural capital, production capital, human capital and social capital in the country or region.

Second, the quality characteristic of development: the country or region’s “natural evolution”, “ecological balance”, “ethic development” and “quality of life”, and how close are they to the rational demand-supply curve (including both material and spiritual demand and supply) constitute the quality characteristic measuring a country or region’s “development”. It includes the composite measurements of levels of material disposal, support to the environment, inner happiness and ethic development.

Third, the fairness characteristic of development: the characteristic judging the fairness in a country or region’s development is composed of the degree of “common prosperity” and how it benefits all members in the society, how the country or region overcomes the wealth gap and urban-rural gap, and how it provides the equal opportunities. It consists of the total volume of inter-personal fairness in concerted efforts and benefit sharing, inter-generation fairness in resource allocation and inter-regional fairness in equal participation.

Only by including the above-mentioned macro identifications in different stages of sustainable development, can the “state of development” in different times and territories be compared on the same basis, and can we attain the shared criteria to observe, control and measure our pursuit of sustainable development.

The effective implementation of sustainable development is mainly reflected in the following 7 factors.

1) Continually maintain the rational economic growth: here the “healthy” economic growth is highlighted. It will not tolerate the “zero growth” which represents the constraint on wealth accumulation. At the same time, it also opposes to excessive growth with a blind eye to necessary considerations. The so-called healthy growth typically refers to the process of satisfying people’s needs

rationally constrained by self discipline and control by expanding the “wealth” measurements of economic growth in certain stages of development. As the famous economist Robert Merton Solow, “The sustainable development is deemed as the general target of non-negative growth in per capita wealth in the constraint of a few parameters such as population, resources and environment.”

2) Work painstakingly to improve the quality of economic growth: it represents the quality of newly-made wealth that should be continually improved and upgraded. Except for optimizing and rationalizing the economic structure on a continuous basis, the newly-made wealth should consume fewer resources and energies, levy less impact and interference in ecological environment, have more knowledge contents and non-material growth, and attain greater general benefits. According to Romer's theory, the incremental model of economic benefits is equal to the economic growth cored on knowledge innovations and professional HR capital. This model can not only produce the internal increment of capital gains, but also result in the benefit increase in conventional factors of production, thus boosting the overall economies of scale and making breakthroughs in the traditional limits to growth.

3) Satisfy the basic human-oriented development need: the sustainable development is initiated for the purpose of overall human development because it is deemed as the cornerstone of all developments to continually secure the basic human rights and keep satiating the basic human needs. In essence, such a strategic goal is just to keep the reproductions of population and materials at the same level of sustainable development. As a result, it is imperative to keep the supporting systems of global, national and regional survival and development within the rational scope. It is necessary to provide sufficient survival necessities by developing basic resources, and ensure the rational structure of incomes, consumptions and savings by providing and deploying jobs, thus safeguarding the peaceful coexistence and physical and psychological health of all people in the world. It is also imperative to transform the population resources into human capital. According to the UNDP's annual *Human Development Report*, it is necessary to rationally deploy the “physique, skills and intelligence” in the acceptable state before reaching the ideal balance between population and development.

4) Maintain, expand and preserve the resource foundation in the nature: in the foreseeable future, the resource foundation on the earth will continue to be the only source to support the world population survival and development. Now that the scientific outlook on development has defined the necessity of increasing wealth while satiating the rational needs of human beings, its physical foundation mainly depends on maintenance, in-depth explorations and rational use of resources on the earth, and even on transforming wastes into resources.

5) Focus on breakthroughs in development bottlenecks made by sci-tech innovations. The scientific outlook on development has always been emphasizing on full coordination of “population, resources, ecological environment and economic growth”. In the process of implementing sustainable development strategy, sci-tech progress can rapidly translate the research results into the driving force for economic growth and overcome the bottlenecks in the development to meet the

overall demand of sustainable development. The sci-tech development, social and economic development and development of management institutions will constitute a large inter-related system. By making macro adjustments and optimizations, the bottlenecks of development will certainly be broken. The economist Simon Smith Kuznets, while giving his speech at the Nobel awarding ceremony, voiced his serious thinking, “Advanced technology is a major source of economic growth. Nevertheless, it is just a potential prerequisite instead of a sufficient condition. To apply technologies in the most efficient and extensive way, it is imperative to make institutional and ideological adjustments so that we can correctly employ the creativity produced by the best part of human knowledge.”.

6) Keep balancing environment and development: the scientific outlook on development opposes to simply pursuing economic growth by sacrificing the capacity and ability of environment. It also goes against the hesitation to motively explore natural resources just to preserve the environment. By making different types of adjustments and controls, we can keep the environment ability at corresponding levels while improving the economic growth constantly. In light of this, when some regions are developing “cycle economy”, “ecological compensation system”, “industrial eco-park”, “whole-process pollution control”, and “green chemical system”, the fundamental purpose of these efforts is just to maintain the balance between man and nature in the process of development.

7) Keep balancing between efficiency and equity: efficiency is the engine to accumulate wealth. While deploying wisdom, creativity, organization, management and other factors in the maximum degree, it also generates the orderly coordination of scale, level and labor-division, thus making the greatest benefits at the minimum cost and becoming the material guarantee of constant social progress. At the same time, the human civilization’s principles and moral criteria require the harmony in social environment, equity and fairness. As a result, the balance between efficiency and equity, in essence, is aimed at maintaining the inter-personal harmony.

Sustainable development, in the history of human development, is a continuous process of making independent innovations and has the dynamic features of forward vector evolution. In different stages of development, sustainable development has different objectives, which are upgraded gradually when the development goes on. In other words, the degree and requirements for sustainable development change as time goes on. If we look back at the scenarios of human history and its evolution, and if we abstract the nature of whole process of world development, we can find that sustainable development is actually the pursuit of the following seven cores on the basis of unity. These seven basic pursuits represent that all efforts in the set directions are towards sustainable development. These efforts are made to expand and accumulate the capacity in sustainable development. And these efforts are made to add the original dynamics to evolution of human civilizations.

On the basis of unity, sustainable development always means improving the capacity to “compress time and space”. Since ancient times, human beings have continually and evidently improved their radius of activities (ability to compress space) and increased the speed of activities

(ability to compress time). The process of sustainable development represents that, the human beings' ability to obtain materials, energy and information has been always improved as they keep improving their capacity to compress time and space.

On the basis of unity, sustainable development always means expanding their "capacity to rationally dominate materials, energy and information". People should not only possess the ability to obtain materials, energy and information, but also improve their capacity to extract from and manage the obtained materials, energy and information. The process of sustainable development, as a matter of fact, demonstrates they are improving their ability of rational domination.

On the basis of unity, sustainable development always means pursuing "the innovation ability to revolutionarily develop science and technologies". In essence, the revolutionary progress in science and technologies is the essential means of and foundation for the ability to compress time and space and the capability to rationally dominate materials, energy and information. While executing the sustainable development, it is imperative to deem the continual progress in sci-tech innovative capacity as the cornerstone and driving force to push forward sustainable development.

On the basis of unity, sustainable development always means pursuing the ability to optimally allocate the productivity factors. In both traditional industrial era and age of knowledge-based economy in the 21<sup>st</sup> century, the allocation of productivity factors will have their structure optimized and function improved with different compositions, levels, intensiveness and depth. In a rational way, the process of sustainable development can be described as the ability to optimize the level and stage of productivity factors.

On the basis of unity, sustainable development always means pursuing the "ability to realize social fairness". Undoubtedly, the degree of social fairness and narrowing poverty gaps and disparities between nations and regions constitute the supreme principle in inter-personal, inter-generation and inter-regional relations, and the foundation to secure social stability and orderly operations. It is imperative to improve the axiom, ethics, institutions and laws in the process of sustainable development to upgrade social fairness and ultimately achieve social fairness.

On the basis of unity, sustainable development always means pursuing "the ability to balance the physical development and spiritual improvement". A modern society should not be satisfied only by the accumulation and expansion of physical wealth. It should also respond to the spiritual pursuit and make spiritual progress. The process of sustainable development is also the coordinated ability to generate physical wealth and spiritual richness.

On the basis of unity, sustainable development always means the pursuit of "ability to integrate regulations and ensure orderly-operating society." Guided by the lofty philosophies and positive value orientations, the constant improvement in regulations, laws and ethics and suitable selections of corresponding political regimes, forms of democracy and humanistic care are basic themes in the humanistic environment of sustainable development. At the same time, they are assurance for the efforts to better organize and identify the sustainable development.

The Chinese Academy of Sciences has long been emphasizing on the close relations between

sciences and the society. By focusing on and encouraging inter-disciplinary studies in natural sciences and social sciences, the Academy tries to find solutions to major social and economic problems the country is facing and identify the suitable development model. At the same time, it has proposed valuable theories, methodologies and tools. To our pleasure, China is now having the same level of perception and studies on modern sustainable development as the rest of the world. Since the start of 1980, the Chinese Academy of Sciences has been keeping a close eye on the trend of sustainable development in the world while playing an active part in the process, thus generating great dynamics for the world's largest developing country with the largest population to implement sustainable development. In 1983, the United Nations made the resolution to establish the World Commission on Environment and Development (WCED). Prof. Ma Shijun and Prof. Niu Wenyuan from the Chinese Academy of Sciences, in the capacity of specialists, were involved in the whole process of drafting the world's first programmatic document on sustainable development, namely, *Our Common Future* or Brundtland Report. In 1988, sustainable development was listed in the catalogue of research topics in the Chinese Academy of Sciences.

Prof. Niu Wenyuan, known as the pioneer of Chinese sustainable development studies and theories, has completed the *Overview of China's Sustainable Development*. When we are celebrating the 20<sup>th</sup> anniversary of United Nations Conference on Environment and Development, this book will present, for the Chinese and overseas readers, his research results in the field of sustainable development. I am confident the book will definitely promote the in-depth studies on sustainable development and prominently help the overseas scholars to have a panoramic picture of China's sustainable development.

As the most populated nation in this world, China is also a large power developing rapidly. The successful implementation of sustainable development strategy and constant progress in this regard have not only proved the Chinese nation has made the right choice, but also made huge contributions to the world. The Chinese nation, renowned for their wisdom and diligence, once had glorious past in the history of human civilizations. She is definitely able to make the same level of achievements in sustainable development in modern times.

By Lu Yongxiang

The former President of Chinese Academy of Sciences

# Preface

Without the existence and development of human beings, the environment of nature would be relatively silent and lack of vitality; however, if the human production and social activities were in an irrational, confused and non-visionary state, the damage to the natural environment would sooner or later be returned to the human beings themselves and lead to their extinction. When discussing and understanding relations between man and nature in this sense, on one hand we are not able to completely get away from the constraints by laws in nature; on the other hand, human beings play a significant part in the process of succession and evolution of natural environment. "Co-evolution of man and nature" is now the ultimate and ideal goal pursued by human beings. What we are doing is either safeguarding the cradle of our survival, or ruining the foundation of our existence. It depends on how rationally human beings perceive and make use of nature, but also on how well they understand their own values and initiative.

In the social environment, if people were in a disorderly and random state, the social organizing capacity, productivity and benefits will not be able to demonstrated or realized. In this way, the social structures and functions are not able to generate the increasing material foundations nor establish or improve the regulated spiritual foundations. Human beings, in their history, have long been discussing and perceiving inter-personal relations in this sense, thus leading to their unremitted pursuit of rationality, harmony, co-building, sharing, self-discipline, self-constraint and awareness, and reflecting that the social evolution has solid humanistic support.

The philosophers of all generations, from different perspectives and in different levels, have pursued the outlooks on nature and man on the healthy basis. Their ideas have become parts of the human civilizations. According to the *Book of Changes* (also known as *Zhou Yi*), "By observing the sky we know something will happen; by observing humans we can conquer the world". In Mencius, he said "Opportunities vouchsafed by heaven are less important than terrestrial advantages, which in turn are less important than the unity among people". *On Judgment* (also known as *Lun Heng*) said, "Human beings are not able to move the heaven with their behaviors while the heaven will not respond to the human beings for their behaviors". Furthermore, *Main Techniques for the Welfare of the People* also said, "If we follow the heaven and earth principles, we will make achievements by making less efforts; on the contrary, if we set free our lusts and disobey the principles, all efforts will end in vain." Some famous western scholars, while discussing the relations between man and nature, have also put forward some smart and fine ideas and thoughts. Carl Ritter, the advocate of man-land relationship theory and one of the founders of modern geography in Germany, in the preface to the book *Europe*, said "the entire land presents the dynamic picture. In this picture the produces of nature and culture, the natural looks and humanistic appearances are smartly integrated into a whole piece, thus perfectly representing the mutual effect of man and nature...Land is producing impact on man while man is doing the same

on land.” (Encyclopedia Britannica, Carl Ritter). His man-land theory studies relations between natural environment and human activities and pursues harmony between man and nature. This theory, which is changing all the time as we are in different levels and stages of development, has instilled great vitality into the future development theory. It has profound effect on our efforts to improve the theories regarding environment & development, man & development, and peace & development that occurred in the latter part of the 20<sup>th</sup> century.

The theory of sustainable development can be traced to the philosophy essences in ancient times. It was also reflected in the human activities in the past. Based on perceptions of man-nature relations and inter-personal relations, the theory discusses the time-space coupling, rational principles and benefit appraisals of human activities, evolutionary dynamics of man and nature, man's control and nurturing of environment, and inter-personal ethic norms in the hope of reaching supreme unity between man and nature and high-level inter-personal harmony. In the 1960s, the original man-land theory was expanded to identify the essence and movement course of the composite system consisting of nature, society and economy. In a corresponding way, the kernel of development theory also started to cover the man-nature balance and inter-personal harmony. In the middle part of 1980s, *Our Common Future*, in a systematic approach, discussed the inherent unity of these two themes, marking the sustainable development study and practices have come into a brand-new era.

The population pressures, resource shortages, environment intimidation, ecological crisis and other problems faced by the world are challenging human beings in the most rigorous way. Many gloomy predictions of our future are puzzling scientists and politicians. The additional effects produced by this elementary proposition are now seen always everywhere in the modern society. As the population keeps increasing, the scale of production expands, the Internet becomes more accessible, and the ecological environment gets more deteriorated, people are forced to wonder how long the human civilization on the Earth will survive. They have to ask themselves how to seek a healthy route to implement sustainable development strategy in a science-based, wise and non-short-term way so that the future generations will obtain a “cautiously prudent” prospect.

Since established, the world sustainable development theory has been following 4 directions in its effort to reveal its connotations and essence. These four directions of study have been recognized by the world academic community as the economics, sociology, ecology and systematology. Meanwhile, study of sustainable development also involves accelerated changes in natural environment, speedy consumption of natural resources, peaceful development of human society and rational regulation of social behaviors. It aims to perfectly combine egoistic and altruistic concepts, current and future generations, regions and the globe, efficiency and equity, and structures and functions.

The economics direction of sustainable development theory study deems regional development, productivity layout, optimization of economic structure and supply-demand balance of materials and energy, etc as its basic contents. The focal point of this direction is to adopt “how the contribution rate of scientific and technological progress offsets or overcomes the lapse rate of the marginal investment returns” as a major indicator and basic tool to measure sustainable development. Studies in this direction are represented by WB World Development Report and *Economic*



*Sustainable Development* by Brown L. (1996) published in *the Futurists*.

The sociology direction of sustainable development theory study includes social equity, development and distribution as well as balance of interests. One focal point in this direction is to adopt “the reasonable balance between social efficiency and equity” as a major indicator and basic tool to measure sustainable development. Studies in this direction are represented by UNDP’s *Human Development Report* and its Human Development Index (HDI).

The ecology direction of sustainable development theory study contains ecological balance, preservation of nature, sustainable use of resources and harnessing of environment as its fundamental contents. One focal point in this direction is to deem “reasonable balance between environment preservation and economic growth” as the key indicator and basic tool to measure sustainable development. Studies in this direction are represented by research reports and speeches made by UNDP and former Norwegian Prime Minister Ms. Brundtland (1992).

China has exceptional performance in theoretical and empirical studies of sustainable development theories. Based on the above-mentioned three directions, China has developed the 4<sup>th</sup> direction in sustainable development studies, namely, systematology. This direction of studies highlights the idea of composite synergy while exploring the origin and evolutionary laws of sustainable development. It is centered on “logic self-consistency and maximized intersection of degrees of development, coordination and continuation”. In a well-organized way, the studies in this direction explain the time-space coupling of sustainable development system and the inter-constraining and interactive relations. Besides, this direction of studies has also established the uniform definitions and rules of identifying man-nature relations and inter-personal relations. The Research Panel of Sustainable Development Strategies in the Chinese Academy of Social Sciences has issued *Report on China’s Sustainable Development Strategy* for years in a row (1999 to 2006). These reports represent the continuation of academic achievements including *Introduction to Sustainable Development* (Niu, 1994, 2007) and systematology studies of sustainable development in 1996 (Niu and Harris).

At present, the world is having a fever for systematology while probing into the laws of sustainable development. The development ideology of all nations has the all-inclusive feature; the pursuit of development in all stages has multiple layers of targets; and the development scheme of all plans boasts elastic contents. As a result, each sustainable development system will always refers to a mammoth nature-economy-society system in which the population, resources and eco environment are balanced. This complex huge system, in general, will lead to discussions of structures, relations, nonbalance, driving force, potential and field, self organizing, development stream and commonly-seen mechanisms such as relation transformation, generalized symmetric, full modeling, optimal treatment and risk analysis. Among the sustainable development theories and methodologies, there are inherent and extensive overlaps and complex links of multiple factors (including cause-effect links and logic links). The sustainable development studies just start with analyzing and explaining such overlaps and links.

The general systems theory established by Bertalanffy, the control system by Wiener, the synergetics by Haken and theory of dissipative structures by Ilya Prigogine, after decades of



development, have become mature and exceeded the original territory. Nowadays, they are deemed as the starting principles of many disciplines, including the sustainable development which is the overlap of social and natural sciences. When philosophy language replaces routine language, in-depth analysis takes the place of superficial descriptions, the multivariate segregation returns to monistic ontology, and qualitative perception transforms to quantitative recognition, the “theory modernization of sustainable development” has been initiated. As what is frequently mentioned by me, only by transforming “an unexpected outcome” into an “expected one”; and by changing an “accidental event” into an “assured event” can sustainable development gain the “independent personality” as a discipline.

Till today, all theories and methodologies of sustainable development are still not able to properly reflect and fully explain the objects of studies. On one hand, it denotes the complexity of the real world; on the other hand, it pushes all scholars in the field of sustainable development to have introspection and profound understanding of the responsibility of sciences. Studies of sustainable development have kept ruminating and absorbing the material and spiritual contributions made in different stages of human evolution. Nevertheless, today when we are stepping into the information age, there is still an evident gap between the recognition it has gained and its ability to solve problems. Faced with the development challenges, all researchers of sustainable development are not positioned to avoid their duties in finding how to promote and finalize breakthroughs and improvement of sustainable development. Over the past century, progress and prosperity in natural and social sciences have instilled great energy in the interdisciplinary sciences. It has become a trend to have synergies, penetrations and complementariness in different disciplines. A stone from other hills may serve to polish the jade of this one. Ways of thinking and mature theories of other disciplines, when used to solve problems in sustainable problems, will often induce intelligence fissions and generate the sudden enlightenment. To sum up, the sustainable development is accelerated and deepened by the “hauling force” of social needs, “psycho charisma” of disciplinary development, and its own “self development”, which combine to form the strong push of “resonant amplification”.

*The Overview of China's Sustainable Development*, targeted at basic ideas of sustainable development, discusses the 6 major challenges faced by China in the 21<sup>st</sup> century. It reveals the basic laws of the complex “nature-society-economy” system in China and designs the strategic framework of sustainable development consisting of “population, resources, environment and development”. Besides, the book proposes the “five major supporting systems” for China's sustainable development strategy while defining the strategic goal of China's sustainable development and 3 “zero growth” steps in implementing sustainable development strategy. For the first time, it unifies the inherent nature of China's modernization process and targets of sustainable development in China.

In *The Overview of China's Sustainable Development*, the connotations of sustainable development are defined as containing 3 elements: first, the “motive element” propelling sustainable development; to be specific, whether the development goals are realized by adopting advanced productivity approaches and taking the innovative path; second, “quality element” identifying sustainable development; to be specific, whether balance between development and