
PRISONERS' DILEMMA IN SUSTAINABLE DEVELOPMENT

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Abstract

Along with the rise of industrial civilization and the information revolution, the conflict between human beings and nature continues to appear. For example, modern mechanized tools speed up the cultivation of crops and encourage farmers to reclaim more land, while the over-exploitation of nature will cause less food production. Therefore, it is imperative to devise a sustainable development view which promotes the harmony of human and nature. In this paper, the definition and evolution history of sustainable development are first introduced followed by the discussion about the in-depth relation between sustainable development and economics, sociology and politics. Besides, the current prisoners' dilemma in protecting ecotope and boosting the economy faced by the whole world is discussed detailedly. Finally, the paper concludes the basic element of sustainable development and discusses some underlying further problem in sustainable development studies.

Keywords Sustainable development · Prisoners' dilemma · Ecotope

1 Introduction

It has been widely accepted that population explosion, environment pollution, food shortage, energy poverty and resources damage are the main five challenges people face[12]. The interplay of these factors deeply affects the develop orientation of social economy. The everlasting pursuit of economic growth has become the consensus of most countries and areas since the first industrial revolution. Kind of this consensus comes not only from the people's burgeoning internal material demand, but the also comes from the external national strength competition. Nonetheless, when the economic growth meets the limits of natural resource, the scramble to finite resource is inevitable. In order to maintain the predominance in the competition, further develop resources to boost the economy will be the only choice for each country.

To tackle this dilemma, *Sustainable Development* was firstly proposed by Brundtland in 1987[2]. In her United Nations' report *Our Common Future*, *Sustainable Development* was formally defined as an

organizing principle for meeting human development goals while simultaneously sustaining the ability of natural systems to provide the natural resources and ecosystem services upon which the economy and society depend[2]. In May 1992, *Earth Charter* was passed as an international declaration. In this declaration, some fundamental values and principles were formulated on which the basis of modern sustainable development[4].

1. *Our Common Future*

Three principles (*Fairness*, *Sustainability*, *Intercommunity*) of *Sustainable Development* were stated briefly in Brundtland's report *Our Common Future*. Such principles did not exaggerate the urgency of environment protection unilaterally, instead, the coordinated development of economy, environment and other influence factors (i.e., society, culture) is emphasized. *Fairness* means the equilibrium resource allocation and utilization between generations ought to be considered. *Sustainability* involves the combination of the short-term interests and long-term interests. And the core idea of *Sustainability* is balancing the economic growth and natural carrying capacity. Last but not least, *Intercommunity* points out the sustainable development is not just one or two countries' goal, but the destination that all human beings pursue.

2. *Earth Charter*

Based on the report of Brundtland, *Earth Charter* elaborates sustainable development as building a just, sustainable, and peaceful global society in the 21st century[4]. It underlines four key point in sustainable development:

- Intergenerational equity and generational equity
- Harmonization between economy and nature
- Quality of economic growth
- Promoting the living standards of contemporary people while keeping the forward-looking vision

Our Common Future and *Earth Charter* have put forward a people-oriented economic development view. Nonetheless, when sustainable development meets financial crisis, most countries fall into a prisoners' dilemma. On the one hand, the economic depression forces the government to stimulate the economy or the leader will be displaced by the voter for high unemployment rate. On the other hand, the exciting economy will consume excessive natural resource. In this situation, all countries that originally agreed to implement sustainable development need to struggle to stimulate the economy or comply with the agreement. At the same time, they also need to worry about whether other countries violate the principle of sustainable development. This is what we call the *Prisoners' Dilemma*[9].

The role played by China and the United States in this dilemma has attracted extraordinary concerns. After all, they are the largest developing country and the largest developed country. Since the new Chinese leaders came into power in 2013, environmental issues have become one of China's basic policies. The constant emergency of extreme weather has led the leadership to realize that GDP is no longer

the paramount development target. While for the United States, the dramatic rise of Trump in 2016 herald the anti-globalization move in America[7]. Pulling out of the Paris agreement and preaching that climate change is scam, what Trump have done indicate that he would be the traitor in the previous prisoners' dilemma.

Sustainable Development is derived from the appeal of some forerunners, however, there is a huge gap between reality and ideal. A consistent national policy is a necessary condition for sustainable development success, nonetheless, the myopic political election makes it is impossible to enact definite laws to constrain the consumption of natural resource in economic development.

Considering the current imbalance in international power, the implement of sustainable development depends entirely on the United States, China and other major countries. The supremacy of the United States makes it too cheap to violate international consensus. Kind of this imbalance make it is unpractical for the international community to reach a consensus with legal force because other countries have no ability to sanction the United States that break the rules. To tackle this issue, the economic influence of emerging nations, the military influence of Russian and the cultural influence of European ought to be combined. Only in this way can the world achieve consensus in on sustainable development.

2 Related Work

The history of *Sustainable development* or similar concepts is of long standing. In ancient China, Mencius a greater scholar, points out "Without violating the laws of the growth of crops, food can never be run out. The dense net does not go down to the pond, and aquatic products such as fish will never be run out. When the trees are cut down in the mountains according to the season, the wood will never be used up"[10]. While in western society, sustainable forest management was proposed to deal with the burgeoning timber consumption demand during 17th and 18th centuries[8]. Most of these ancestors' ideas about sustainable development are based on resource consumption. The systematic concept of sustainable development was not proposed until 1960s.

The subtle relationship between economic growth and environmental deterioration caught people's attention after Rachel Carson publishing his book [3]. The limited source in the development of society was pointed out in Kenneth's famous essay *The Economics of Coming Spaceship Earth*[1]. While the word *Sustainable* was used by the Club of Rome in the classic report *Limits to Growth*[6] for the first time in 1972. Soon after, in 1973, *Sustainable Development* was firstly proposed by an MIT Group in a hearing which was held on "Growth and Its Implication for the Future". After several years of development, World Commission on Environment and Development (WCED) has adopted sustainable development in its official documents in 1978. Nine years later, WCED released the report *Our Common Future* which played a drastic influence in the subsequent economic development and cultural transmission. And in this report, the most widely accepted definition of sustainable development was proposed. In 1992, the largest international conference in human history was held in Rio de Janeiro. *Earth Charter* and *The action plan Agenda 21* were published in this conference which means that sustainable moves from theoretical discussion to practical action.

3 Prisoners' dilemma in Sustainable development

The early negotiations of sustainable development had the wind at its back. The positive attitudes of various countries may come from the prosperous economy in the 1980s and 1990s. As indicated by *Maslow's hierarchy of needs*, when people's basic material needs are met, the high-level goals are what people pursuing[5]. However, when the whole world marches into for the 21st century, the recession of economy and the rise of developing countries broke the long-standing superiority in the developed countries.

Specifically, *Kyoto Protocol* was adopted in Kyoto, Japan, on 11 December 1997. The goal of Kyoto Protocol (the rise of temperature will be limited to 0.02 °C to 0.28 °C by 2050) is too distant to obtain[11]. After the early frenzy, those countries that have signed up are divided into three categories - developing countries, European developed countries and other developed countries. Developing countries are outside of the framework of kyoto protocol which makes these countries are willing to signed this treaty. While for developed countries, especially those countries that rely heavily on fossil energy, such as Canada, America and Australia, such an agreement is undoubtedly very unfavorable. The entirely different attitudes of these countries are doomed to the failure of kyoto protocol. As of 2012, Russian, Japan, America and Canada all quit the treaty. Nonetheless, the bankruptcy of the above treaty is not a manifestation of the prisoner's dilemma for the simple reason that the treaty itself is unbalanced. The subsequent *Copenhagen Accord* and *Paris Agreement* have considered the inconsistent development level of various countries and each country was assigned corresponding carbon emission task. Constraints in international credibility, the need for economic growth and the consumption of natural resource have contributed to the prisoners' dilemma in various countries.

4 Discussion

The core idea of *Sustainable Development* is making a balance between economic growth and natural resource consumption. And it is exactly this unachievable balance and corresponding costs that contribute to the failure of various treaties and the prisoners' dilemma. However, the constant natural energy consumption and limited natural resource are ultimately what we have to face. In prisoners' dilemma, many solutions were proposed and most of them could be summarized into two categories: extrinsic method and intrinsic method. Corresponding to *Sustainable Development*, extrinsic method means it is necessary to make all countries realize the external punishment (various awful natural disaster) is far greater than benefit of breaking treaty. While the intrinsic method encourages all countries living on earth to reach a treaty with legal force.

The two method mentioned above are constantly applied in the international community. Apparently, due to the myopia and imbalance power in various countries, the progress in *Sustainable Development* is not optimistic. Besides, the ever-increasing black swan events in international politics have aggravated this uncertainty. For the time being, only more and more serious natural disasters and the rise of emerging state power can bring *Sustainable Development* back on track.

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