“Chinese Mode” of Combating Desertification

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Abstract. The “Chinese Mode” of combating desertification adopts a multi-wheel driven mode in the process of combating desertification, follows the principle of “dual track system”, taking into account ecological construction and economic development, and achieving poverty eradication and development of sand industry through sustainable land management, until achieve harmonious and sustainable development of deserts and human. This paper puts forward the theoretical concept of “Chinese Mode” and analyzes its practical experience, and the author hope to play a reference role in the international cooperation on combating desertification in “The Belt and Road” countries and the Pan-African Great Green Wall. It aims to better participate in the cooperation and development of relevant local industries for enterprises and institutions, and promote the construction of “going out” and “The Belt and Road Green Development Alliance” for afforestation and sand-fixing technologies.

1. Introduction

Desertification is one of the world’s major natural hazards which periodically impacts nations and livelihoods around the world. Desertification is not only a hot issue in the field of natural ecology, but also seriously affects the world’s poverty elimination, economic and social stability and sustainable development. China is one of the countries with the most serious desertification in the world. Due to the government’s high priority, a series of desertification control policies, laws and regulations have been formulated and promulgated. The area of desertified land in China has expanded from 10,400 km² per year at the end of the last century to a current annual reduction of 2,424 km². The area of desertified land has expanded from 3,436 km² per year at the end of the last century to a reduction of 1980 km² per year. The historic transformation of green into the sand. The recent satellite data (2000~2017) reveal that China alone accounts for 25% of the global net increase in leaf area with only 6.6% of global vegetated area, and the greening in China is from forests (42%) and croplands (32%) [1]. In the past 6 years, China has proposed the “The Belt and Road” initiative. More than 60 countries in “The Belt and Road” have been affected and threatened by varying degrees of desertification. More than one billion people have suffered from sandstorms for a long time. Human beings have only one earth, and all countries share a world, we are “A community with shared a future for mankind”. It is hoped that the “Chinese Mode” of combating desertification will provide a new perspective and reference for the international cooperation on combating desertification and the green development of the “The Belt and Road”.
2. Material and Methods

2.1 “Chinese Mode” theoretical concept
The “Chinese Mode” of combating desertification (Figure 1) is a multi-wheel drive mode for combating desertification. The policy and regulation system is driven by legally; the management system is administratively driven; the science and technology support is driven by education; and the sand industry system is driven by industry. Four driving factors for combating desertification with Chinese characteristics. China’s “top-down” combating desertification policies and regulations system (Figure 2) and the convention’s “bottom-up” effective combination, there are both legal and legal guarantees, but also independent participation.

2.2 “Chinese Mode” practice
The “Chinese Mode” of combating desertification, in the process of combating desertification, will focus on 4 kinds of “two hands”, ① ecological construction and economic development; ② management desertification and poverty elimination; ③ policies/regulations and technological innovation; and ④ sand control and the sand industry. The “Chinese Mode” has been provided as a reference for global desertification control, and the enthusiasm of combating desertification and development of ecological industries by farmers and herdsmen in the desert areas has been fully mobilized. Only in this way could the international cooperation on combating desertification in “The Belt and Road” will be sustainable. For example, in the national combating desertification cooperation in “The Belt and Road”, some new technologies will be popularized and marketing, by which improving rural credit services, the pressure on farmers’ funds can be alleviated. Furthermore, by promoting the application of new technologies, production efficiency and labor time could be improved, especially, increase income, change and influence farmers’ land use behavior.

Figure 1. “Chinese Mode” of desertification combating
At the same time, it is worth mentioning that China’s combating desertification follows two standards and systems- “dual track system”, which mainly includes 4 aspects: ① international conventions and Chinese laws and regulations; ② international action plans and China policies; ③ foreign management ideas and Chinese governance experience; and ④ foreign community modes and China’s key ecological projects. China actively implements the UN Convention to Combat Desertification, and according to the status quo of desertification and the needs of monitoring in China, the laws, regulations and policies guidance on combating desertification in line with China’s national conditions were formulated and promulgated. Therefore, the framework and corresponding standards and indicators of desertification monitoring and evaluation indicators in China were proposed [2]. There are currently 14 national and industrial standards for desertification combating in China (Table 1). Countries along “The Belt and Road” should establish desertification standards that
are in line with their national conditions and development. China’s “dual track system” experience could be applied to international cooperation in “The Belt and Road” desertification combating [3].

Table 1. National standards and industry standards for desertification combating in China.

| Standard name                                                                 | Standard property | Standard category |
|------------------------------------------------------------------------------|-------------------|-------------------|
| Grading indicators of natural grassland degradation, desertification and salinization | National          | Method            |
| Technical regulations for closing hills                                      | National          | Method            |
| Land desertification monitoring method                                       | National          | Method            |
| Sandstorm weather monitoring specifications                                 | National          | Method            |
| Sandstorm weather rating                                                     | National          | Basic             |
| Technical specifications for desertification combating                       | National          | Method            |
| Technical regulations for monitoring desertified land                        | National          | Method            |
| Technical requirements for aircraft seeding and sand fixing                  | Industry          | Method            |
| Technical regulations for oasis shelter forest system construction           | Industry          | Method            |
| Monitoring and evaluation indicators of social and economic benefits of the Beijing-Tianjin wind and sand source control project | Industry          | Method            |
| Desert ecosystem positioning observation index system                        | Industry          | Method            |
| Technical specifications for desert ecosystem positioning observation        | Industry          | Method            |
| Construction specifications of desert ecosystem observation and research station | Industry          | Method            |
| Industry standard desert ecosystem service evaluation specification          | Industry          | Method            |
3. Results and Discussion

There are no specific regulations and modes for international cooperation on combating desertification. The “Chinese Mode” provides a new perspective and reference. At present, there are 4 main “Chinese Mode” (Table 2) that make ecological and economic sustainable development. Compared with the desertification control technologies and methods in developed countries such as Europe, the United States, and Australia, it is not applicable to most countries in “The Belt and Road” of developing countries. The “Chinese Mode” might give countries a reference. Therefore, “Chinese Mode” could be an effective practice in policy communication and policy landing in international cooperation [4].
Table 2. Four “Chinese Mode” of desertification combating.

| Modes         | Characteristics                                                                 | Promotion areas                        |
|---------------|---------------------------------------------------------------------------------|----------------------------------------|
| Kubuqi mode   | “Four-wheel drive” of government policy support, enterprise industrialization investment, market participation of farmers and herdsmen, and technology continuous innovation | Desert area with sparse population     |
| Yulin mode    | Establish a sand-proof system combining “belt, piece and net” to vigorously develop returning farmland to forests and comprehensive agricultural development | Semi-arid area                         |
| Alxa mode     | Vigorously develop the sand grass industry and cultivate the development mode of “enterprise + base + farmers and herdsmen” | Desert steppe area                     |
| Hotan mode    | Shelter forests that improve farmland microclimates and ensure high yields and stable yields of crops (narrow forest belts, small grids) | Oasis farmland shelterbelt             |

The “Chinese Mode” inspire and replicate the various countries facing the threat of desertification, but it should be adjusted to suit local conditions and take into account differences in political, economic, social and cultural differences. The Pan-African Great Green Wall (PAGGW) initiative was officially launched in 2005, but most countries are building very slowly. The Pan-African Green Great Wall Initiative is not only a simple afforestation activity, and its purpose is not only to combat desertification, but also to be a comprehensive development project that needs to improve people’s livelihood and build capacity[5]. The “Chinese Mode” of combating desertification and PAGGW initiative both advocate the combination of sand-fixing and poverty alleviation, vigorously develop ecological industries suitable for desert areas, increase the income of farmers and herdsmen, and fully mobilize the prevention and development of desertification in the desert areas. The enthusiasm of the eco-industry, improve the living standards of rural communities, and influence and change the land use behavior of farmers by promoting the application of new technologies [6, 7]. The author believes that the “Chinese Mode” of combating desertification represents a solution and a mode that could be adapted to countries in the Pan-Sahel region.

4. Conclusion
The problem of desertification is neither a simple ecological environment problem nor a simple economic development problem, but a comprehensive problem that can be solved by the intersection of many disciplines of natural science, humanities and social sciences. The “Chinese Mode” of combating desertification not only brings new ideas to the economic development of desertification areas, but also better coordinates the multi-party relationship of “related stakeholders”, which is worthy of reference and promotion in the global combating desertification.

Acknowledgements
This research was funded by the West Light Foundation of The Chinese Academy of Sciences (2017-XBQNXZ-B-017) and China-proposed”The Belt and Road”Special Project of Chinese Academy of Sciences (131965KYSB20170038).
References

[1] Chi Chen, Taejin Park, Xuhui Wang, et al. 2019 China and India lead in greening of the world through land-use management. *Nature sustainability* 2:122-129.

[2] Xianghui Cui and Qi Lu 2012 Development status and prospect of standardized desertification combating in China. *Arid zone research* 29(5):913-919.

[3] The law of the People’s Republic of China on Prevention and Control of Desertification. http://www.npc.gov.cn/npc/xinwen/2018-11/05/content_2065660.htm.

[4] Jia Hu 2011 Research on local government collaboration in environmental governance across administrative regions. In: Chinese People's Publishing House. Beijing.

[5] Millennium Ecosystem Assessment 2005 Ecosystems and Human Well-being: Desertification Synthesis. World Resources Institute, Washington DC.

[6] Liu, J 2010 China’s road to sustainability. *Sci.* 328:50.

[7] Nick Middleton 2009 Deserts: a very short introduction. Oxford University Press, 1St Ed.