

The Exploration of Paradox and Chance of International Cooperation under Global Environmental Governance

Chia-Hsun Chang

Abstract—The Industrial Revolution has unveiled the development of global capitalism. States, corporations and individuals are accumulating capital for desire. While consuming resource on earth, it is confirmed by IPCC in the 4th evaluation report that human activities are the main reason for global warming. In the past decades, global warming has become the main important issue in international society. It reflects that the globe is undertaking a revolution, which takes low-carbon development as the core under the challenge climate risk and the security of resource. The states are confronting the decision paradox of the state's individual interest and the global public interest. Despite the fact that the state plays the main role in international anarchy society, it is obstructed by the lack of supra-nation organization to force the states to obey international regime. Therefore, it is difficult to solve the problem of collective action problem, free rider problem and dilemma of common aversions...etc. Those things will influence the result of environmental regime. The state or non-state actor reaches good outcome with systematic collaboration or cooperation. However, the governance trend of international systematic collaboration has usually ignored or weakened the aspect of power. During the process of global environmental governance, power may represent in multiple or sequent operational ways, or jump out of the role, which take nation as the main and traditional role to exercise power. Because the regime has compulsory problem, deviation, privilege of regime and unfair confined actions, studying multiple aspects of power operation during governance could help us understand the paradox of international cooperation in order to explore the chance of international cooperation.

Keywords—climate change; global environmental governance; international regime ; power

I. INTRODUCTION

The population has rapidly grown from 500 million to 7 billion people since the industrial revolution. With the advance of technology, human beings produce enormous amounts of greenhouse gas like carbon dioxide, methane as a byproduct of development. Scientific evidence has shown that the main reason for the problems related to climate change, like the melting of glaciers, the rise of temperatures, El Nino, greenhouse effect and the food crisis, is human activities. Island

countries which have carbon emission that are relatively low, such as Tuvalu and the Republic of Kiribati, are facing a crisis survival due to current sea level rise. Since 1980, the average temperature around the globe has dramatically increased. The life cycle of carbon dioxide which is produced by human is about 50 to 250 years since 1970. Even if we stop every human activity, global warming will still last for a period of time. Taking action against climate change is of the greatest urgency in dealing with global warming trend. Therefore, an international institution on climate should be established in order to alleviate the crisis of global warming. The United Nations Framework Conference on Climate Change (UNFCCC) which is entered into force in 1994 has as its aim calling nations to reduce the emission of greenhouse gas in response to the climate change problem. Except the Kyoto Protocol, which is formal and legally binding, and explicitly regulates the index of emission of carbon dioxide of the main industrial nations, other conferences of the parties can merely regulate on the basis of agreement. In December 2012, the Cancun Conference passed the Green Climate Fund plan, though the source of capital was unknown. In the November 2012 of "Doha Agreement", there was a minor advance regarding the larger question of whether the carbon emission reduction called for by the Kyoto Protocol will succeed, and whether COP can reach a consensus on the issues of carbon emission reduction. Nevertheless, the Umbrella Group has exempted from the requirements of the agreement. Above all, when states are facing a global warming crisis which has urgent implications for human survival, why is global collective action so difficult to achieve? What kind of dilemma does global climate security governance confront when a state's individual interest is contradicted by the international regime's collective interest?

To answer and clarify these research questions, the article first explores climate change and analyzes the status quo of carbon emission around the world. Under the global governance research approach, the article discusses governance paradoxes during the formation of

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climate change regime: free riding, representative, accountability, transparency and participation. Under the function of strategy choice of state actor and international organization and non-governance organization, power can be view as a unit and form a new governance concept. These two concepts do not contrary to each other. The conclusion can examine the function of power into two concepts. One is the social relationship (the interaction of actor or the relationship of social regime). The other is the classification of social relationship (direct or diffuse), which is formed by four types of power. This concept applies to the approach of global governance. The article examines the chance of state cooperation from the case of global climate change conference.

II. THE PROCESS ON CLIMATE CHANGE REGIME FORMATION

Climate change has been viewed as an important environmental problem on global diplomatic stage. In the past two decades, the consistency of carbon dioxide has increased. The impact of climate change has become an international consensus. In terms of range, climate change regime is global and most members in international society are included. The legislative system in every state commonly focuses on the climate change. The highest leadership level (president and prime minister) has highly consensus and participation [1]. Therefore, it is important between state and non-state actor. The formation of horizontal governance structure indicates the concept of “the governance with government”, which reduces bureaucracy system and reach the goal of governance.

United Nations Framework Convention on Climate Change (UNFCCC) also suggest that stability the consistency of carbon dioxide is important, which can prevent climate system from human interfere. In order to understand the problem of climate change, the following paragraph will discuss the formation and status quo of UNFCCC, list the present amount of carbon emission around the world and recognize the real threat for human at the present from the global warming report from the Intergovernmental Panel on Climate Change (IPCC).

A. Intergovernmental Panel on Climate Change (IPCC)

Global warming and climate change are interchangeable terms. As a matter of fact, these two terms have some important distinctions. Global warming is the phenomena that can be easily observed from the annual average temperature over the past two centuries and the predicting temperature in the future; while climate change includes different aspects like precipitation, stability of climate and the frequency of extreme event. To prevent the aggravation of climate change, United Nations (UN) establishes Intergovernmental Panel on Climate Change (IPCC), which is formed by World Meteorological Organization (WMO) and United Nations Environment

Program (UNEP). It presents a climate change assessment report (AR) in average of 6 years. Until 2007, it has totally presented 4 global warming assessment Reports “table 1”.

TABLE I. THE GLOBAL WARMING REPORTS FROM IPCC.

	Main content and Influence	
1st	Climate Change	Ensuring the science basis of climate change, which is beneficial to the formation of UNFCCC. The convention is legally binding on March 1994.
2nd	Climate Change 1995 (AR2)	Submitting to 2nd Conference of the parties (COP2) and contributing to the negotiation of Kyoto Protocol.
3rd	Climate Change 2001 (AR3)	Including 3 working groups relevant to science basis, influence, adaptability and vulnerability, mitigation reports, and focusing on the integrated reports of science and technique. The report indicates that “human activities may cause Global warming.”
4th	Climate Change 2007 (AR4)	<p>*1st Working Group (WG1): physical report. The average temperature of first 50 years is warmer than 0.13 °C ; after the following 20 years, the temperature will increase in the speed of 0.2°C per decade. Until 2100, the global temperature will increase from 1.1 to 6.4°C, and the sea level will rise 18 to 59 cm.</p> <p>*2nd Working Group (WG2): aiming at providing evidence that many nature systems are influenced by regional climate change, examining from influence, adaptability and vulnerability. Greenhouse effect will lead to the distinction of 1/3 of species. The phenomena, such as famine and water shortage, will be more common.</p> <p>*3rd Working Group (WG3): a proposal about mitigating climate change and the limitation of the atmosphere concentrations of greenhouse gas in 445-650 ppm. Proposing inter-section cooperation, reciprocity and transaction. Government should reduce carbon emission before 2015.</p>

IPCC Assessment Report 1990、1995、2001、2007

B. Process of global climate change regime formation

During the period time of AR4, countries around the world were having negotiations. The UN establishes the institution of climate change, United Nations Framework Convention on Climate Change (UNFCCC), which was drafted in 1992 and enter into force in 1994. The aim is to call for the stability of greenhouse gas emission. Until 2014, there are 194 members has accepted the convention’s regulation. UNFCCC has separated the members into 3 categories. Members in Annex I should reduce the amounts of greenhouse gas emission to the standard in 1990. The developed countries in Annex II should provide capital for the total cost brought by the obligation that the developing countries handling for global warming, and for the fund needed in technology transformation. Non-Annex I countries have no other promise regarding to the reducing amount of greenhouse emission, except providing statistic numbers of their country.

UNFCCC based on the convention of Article 7 has periodically convened Conferences of the Parties to evaluate the plans for handling climate change since 1995. That UNFCCC has been through 16 conferences since the 1st conference in 1995. During the period of time, none of the countries in Annex I could reach the presuming goal of the reducing amount of carbon emission. COP3 has passed the Kyoto Protocol, which is legally binding in 2005 since the first negotiation in 1997. It explicitly regulates the goal of greenhouse gas emission for the EU and 37 industrial countries. During the period of promise, 2008-2012, Annex I countries should reduce 6 kinds of greenhouse gas emission at least 5% on the standard 1990. COP15 proposes that global temperature should keep in 2 degree Celsius range and requests that Annex I countries should propose their goal for reducing the amounts of greenhouse gas emission before January 2010. Their mitigation and finance should be monitored, reported and investigated. Non-Annex I countries should also proposed domestic mitigation plans and accept the international measurement of National Appropriate Mitigation Actions (NAMAs), report and investigation. Copenhagen Accord has also proposed to establish Green Climate Fund providing 300 billion dollars as additional assistant from 2010-2012, and provide 1000 US dollars for finance in 2020[2]. In general, the effect of Copenhagen Accord is only for politic declaration.

The 2010 Cancun Accord (COP16) is the extension of Copenhagen Accord in 2009, providing private sectors a platform for performing the previous efforts for climate mitigation, especially in trade, investment and technology development. COP 16 held in Mexico Cancun is to compensate the insufficiency of Copenhagen Accord, declaring the members should carry out the promise. The accord made a resolution to establish Green Climate Fund to manage the capital of developed countries for assisting countries which suffer the most from climate change. Cancun Accord focuses on capitals, which will provide 1000 billion US dollars for handling climate change problems per decade. Part of the capitals will be used for providing low-interest loan and microcredit. However, the developed countries refuse to promise a concrete numbers, unless the developing countries explicitly explain how to use the money [3]. In addition, Cancun Accord (COP 16) merely calls on a vision for long-term cooperation with morals. Despite few of the Umbrella Group withdraw the promise (Japan, Russia, New Zealand, Canada and so on). COP 18 has made the decision to postpone the second promise period to 2020.

III. THE PRESENT SITUATION OF GLOBAL CARBON EMISSION

The book, *Six Degrees*, written by Lynas, predicts that if the average temperature on earth rises 1 degree Celsius, the agriculture zone will undergo desertification and the coastal area close to sea level will be flooded; when rising 2 degrees Celsius, one-third of all species will be threatened to

death; if it is rising 6 degrees Celsius, human beings will need to be concerned about their own. At present, the average temperature on earth has risen 0.8 degree Celsius. Therefore, human beings should take action on mitigation measures to keep the temperature rise within the key 2 degrees Celsius range. From 2009 to 2014, the top 10 carbon-emitting countries (Fig.1) accounted for 61% of the total carbon dioxide (CO₂). China and the US accounted for 43%. Six of the ten countries are members of the Organization of Economy Cooperation and Development (OECD)¹. The developed countries accounted for the bulk of global carbon emissions. Under the condition of rapid economy growth, the emission of carbon dioxide around the world is expected to increase an average of 1.7% from 2007 to 2035. For OECD countries, under the condition of rapid economic growth, the average increase is 0.5% per year; for non-OECD countries, the average increase is expected to be 2.4% per year. Under the condition of low economic growth, from 2007 to 2035 the amount of carbon dioxide emission around the world will increase an average of 0.1% per year, with OECD countries accounted for -0.1% and non-OECD countries accounted for +1.6%[4].

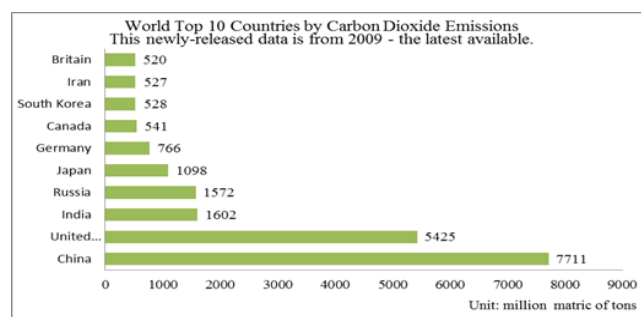


Figure 1. Top 10 Carbon Dioxide Emitting Countries . (Raw Data collected from CO2 NOW.org website)

If we try to understand the present situation of carbon emission of members under the structure of UNFCCC, Annex I accounts for more than half of total carbon emission in 2009. From “Fig.2”, the total amounts of the world’s carbon emission from the top 10 countries of Annex I account for 45%. The US, EU and Japan are the most. Judging from the statistics, it will be a big challenge for developed countries to reduce their carbon emission back to the standard in 1990 with mitigation measures that is still not enough. In addition, from “Fig.3”, the top 10 countries of non-Annex I account for 40%. China and India account for 30% of the world total carbon emission. It is clear that coal is main energy of carbon emission that increases the most. In short, the outcome for state to pursue of development represents the trend of the increasing amount of carbon dioxide, which reflects the important function of non-OECD’s energy structure. Until 2035, China and India will account for 37% of the world total carbon emission. And China accounts for 31%[5].

¹ The US, Japan, Germany, Canada, Southern Korea and the UK.

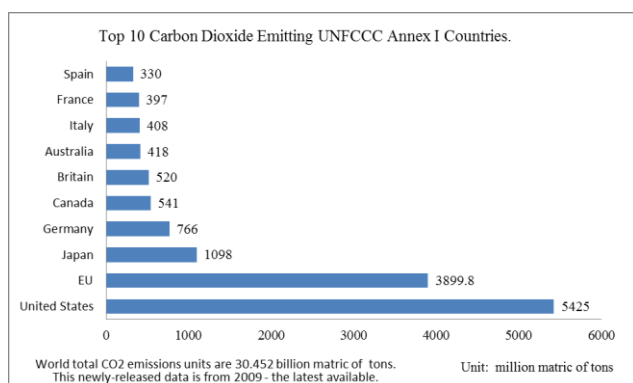


Figure 2. Top 10 Carbon Dioxide Emitting Annex I Countries. (Raw Data collected from CO2 NOW.org website)

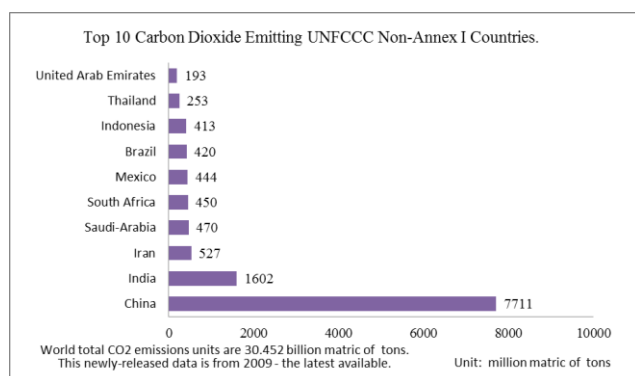


Figure 3. Top 10 Carbon Dioxide Emitting UNFCCC Non-Annex I Countries. (Raw Data collected from CO2 NOW.org website)

IV. PARADOX OF INTERNATIONAL COOPERATION UNDER GLOBAL ENVIRONMENTAL GOVERNANCE

Climate change belongs to transnational issue. When the state takes self-interest as priority, the governance of climate change will face extreme challenge and governance crisis. The process of climate change formation is existing dilemmas. The following discourse discusses the dilemmas of state cooperation under climate change regime, such as free rider, representative, participation, accountability and transparency.

A. Free rider

Climate change is global problem. Global public problem is global public bads. Greenhouse gas contains the properties with globe and public bads, which is the obstacle for human to have or enjoy public goods (like carbon emission of a state) and the consequence is untaken by the whole. If every state takes self-interest as its priority, it is likely to have the condition of free rider. That is, the reduction of carbon emission from other states can obtain more interest for the self. In specific situation, the public

goods become typical prisoner's dilemma. In order to obtain the interest of non-exclusive goods, sub-optimal provision originates from the incentive for individual to be a free rider [6]. We draw the prisoner's dilemma as " Fig.4 ". Compared with A2B2, two actors prefer the result of A1B1, but the result is not reliable and not able to obtain individually. In order to achieve Pareto-optimal result, two actors need to avoid dominant strategy. When independent decision making causes Pareto-deficient equilibrium, all the actors prefer the other equilibrium, which will result in dilemma of common interests due to the pursuit of common interest. Therefore, the result mutual cooperation is not equilibrium. Two actors can immediately acquire a better result by cheating.

When the actors' common expectation is not Pareto-optimal result, dilemma of common interest will come up. In order to resolve the dilemma and ensure Pareto-optimal result, two actors must cooperate with each other, and solve the regime of dilemmas of common interests with strict behavior pattern to ensure no one is cheating. When the individual does not have advantages on having more contributions, everyone will decide to be a free rider in the equilibrium world. The result is worse than the world that public goods are equal contribution. To break the dilemma, the convention of mutual cooperation with international regime is needed.

		Player B	
		B1	B2★
Player A	A1	(3, 3) (A1, B1)	(1, 4) (A1, B2)
	A2★	(4, 1) (A2, B1)	(2, 2)★★ (A2, B2)

★ Actor's dominant strategy
★★ Equilibrium Point

Figure 4. Prisoners' dilemma

B. Representative and Participation

The global environmental degradation has no boundaries. The trait emerges in many international areas without regimes and methods to control sovereign states' actions. Therefore, international cooperation to gain the effect of internalization is needed. The alliance groups related to UNFCCC have emerged, mainly including Organization for Economic Co-operation and Development (OECD), a handy way of describing Japan, the US, Switzerland, Canada, Australia, Norway and New Zealand, the negotiating bloc for the non-EU developed countries. If

we add Russia, we can call them the Umbrella Group (JUSSCANNZ), European Union, Group of 77², China, the Alliance of Small Island States (AOSIS), Organization of Petroleum Exporting Countries (OEPC) and Central American Group. From “Fig.5”, that OECD nations and JUSSCANNZ³ accounted for the most in the total amount of carbon emission in these 7 national groups, and AOSIS accounts for the least. Therefore, in terms of climate change, OECD has nothing to do but gradually reduce the carbon emission of industry. Therefore, in terms of climate change, OECD has nothing to do but gradually reduce the carbon emission of industry.

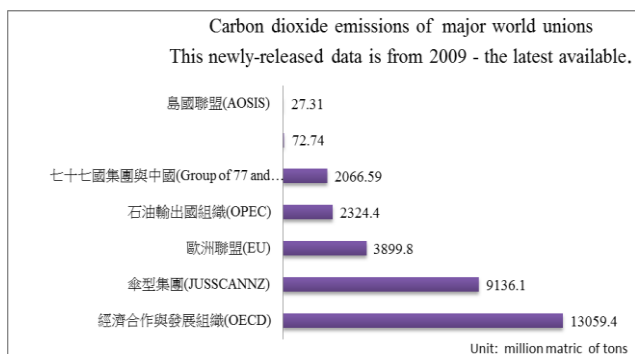


Figure 5. Carbon dioxide emissions of major world unions (Raw Data collected from CO2 NOW.org website)

During the negotiation of climate change regime, the hegemony of China and the U.S dominates the agenda of negotiation to ensure its biggest interests, which leads the negotiation to G2 framework. AOSIS and Least Developed Countries (LDC), which suffer the most from global warming crisis, fall to be a sacrifice under the framework of great countries, which makes people to question about the representative of UNFCCC. There are 194 members participate in UNFCCC, a N-person dilemma, which causes the negotiation either hardly to have common ground or form dilemma of common aversions. Therefore, the coordination of climate change regime is needed to enhance the effectiveness of global climate governance.

1) Dilemma of N-person games

Under the premise that nations will cooperate with each other in anarchy, take N-person games as an example, Kenneth A. Oye explains, when the agents increase, the dilemma of trade cost, information cost, the possibility of

² Group of 77: A group designed to promote its members' collective economic interests and create an enhanced joint negotiating capacity in the United Nations, funded in 1964.

³ Formed by non-EU industrial states. They members usually gather together to discuss issues for common consensus. Members include Australia, Canada, Iceland, Japan, New Zealand, Norway, Russia and the U.S. The organization was formed during COP4, which supports to reach the goal of reduction of greenhouse gas by transaction.

betray and problem control will increase as well. The nations can reduce the number of agents for cooperation. In the condition of the cooperation dilemma brought by N-person game, establishing international institution can reduce the possibility of non-cooperation[7].

If we want to decrease the negotiation representatives for increasing the possibility of cooperation between nations, we can elect negotiation representative from 194 members. However, if we reduce the representative from 194 to 7 under the 7 interest alliance groups mentioning before, the dilemma to reach a common ground still exists. From chart 6, we can observe that the OECD and JUSSCANNZ accounts for the most of the total amounts of carbon emission from 7 national groups, and The Alliance of Small Island States (AOSIS) account for the least⁴. The external contradiction of 7 interest alliances from different interest is the domestic adjustment cost brought by industry change if the alliances emitting the most choose to cooperate in mitigation. Furthermore, each alliance has different internal contradictions under the degree of economic development.

2) Dilemma of common aversions

The members' position on the negotiation of climate convention is so different that clashes with each other. Southern states put emphasis on national development than carbon emission. Northern states do not emphasize historical responsibility but grandfather law, which require the newly emerging developing countries to set standards for reducing carbon emission. Take the U.S as an example. If China does not accept international supervision and insist on self-audit, the U.S are either not willingly to keep promise for reducing carbon emission or providing climate funds. In precondition that everyone is afraid of global warming, this negotiation position for “neither you nor me” is the game for dilemma of common aversions and common indifference. We can observe from “Fig.6” that there are two equilibriums for dilemma of common aversions and common indifference: A1B1 and A2B2. If the actors have contingent Strategies and act simultaneously, they cannot be certain that they will arrive at one of these outcomes if they act independently and simultaneously [8]. Without coordination, they may well end up with one of the outcomes that they neither wants due to divergent interests and not care about the emergence of two equilibriums. The specific outcome for common aversions is easy to deal with. To deal with dilemma of common aversions, the common interest for both sides lies in regime and not acting independently, which aims to acquire a convergence of their expectations and makes coordination possible as well as resolve the dilemma of independent decision making.

⁴ The formation of non-EU industrial countries usually gather together to seek for common consensus. Members include Australia, Canada, Iceland, Japan, New Zealand, Norway, Russia, and the US, which agree with trade action for reducing greenhouse gas emissions. The organization was form in COP4.

		Southern states	
		B1	B2
Northern states	A1	(1, 1)★★ (A1, B1)	(0, 0) (A1, B2)
	A2	(0, 0) (A2, B1)	(1, 1)★★ (A2, B2)

1: Preferable
2: Least preferable
★★Equilibrium Point

Figure 6. Dilemma of common aversions and common indifference

Environmental NGOs advocate to against global warming with multiple ways in order to conduct the duty of anti-global warming and accomplish the mission of organizations as the environment citizen. The World Wide Views on Global Warming was held in September, 2009. Through global media strategy and the discussion and participation of global warming issue, more than 40 states, 4000 citizens had expectations on neo climate convention correspond to justice and influenced the decision-making of global environment [9]. World Wild Foundation advocates state leaders have fair, justified and legally binding global climate convention and emphasizes that developed countries and developing countries should take action together in order to deal with climate change. It submits the proposal to the secretariat of UNFCCC.

In 2008, COP 14 had advance in Reducing emissions from deforestation and forest degradation (REDD), including consenting to hold seminar related to issues like estimation and monitor of the carbon emission from deforestation and degradation of forest, national and local monitor and report system, the methodology of forest resource on the ground and remote measure and finance incentives. It agreed to take aboriginal opinions as reference and provide opportunity for full and effective participation. However, many aboriginal communities complaint that their rights were not be guaranteed.

During the convention on Copenhagen, countries or groups without qualification are lack of opportunities to express themselves, which is against to UNFCCC Article 4.1 that encourage the widest participation in this process, including that of non-governmental organizations. Global climate governance should combine public sector with private sector and the third sector, which will form as The Governance Triangle, proposed by Kenneth W. Abbott and Bertrand Schneider[10]. It will become an interactive climate governance network. Private sector (market and Multi-National Corporations) and the third sector (civil society and NGOs) should present their opinions to the public sector

through normal negotiation. The equations are an exception to the prescribed specifications of this template. You will need to determine whether or not your equation should be typed using either the Times New Roman or the Symbol font (please no other font). To create multileveled equations, it may be necessary to treat the equation as a graphic and insert it into the text after your paper is styled.

C. Accountability and Transparency

Accountability and transparency are like two sides of a coin, which is necessary for good governance. Accountability responds to the obligation and expectation requested by the regime. Mulgan defined accountability as “being effected by privilege and interest.” responsibility refers that power has space to display and is only willing to take responsibility for the self. Accountability refers to ask those who have the power to explain their behavior [11]. Accountability can be explained by laws and administrative procedures. Define explicit responsibility and obligation; cooperate with mechanism of punishment and amendment. Conference of the parties (COP) have consensus on preventing climate change and take actions to reduce emissions of greenhouse gases, which is in accordance with the basic rules of UNFCCC Article3: differentiated responsibilities⁵ and the principle of fairness⁶.

The core problem for Copenhagen convention lies in having common ground on common but differentiated responsibilities. Compared with the U.S and Umbrella Group, European countries are more willing to take historic responsibility, emphasize on the assist for least-developed countries to adapt climate change. BASIC countries, including Brazil, South-Africa, India, China, focus on the right for the development of countries. Without legally binding commitment, it turns out in the increasing amount of carbon emission. During the negotiation, China has been seen as an obstacle. The Copenhagen Accord promised to provide 30 billion US dollars for developing countries against climate change. The concession of China lies in the practice of the promise. China strongly insists on the economic development and reminds the historic responsibility of developed countries to take a lead to reduce carbon emission. Greenpeace USN indicates that the cumulative amount of carbon emissions in the U.S is 2.4 times higher than China during 1960 to 2005. The former prime minister of China, Wen Jia Bao strictly pointed that developed countries must take the responsibility for 80% of

⁵ UNFCCC Article 3.1 : The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.

⁶ UNFCCC Article 3.2 : The specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration.

the amount of carbon emission since industrial revolution on Copenhagen climate change conference[12]. The China's negotiation representative insists the position on the core principle of common but differentiated responsibilities. Common responsibility refers that every country should be dedicated to national, regional and global environmental protection; differentiated responsibilities refer to the consideration of different conditions in different countries, especially for the historic responsibilities and the capability of protection, reduction and control. For example, the developing countries like the U.S can undertake the commitment to set a higher goal for the reduction of carbon emission than developing countries.

The distinction of responsibility and capability involves with actors who cause global warming and actors who have resources to correct the result. UNFCCC Article 3 rules that the Parties have a right to, and should, promote sustainable development, which also refers to "the right for normal development". If the party does not practice the right of development, the proposal can be viewed as illegal. Therefore, the developing countries also have the responsibility to pursue sustainable developing path for environment with the goal to comply with the economy, social development and eliminate poverty. From the perspective of economic development, in order to maintain the privileged lifestyle of developing countries, it is unfair for poor countries to pay for the price, which may delay the development [13]. Providing permission for the poor countries to emit carbon dioxide during the development may be easier to accept. In terms of the society and economy development of least-development countries, there is no practical approach except accepting carbon emission.

The concept of differentiated capability reflects on the concept that the parties with different economy development standard and income should have differentiated contribution for climate change. Darrel Moellendorf argued that UNFCCC should regulate acceptable range of distribution negotiation for reducing the burden of climate change. The industrial countries should take more burdens. Therefore, with the policy promoting and protecting poor countries economy development and reach the moral goal to eliminate poverty, UNFCCC should be legally binding in international laws. UNFCCC advocates the approach of equal burden and the burden equalization of reducing carbon emission. The parties (with the same environmental countries) should put the effort to take equal burdens. If not permitting developing countries continues to increase the amount of carbon emission, it is contradicted to equal burdens. Martino Traxler defended for equal burden and argued that the equal burden to reduce the amount of carbon dioxide is prior to the request for the ratio of every state that is advocated by international climate convention [14]. "Per capita emission" and "mixed per capita and grandfather law" is the present acceptable principle for most countries. If every country is requested to reduce the emission that is proportional to the history of global emission process and the total demand to compensate the total emission of poor countries, it seems to comply with

UNFCCC's three regulations that emphasize on the development right and the burden distribution of responsibility on the basis of different responsibility and capability.

Transparency can be defined as the process of the unveiling personal information, which is across the range of international regime and the new practice standard for national action [15]. transparency can be view as the utility of that is based on regime theory and related to institution information. The negotiation action for institution supporters reconstructs the confidence for people who are afraid to be a fool because they obey the regulation, as well as provides necessary information for negotiation correction [16]. Transparency can be viewed as organizational principles of the formation of global governance structure in the following and the same period of time. When organizational principles embed in social practice and is viewed as legally binding and institutional, it is important for governance. In other words, when the international institution becomes more transparent, it can encourage the necessary negotiation and cooperation between countries and practice the convention of climate change.

In early 1990s, environmental design, environmental label, environmental report and environmental audit have played important roles in global environmental governance structure. Environmental audit includes environmental accounting (EA) and environmental management systems (EMS), which are important tools to strengthen the transparency of environmental effects and encourage new technology for improving environmental effects. The importance of transparency of global environment governance is beyond the practice of environmental treaty [17]. The following paragraphs will discuss about the institution of emission trade and environmental management.

We need climate change institutions and establish the ability for developing counties to deal with climate change, especially for those fragile countries, which needs financial resources and technical transfer. Adaption fund is an arrangement. COP14 in 2008 decided to start adaption fund. The source is from clean development mechanism (CDM) in the Kyoto Protocol's Article 12, which is the complete climate financial institution for UNFCCC structure. It consents to provide legal position for adaption fund board and finance developing countries to promote climate change adaption. Global Environment Facility (GEF) is the Secretariat. World Bank is the trustee of the fund. The arrangement is temporary. It will be examined on the basis of 3 years. CDM, developed by Kyoto Protocol, has permitted developed countries to invest in developing countries to reduce carbon emission in order to compensate the carbon credit limits promised by Kyoto Protocol for developed countries. It will increase the same carbon credit limit for Annex I countries, which will not reduce the carbon emission in concrete but violet the global additional principle. Therefore, the present CDM has to redesign the climate change institution on environmental and economy efficiency. The Article 6 on Kyoto Protocol regulates the

joint implementation (JI), which makes Annex I countries to examine and transfer/gain reducing carbon emission unit under the supervision of the Supervisory Committee. The Emission Trade (ET) on Article 17 only limits to the countries listing in appendix B in Kyoto Protocol.

The Framework Convention on Climate Change requests the parties to provide national communications to make the information interactive and transparency. COP5 in 1999 has passed Guidelines for Annex I National Communications and demanded Annex I countries provide the guidelines since 2000. The Framework Convention on Climate Change sets a non-Annex I national communication group to improve the national communication of non-Annex I countries and examine the authority range of the group in COP 7. No matter Annex I or non-Annex I, its members include three parts: total greenhouse gas emission and remove detailed list, steps for implementation on convention and the information to reach the goal of convention.

COP 7 in 2001 has established the compliance committee, which has 2 branches of facilitative and enforcement. If the country does not obey the treaty, the punishments include eliminating 1.3 amount of emission credit limit for next permitting period, suspending the qualification for emission trade and planning for complying action. COP 13 in 2007 passed Bali Action Plan. For developed countries, the adequate action for carbon emission reduction includes quantification of emission limits and the reduction goal; for developing countries, the action includes carbon emission reduction under the premise that developing countries can continue to develop economy and gain profit and participate adequate action of greenhouse gas environmental audit mechanism that is measurable, reportable and verifiable under the structure of technology and capital. The China's mediation goal is that the amount of greenhouse gas emission per unit of GDP in 2020 can reduce by 40-45% than 2005. Despite the fact that China promises to mediation in volunteer, it insists on self-examine rather international one, which is a discrepancy in two countries and the biggest obstacle for the implement on climate change.

V. GOVERNANCE NEEDS POWER

During the implement of the Framework Convention on climate, we can understand that the effect of global climate change governance will be influenced by the phenomenon of free-rider, representative, participation and accountability and transparency during the negotiation and cooperation of states. In anarchy international society, sovereign states are no longer able to handle global public problem alone. When international regime cannot regulate the parties with power, can global governance provide a solution?

Realism considers power as material, which is not able to deal with existing regulation or cultural issue. Realism cannot explain why powerful states are able to be convinced

by obey the rule, and how weak states reach their hopeful politic results by norms. Neo-liberalism emphasizes on the important of institution, but focus on the material profit rather than norms. If we review Peace of Westphalia, we can find that international politic problems are not fully be solved by norms. The strategic negotiation or evaluation on politic risk can overwhelm the norms. If the politic idea becomes the result of risk evaluation, the reason for neo-liberalism that states join international organization lacks the context of norms while constraining states' action. Structuralism aims at the process of regulating structure and implementation. However, it is not able to explain how politics and norms connect together. In sum, we can infer that power cannot be depicted by single theory.

Power can also be seen as a unit and come up with a new governance concept. Whether the process of power is by external power interaction or internal social norms, we should examine "power to" and "power over". "Power over" refers that power leads the actor. "Power to" refers that the regulation between actors decides what to do⁷. Michael Barnett and Raymond Duvall separate power in two sectors. One is that power works through social relationship (interaction between agents or relationship in mechanism society) the other is that the four types of power formed by social relationship categories (direct or diffuse) after power works. The viewpoint adds to the approach of global governance. See as "Fig.7" :

Relational specificity		
Power works through	Direct	Diffuse
	Compulsory	Institutional
	Structural	Productive

Figure 7 Taxonomy of power

Source: Michael Barnett and Raymond Duvall, "Power in Global Governance," in *Power in Global Governance*, eds. Michael Barnett and Raymond Duvall (New York: Cambridge University press, 2005), p12.

Compulsory power permit an agent directly shapes the situation or action for the other agent. This type of power seems to the definition by Michael Dahl, which refers that A has the ability to force B to do what A wants and B completely accepts the order and practices it.

⁷ Robert Dahl focuses on the recognition and observation of power as well as the connection between agents. The rest will understand indirect contact and the diffuse of social relationship. Compared with form one, the later has wider approach to analyze the position of power in social regulation. The relationship between power and regulation includes the formation of creating rules and direction, which are the key to decide whether agents can influence other agents, even though the result is not intended or necessarily created by institution.

Institutional power refers that the controlling activity of agent is indirect, which is through a formal or informal institution to adjust the social relationship between A and B. For example, under the rule and the procedure of the institution, A decides the guidelines for power implement among other but A does not have full decision power. Structure power refers that power between agents is regulated by each other under the structure. Structure decides the direction of agent in social relationship. Different from compulsory power, structural power is passive. That is, the existence of A is due to the existence of B in the structure which is effective. Productive power refers that the social ability of an agent is the production of society. However, the process forms the self-understandings of an agent and he realizes the existence of profit. The process is indirect and power it produces is the regulation for any issue in the society.

Global environmental governance includes four types of power implementation “ Fig.8 ” . Because the international social structure formed by strong and weak states, compulsory power and structural power has become the direct power of state and non-state actors, which makes 194 sovereign states be willing to have consensus and establish the regime on climate change. It is the importance of institution for international cooperation that neo-liberalism has emphasized. The institution can provide incentive for states to understand that the interest for cooperation is better than defend, and neo-realism emphasizes the influence of international structure on states’ actions. If the strong states are positively against climate change, it can enhance the willingness of the weak states to participate. During the formation of regime on climate change, global public goods are the results we share after solving the global environmental problem. Global environmental problem is the obstacle for human to share global public goods because the environment does not have exclusive public goods. To prevent the dilemma of free-rider, the international norms that is acceptable by every state, which is in the premise that the international society establishes trust, form social capital and create path dependence. It is the function of productive power. Non-state actors can produce institutional power and take the responsibility and solve the environmental problems together through transnational advocacy network and agenda-setting, which influences the sovereign states to accept the regulation automatically from bottom-up. It is what structuralism has emphasized that the states action will eventually transform through internal process, which will influence the action direction for the states’ interaction as well as the compliance for international norm.

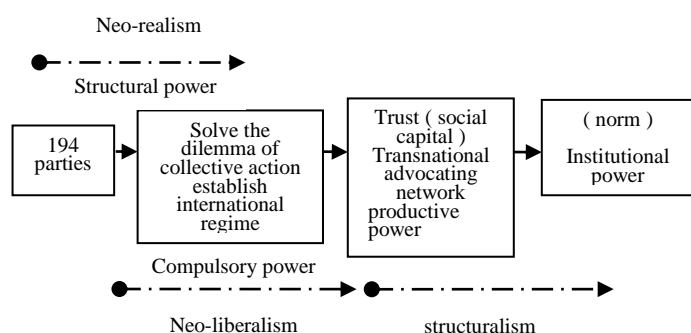


Figure 8 The power operating of global environmental governance

VI. CONCLUSION

Global environmental governance, a new problem-solving and analyzing approach, meet the multiple and core characteristics of global environmental problem and fulfill the operating request through the cooperation and multiple controlling approaches between actors. Many non-national actors play vital role in these approaches. Research, data collection, analysis or supervising rely on the cooperation between national and non-national agents. Therefore, the aspect of power changes from traditional topside-down type to different layers. Power is a product impossible to exist alone but produced by social relations. The process of international relationship will efficiently shape the actor's ability. The ability can decide the actor's destiny and situation.

Governance needs power, which is not contradicted to each other. The problem of climate change fundamentally changes the global power relationship. Through negotiation and cooperation, the state can redefine the state interest and recognize joint gains in the complex and reliable international environment. The actor realizes that the individual's maximum profit is not equal to collective profit. Under the consensus of “common but differentiated” principle, if the developed countries can see the value that moderates the negotiation, it is possible to attract developing countries (especially for those rapid economic growing countries which produce great amount of carbon dioxide) and provide more space for them to bargain, which is a representation of international social structural power. Global environmental governance focuses on efficient governance of accountability, participation and transparency, which indicates the important or the participation of non-state actors. The actors internalize environmental value, make the state actors get rid of the sovereign right and secure factor, accept the norms and have the consensus for collective action. Finally, it is possible to reach the goal of good governance in global environmental governance.

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AUTHOR'S PROFILE

Chia-Hsun Chang is a Doctoral candidate in the Graduate Institute of International Politics in National Chung Hsing University Taichung, Taiwan.