Korea's International Cooperation on Climate Change under the Paris Agreement

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Abstract

Korea has announced its commitment to reduce greenhouse gas emissions by 37 percent from business as usual (BAU) levels by 2030. The recently revised national roadmap for greenhouse gas reduction encompasses mainly domestic reduction policies and measures to cover 32.5 percent of the total 37 percent reductions, and partly the share of international cooperation and forest sinks to cover the remaining 4.5 percent. It means that the expected amount of reduction from international cooperation activities still reaches up to 38.3 MtCO2e by the end of 2030 (MOE, 2018).

In an effort to explore appropriate options and suitable partners for international mitigation efforts, this study firstly assessed the relative importance of five decision-making criteria for international cooperation on climate change – adaptation needs, mitigation potential, project certainty, economic development, and global peace. As a second step, this study applied the relative importance of the decision-making criteria in evaluating the appropriateness of three international cooperation options stipulated in article 6 of the Paris Agreement – cooperative approaches (CA), sustainable development mechanism (SDM) and non-market approaches (NMA) – and gauging the suitability of eight Asian countries as cooperation partners. The eight Asian countries are: Vietnam, Indonesia, Philippines, Bangladesh, Mongolia, Pakistan, Myanmar and

North Korea.

The analytic hierarchy process (AHP) was used to assess the relative importance of five decision-making criteria. The English language questionnaire addressed the relative importance of five decision-making criteria and the appropriateness of three international cooperation options for 32 foreign negotiators. The Korean language questionnaire asked about the suitability of eight Asian countries as cooperation partners, in addition to the relative importance of the five decision-making criteria and the appropriateness of three international cooperation options, to 34 Korean negotiators and 43 Korean experts.

Regarding the relative importance of five decision-making criteria, the four groups – foreign negotiators from developed countries; foreign negotiators from developing countries; Korean negotiators; and Korean experts – took on different preference patterns respectively. Foreign negotiators from developed countries put the most importance on mitigation potential and the second most importance to that of project potential, while attaching the least importance to that of adaptation needs among the groups. Foreign negotiators from developing countries put the most importance on the criteria of economic development and adaptation needs, while attaching the least importance to that of project certainty among the groups. Korean negotiators attached the most importance to the criterion of project certainty and the second most importance

to that of mitigation potential, while attaching the least importance to that of global peace. On the other hand, Korean experts attached the most importance to the criterion of global peace, while attaching the least importance to mitigation potential.

Generally, negotiators from developed countries put more importance on project certainty and mitigation potential, while negotiators from developing countries attached relatively more importance to economic development, adaptation needs and global peace. In this regard, Korean negotiators had tendencies in between those of negotiators from developed and developing countries.

Regarding the preferences towards the appropriateness of three international cooperation options, foreign negotiators from developed countries put more value on cooperative approaches (CA), followed by sustainable development mechanism (SDM) and non-market approaches (NMA). Korean negotiators preferred both CA and SDM. Korean experts preferred CA, followed by SDM and NMA.

Regarding the preference of suitable cooperation partners, both Korean negotiators and experts generally put Vietnam, Indonesia and Philippines in the upper ranks. In relation to the suitability of North Korea, Korean experts chose North Korea as the third most suitable cooperation partner by giving the highest value on global peace for North Korea, while Korean negotiators put North Korea in seventh place by awarding the lowest value on global peace.

In order to get objective interpretations on and explore undiscovered explanations of survey results, 15 Korean executive experts with experience of at least 10 years in international negotiations, domestic implementation and policy making were requested for interviews. 13 of them answered the structured interview on the survey results. Most executive experts appraised that each group attached the relative importance to different decision-making criteria from the perspective of its main interests and top priority concerns. For example, they commented that foreign negotiators from developed countries put priority on meeting their mitigation targets, while foreign negotiators from developing countries had a keen interest in resolving their urgent needs of poverty eradication and adaptation to adverse impacts of climate change. Meanwhile, they mentioned that Korean negotiators paid special attention to project certainty in accomplishing their 2030 mitigation target, while Korean experts put emphasis on alleviating conflicts and promoting peace with North Korea. Korean executive experts commented that Korean negotiators took intermediate positions between foreign negotiators from developed and developing countries with reference to mitigation potential, adaptation needs and economic development. Their positioning may have reflected the practical needs of their home country or may have been aligned with their long claimed positions as an unofficial mediator between developed and developing countries in international climate negotiations.

Many executive experts, agreeing on the low evaluation of North Korea's project certainty, suggested (1) the development of a special mechanism tailored to North Korea, which may be internationally recognized in cooperation with the UNFCCC; (2) the development of safeguard measures based on the UNFCCC; (3) the execution of climate projects in cooperation with China and Russia and so on.

This study confirmed the different preferences of four groups on five decision-making criteria, three international cooperation options stipulated in the article 6 of Paris Agreement and eight Asian countries. 13 Korean executive experts provided reasonable interpretation and insightful suggestions on the survey results.

Keywords: Climate Change, Analytic Hierarchy Process(AHP), Decision-making Criteria, Paris Agreement, International Cooperation, Mitigation and Adaptation

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List of Abbreviations

AF	Adaptation Fund
AHP	Analytic Hierarchy Process
AN	Adaptation Needs
BAU	Business As Usual
BI	Bank of Indonesia
CA	Cooperative Approaches
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CI	Consistency Index
CIS	Commonwealth of Independent States
CPV	Communist Party of Vietnam
CR	Consistency Ratio
DNA	Designated National Authority
ED	Economic Development
EIU	Economist Intelligence Unit
ETS	Emission Trading Scheme
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Greenhouse Gas
GIR	Greenhouse Gas Inventory and Research Institute
GP	Global Peace
INDC	Intended Nationally Determined Contributions
IPCC	Inter-governmental Panel on Climate Change
JI	Joint Implementation
LDCF	Least Developed Countries Fund
MoE	Ministry of Environment

MoTIE	Ministry of Trade, Industry and Energy
MP	Mitigation Potential
$MtCO_2e$	Million tons of CO_2 equivalent
NIMS	National Institute of Meteorological Studies
NMA	Non-market Approaches
ODA	Official Development Assistance
PC	Project Certainty
SCCF	Special Climate Change Fund
SDM	Sustainable Development Mechanism
SMC	Seoul Metropolitan City
SOEs	State-owned Enterprises

Chapter 1. Introduction

1.1 Research Background and Objective

The Inter-governmental Panel on Climate Change (IPCC) estimated in its recent special report that human activities have caused approximately 1.0℃ of global warming above pre-industrial levels. It also predicted that global warming is likely to reach 1.5℃ between 2030 and 2052 if it continues to increase at the current rate (IPCC, 2018). On the Korean peninsula, the annual average temperature has risen by 1.4℃ during the last 30 years from 1988 to 2017 compared to the previous period from 1912 to 1941, with summer increasing by 9 days and summer nights with a minimum temperature of more than 25℃ increasing by 7 annually over the same period (NIMS, 2018). Such weather extremes of global warming, as heat waves and drought in Europe and Australia have been observed in many parts of the globe (WMO, 2018).

In response to the unprecedented extent of climate change, the international community has taken various policies and measures to reduce greenhouse gas emissions and relieve the impacts of climate change domestically, as well as executing international cooperation projects in accordance with relevant treaties. In this regard, the Paris Agreement adopted in 2015 aimed to strengthen the global response to the threat of climate change, within the framework of the United Nations Framework Convention on Climate Change (UNFCCC).

Korea announced its voluntary mitigation target in 2009 in order to reduce greenhouse gas emissions by 30% from the business as usual (BAU) levels domestically

by 2020. The target was postulated in the sub-law of the Framework Act on Low Carbon Green Growth which entered into force in April 2010. In preparation to achieve the 2020 reduction target, the Korean government worked out the National Greenhouse Gas Emissions Reduction Roadmap in January 2014 for the implementation of sectoral action plans. In addition, Korea enacted the Act of the Allocation and Trading of Greenhouse Gas Emission Permits in 2012, and launched a nation-wide Emissions Trading Scheme (ETS) in 2015. The Korea ETS covered 525 business entities which accounted for 67.7% of national greenhouse gas emissions at the initial stage. The Korea ETS completed its 1st phase for 3 years from 2015 to 2017 and started the 2nd phase with incorporating international mitigation projects for another 3 years from 2018 to 2020 (GIR, 2018).

In preparation for its 2030 mitigation target that almost all the countries agreed to submit as "intended nationally determined contributions (INDC)," Korea established a task force composed of relevant ministries, including the Ministry of Environment (MoE) and the Ministry of Trade, Industry and Energy (MoTIE), chaired by the Prime Minister's office. The 2030 mitigation target was deliberated by the Committee on Green Growth, and adopted in accordance with national authorization procedures. As a consequence, the Korean government has announced to the international community its commitment to reduce greenhouse gas emissions by 37 percent from business as usual (BAU) levels by 2030. Even though the "national roadmap for greenhouse gas reductions to implement this 2030 reduction target had been finalized in late 2016, the Korean government has completed a review process in order to develop an upgraded

version of the national roadmap in 2018. The revised roadmap increased the portion of domestic mitigation reductions from 25.7 percent to 32.5 percent of the total 37 percent - 276.5 million tons of CO_2 equivalent ($MtCO_2e$) compared to 315 $MtCO_2e$ of total reduction goals, accordingly reducing the share of international cooperation and forest sinks from 11.3 percent to 4.5 percent (38.3 $MtCO_2e$). It means that the expected amount of reduction from international cooperation activities still reaches up to 38.3 $MtCO_2e$ at the end of 2030 (MoE, 2018). With respect to international cooperation options, the inter-governmental discussion on the operational rules of international cooperation options stipulated in the article 6 of the Paris Agreement remains to be extended until the 25th session of Conference of Parties to the UNFCCC (COP 25) to be held in Chile in November 2019.

Many international cooperation projects have been taking place in the form of mitigation and adaptation projects. Generally speaking, mitigation projects have been driven by the interest of acquiring emission reduction units, mainly by developed countries in the format of Clean Development Mechanism (CDM), pursuant to the Kyoto Protocol. Accordingly, while many mitigation projects are concentrated in China, India and other Asian countries, a relatively limited number of them are distributed in Latin America and Africa. In this regard, many developers of mitigation projects are presumed to focus on the aspects of mitigation potential and project certainty of the recipient countries. Meanwhile, many international adaptation projects have been conducted with the financial support from international funds, such as Adaptation Fund (AF) and Green Climate Fund (GCF). Many adaptation projects supported by the related

international funds have been widely distributed among geographical regions. However, the regional distribution of adaptation projects may not be congruent with the urgency and extent of adaption needs for different countries or regions.

The concept of mitigation potential is related to the sizes of Gross Domestic Product and greenhouse gas emissions, and the possibility of reducing greenhouse gas emissions in the recipient country of international cooperation on climate change. The concept of project certainty is closely related to the transport, communication and electricity network, labor quality and discipline, social and administrative circumstances of the recipient countries and cultural compatibility between donor and recipient countries.

However, the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement envision international cooperation happening "in the context of sustainable development" and "the principle of common but differentiated responsibilities and respective capabilities." Article 2.1 of the Paris Agreement laid down that the Agreement aims to "strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty." Article 2.2 also stipulated that "the Agreement will be implemented to reflect equity and the principle of common but differentiated responsibilities and respective capabilities, in the light of different national circumstances."(UNFCCC, 1992; UNFCCC, 2015)

Accordingly, it can be assumed that the concepts of mitigation potential and project certainty versus those of adaptation needs, economic development and global peace are - in many cases - mutually conflicting or contradicting criteria for the design and implementation of international cooperation on climate change. The relative importance

of the five concepts – adaptation needs, mitigation potential, project certainty, economic development and global peace – may critically affect the decision-makers in selecting international cooperation options and partner countries.

In this regard, this study aimed to assess the relative importance of the five decision-making criteria for four different groups and then evaluate the appropriateness of three international cooperation options stipulated in the article 6 of the Paris Agreement and the suitability of eight Asian countries as cooperation partners based on the relative importance of five decision-making criteria.

1.2 Research Scope and Procedure

In order to attain the aforementioned research goal, this study selected five decision-making criteria for international cooperation on climate change and assessed their relative importance from the perspective of policy makers and other groups. In addition, this study applied the relative importance of five decision-making criteria to evaluating the appropriateness of three international cooperation options stipulated in the article 6 of the Paris Agreement – cooperative approaches (CA), sustainable development mechanism (SDM) and non-market approaches (NMA) – and gauging the suitability of eight Asian countries as cooperation partners. The eight Asian countries are Vietnam, Indonesia, Philippines, Bangladesh, Mongolia, Pakistan, Myanmar and North Korea. The specific research method and procedure of this study are as follows.

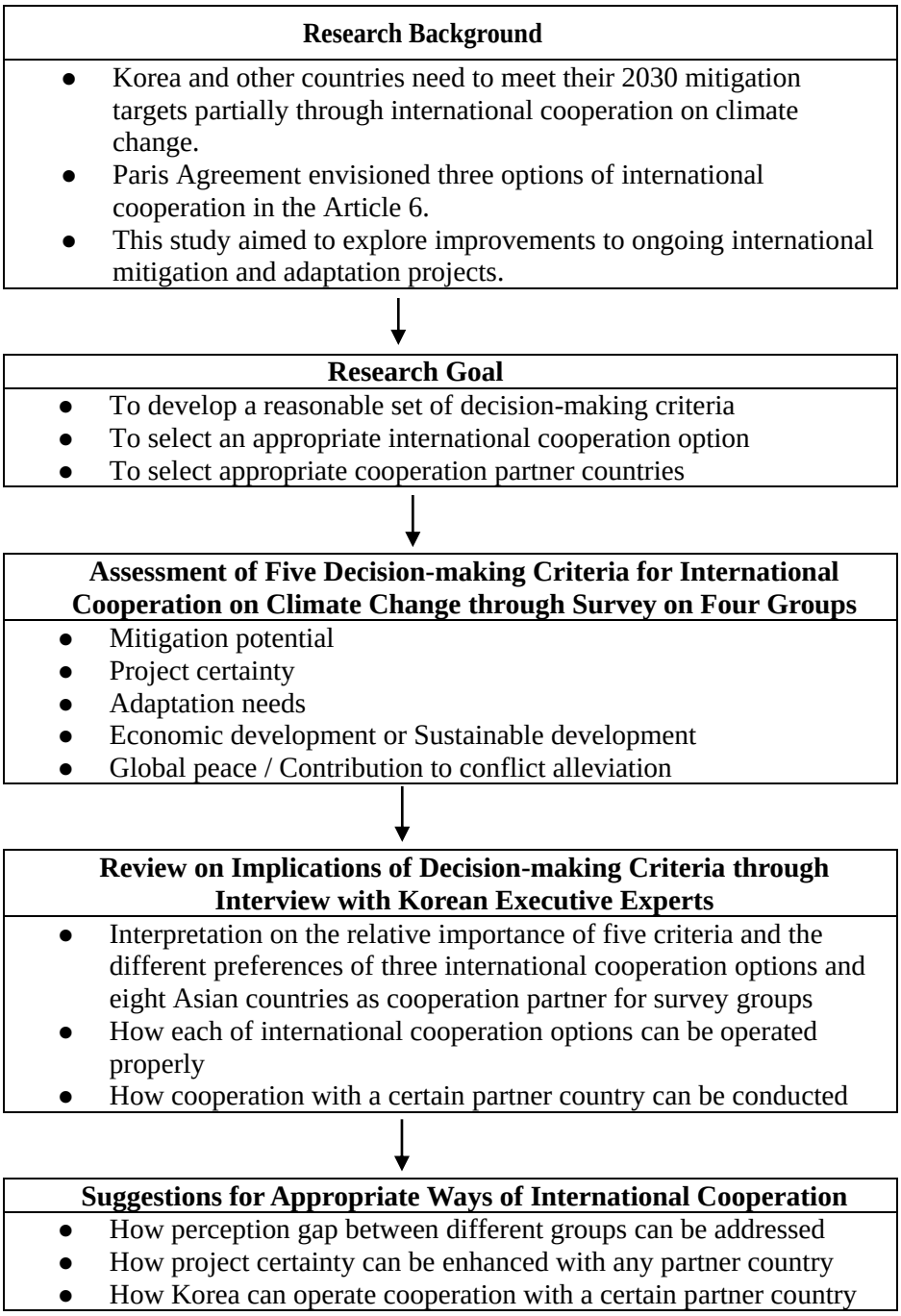
Firstly, the assessment of the relative importance of five decision-making criteria was made by (1) foreign negotiators from developed countries, (2) foreign negotiators from developing countries, (3) Korean negotiators, and (4) Korean experts respectively. These four groups took on the different dispositions of preferences towards the five decision-making criteria.

Secondly, the evaluation of the appropriateness of three international cooperation options was made with respect to the aforementioned five decision-making criteria by the four groups respectively. The appropriateness of three international cooperation options was evaluated by an integer scale from 5 to 1 and then multiplied with the mean value of importance for one of the five respective criteria given by each group.

Thirdly, the evaluation of the suitability of eight Asian countries was made with

respect to the five decision-making criteria by the two groups of Korean negotiators and experts. The suitability of eight Asian countries was weighed by an integer scale from 5 to 1 and then multiplied with the mean value of importance for one of the five criteria given by each group. After the mean values of suitability for eight Asian countries with reference to five decision-making criteria were produced by multiplication with the mean value of importance for the respective criterion given by the relevant group, the total sum of the results of multiplication for each partner country was calculated in order to rank the eight countries.

Finally, 13 Korean executive experts who had at least 10 years of experience as international negotiators or executives involved in the national emission trading scheme (and other related policy-making) were interviewed in order to get their objective interpretation on and explore undisclosed explanations and arguments behind the results of this survey (See <Figure 1.1>).



<Figure 1.1> Research procedure

Chapter 2. Theoretical Review of International Cooperation on Climate Change

2.1 International Cooperation under UNFCCC and its Subsequent Treaties

The conference under the title of "the Changing Atmosphere: Implications for Global Security" held in Toronto in 1988 was an important turning point that converted climate change from a scientific priority to a political one, after academic and scientific discussions for decades. Coincidentally, the year 1988 was one of the hottest years of the 20th century. After the decision to initiate formal negotiations towards the adoption of an international treaty was taken in 1991, two pillars of the international climate change regime were instated – the 1992 United Nations Framework Convention on Climate Change (UNFCCC) and the 1997 Kyoto Protocol (Afionis, 2017).

The UNFCCC was agreed as the first international environmental treaty to address climate change and its adverse effects by an Inter-governmental Negotiating Committee in May 1992. The UNFCCC was opened for signature along with the United Nations Convention on Biological Diversity and the United Nations Convention to Combat Desertification at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil in June 1992 and entered into force in March 1994, after 165 states had ratified it. The convention defined climate change as "the common concern of humankind" and called for the cooperation by all countries "in

accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions." (Jeon et al., 2016)

The convention also tried to strike the balance in dividing the responsibilities of climate change between the developed and developing countries by stating that "the largest share of historical and current global emissions of greenhouse gases has originated in developed countries" and that "the share of global emissions originating in developing countries will grow to meet their social and development needs." Meanwhile, the convention invited developed countries which are included in Annex I and II to "take the lead in addressing climate change and its adverse effects" by taking domestic mitigation actions and assisting developing countries through technology transfer and financial support. The convention further required coordination between responses to climate change and social and economic development, "taking into account the needs of developing countries for sustained economic growth and poverty eradication."

In regard to international cooperation on climate change, the UNFCCC envisioned "joint implementation" in which the developed county parties and other parties included in Annex I are supposed to execute mitigation projects in the latter parties. The concrete nature of joint implementation (JI) was elaborated under the Kyoto Protocol and the JI projects took place in the Eastern European countries afterwards. The UNFCCC also stipulated the financial assistance and technical transfer of developed countries to developing countries in relation to mitigation and adaptation activities (UNFCCC, 1992).

The parties to the UNFCCC decided on the Berlin Mandate to “begin a two-year negotiation process to establish legally binding mitigation targets and time tables for greenhouse gas (GHG) emissions after 2000” at the first session of the Conference of Parties to the UNFCCC (COP 1) held in Berlin, Germany in April 1995. As a consequence, the Kyoto Protocol was adopted at the COP 3 held in Kyoto, Japan in December 1997 and came into effect in February 2005 (Jeon et al., 2016). The Kyoto Protocol committed developed countries to cooperate with other such countries to enhance the individual and collective effectiveness of their policies and measures to address climate change, pursuant to the principles of the UNFCCC. Additionally, while the developed countries would assist developing countries in achieving sustainable development, they would achieve compliance with their own emission reduction commitments through Clean Development Mechanisms (CDM). Specifically, whereas developed countries are supposed to conduct mitigation projects in the territories of developing countries in order to acquire emission reduction outcomes with which to meet their own mitigation targets, the developing countries could try to enhance the level of their economic development through the CDM projects. Kyoto Protocol also briefly postulated the provision of emission trading in article 17 (UNFCCC, 1998). The detailed rules and procedures of emission trading have been developed and finalized in the consequent conferences of parties to the UNFCCC (See <Figure 2.1>).

<Figure 2.1 > Brief history of major climate change negotiations

2.2 The Paris Agreement and its New Climate Change Regime

Similarly to the process of Kyoto Protocol, the Parties to the UNFCCC agreed to establish a working group on the "Durban Platform for Enhanced Action," to negotiate "another legal instrument or an agreed outcome with legal force, which would be applicable to all Parties" at the COP 17 held in Durban, South Africa in December 2011. Consequently, the Paris Agreement was adopted at the COP 21 held in Paris, France in December 2015 and entered into force in November 2016 (Jeon et al., 2016).

The Agreement, for the first time, brought both developed and developing countries into a common endeavor to undertake ambitious activities to address climate change and adapt to its adverse effects, with strengthened support to assist developing countries in doing so. As such, The Paris Agreement charted a new course in the global climate effort (Howard, 2017). Although the Paris Agreement recognized that peaking would take longer for developing countries, developing countries are encouraged to "move over time towards economy-wide emission reduction or limitation targets in the light of different national circumstances," while developed countries should continue taking the lead by pursuing economy-wide absolute emission reduction targets (UNFCCC, 2015).

When addressing international cooperation, the Paris Agreement comprehensively enumerated three options of international cooperation in article 6. The article also reflected "experience gained with markets under the Kyoto Protocol – from the perspectives of both proponents and skeptics of markets – as well as proposals for change in the mechanisms made over the years". The article starts with an "aspirational statement of ways to ratchet up countries' ambition on climate change" and the nature

of cooperation on a voluntary basis in the paragraph 1 (Howard, 2017).

Cooperative approaches refer to voluntary crediting and emission trading mechanisms in paragraph 2 and 3 of article 6. Sustainable development mechanism refers to a centralized crediting mechanism under the guidance of the Conference of Parties to the Paris Agreement, which is similar to clean development mechanism under Kyoto Protocol in the paragraphs 4 to 7 of the article 6. Non-market approaches refer to a variety of assistance schemes for mitigation, adaptation, finance, technology transfer and capacity building, as stipulated in the paragraph 8 and 9 of the article 6 as follows.

Text of the Article 6 of the Paris Agreement

1. Parties recognize that some Parties choose to pursue voluntary cooperation in the implementation of their nationally determined contributions to allow for higher ambition in their mitigation and adaptation actions and to promote sustainable development and environmental integrity.

2. Parties shall, where engaging on a voluntary basis in cooperative approaches that involve the use of internationally transferred mitigation outcomes towards nationally determined contributions, promote sustainable development and ensure environmental integrity and transparency, including in governance, and shall apply robust accounting to ensure, inter alia, the avoidance of double counting, consistent with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to this Agreement.

3. The use of internationally transferred mitigation outcomes to achieve nationally determined contributions under this Agreement shall be voluntary and authorized by participating Parties.

4. A mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development is hereby established under the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to this Agreement for use by

Parties on a voluntary basis. It shall be supervised by a body designated by the Conference of the Parties serving as the meeting of the Parties to this Agreement, and shall aim:

(a) To promote the mitigation of greenhouse gas emissions while fostering sustainable development;

(b) To incentivize and facilitate participation in the mitigation of greenhouse gas emissions by public and private entities authorized by a Party;

(c) To contribute to the reduction of emission levels in the host Party, which will benefit from mitigation activities resulting in emission reductions that can also be used by another Party to fulfill its nationally determined contribution; and

(d) To deliver an overall mitigation in global emissions.

5. Emission reductions resulting from the mechanism referred to in paragraph 4 of this Article shall not be used to demonstrate achievement of the host Party's nationally determined contribution if used by another Party to demonstrate achievement of its nationally determined contribution.

6. The Conference of the Parties serving as the meeting of the Parties to this Agreement shall ensure that a share of the proceeds from activities under the mechanism referred to in paragraph 4 of this Article is used to cover administrative expenses as well as to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation.

7. The Conference of the Parties serving as the meeting of the Parties to this Agreement shall adopt rules, modalities and procedures for the mechanism referred to in paragraph 4 of this Article at its first session.

8. Parties recognize the importance of integrated, holistic and balanced non-market approaches being available to Parties to assist in the implementation of their nationally determined contributions, in the context of sustainable development and poverty eradication, in a coordinated and effective manner, including through, inter alia, mitigation, adaptation, finance, technology transfer and capacity building, as appropriate. These approaches shall aim to:

(a) Promote mitigation and adaptation ambition;

(b) Enhance public and private sector participation in the implementation of nationally determined contributions; and

(c) Enable opportunities for coordination across instruments and relevant institutional arrangements.

9. A framework for non-market approaches to sustainable development is hereby defined to promote the non-market approaches referred to in paragraph 8 of this Article.

2.3 The Current State of International Cooperation on Climate Change

2.3.1 Mitigation and international cooperation

Although clean development mechanism (CDM) projects have contributed to climate change mitigation and given developing countries opportunities for involvement in the global carbon market by hosting projects, the CDM projects are widely considered to have a number of weak points. The major criticisms surrounding CDM include high transaction costs, failure of promoting sustainable development and uneven spread of both projects and funding across developing countries (Rahman et al., 2014).

As of December 2012, 154 non-Annex I countries have ratified the Kyoto Protocol, 130 of them have also established a designated national authority (DNA) and a total of 5,193 CDM projects were registered through December 2012. The spread of projects was very wide but from a regional perspective the projects were quite concentrated. The Asia Pacific region had 83% of the total CDM projects, where China and India accounted for 52% and 19% of the region's projects respectively, while Vietnam came in third place with 3%. Latin America had 13% of the total CDM projects, with Brazil and Mexico contained 2% and 1% of the world's total CDM projects respectively. It is important to realize that 10 countries with the most registered CDM projects accounted for more than 90% of the total generation capacity. This illustrated the unequal distribution of projects across qualifying countries. Africa and the Middle East had only

2% and 1% of total CDM projects respectively (Rahman et al., 2014).

Rahman et al. (2014) found that the distribution of different types of CDM projects across host regions or countries did not follow the principle of comparative advantage. Comparative advantage may have been only one of several factors in attracting CDM investments. Endowment of and access to natural resources, various costs of doing business, and national policies contributed to attracting investors by host countries.

It may be the case that investors considered production costs as well as transaction costs in various stages of project development; access to and ease of use of natural resources, and national policies of certain host countries might have motivated investment decisions in those countries. It is worth noting that investors also considered the risks and costs associated with transactions at different stages of the production and marketing processes (Rahman et al., 2014).

China has attracted major share of CDM investment internationally. Meanwhile, there are big differences in the geographic distribution of Chinese CDM projects. Provinces, such as Yunnan, Sichuan, Inner Mongolia, Hunan and Gansu (located in central and western China) have been accommodating more projects due to their rich hydro and wind resources, while there were very few projects in the eastern, already developed areas of the country. This trend was consistent with the CDM's major goal to assist less developed areas to achieve sustainable development (Hong, 2013). However, this trend was rarely found in the distribution of CDM projects between more developed and less developed countries.

Politics and governance have also contributed to the current form of the Clean

Development Mechanism market in India. Findings showed that foreign direct investments, official development assistance, and trade had a positive influence on project attraction (Roettgers et al., 2014). Winkelman et al. (2011) found that human capital and GHG emission levels influenced which countries have accommodated projects and the volume of certified emission reductions (CER) issued. Countries that provided growing markets for CDM by-products, such as electricity, had more chances to be CDM hosts, while regions with higher carbon intensity levels had greater CER issuance. All in all, the size of economy, the level of greenhouse gas emissions and the general circumstances of doing business in the host countries are crucial for attracting CDM projects. It means that the criteria of mitigation potential and project certainty would be highly evaluated among the five decision-making criteria for international mitigation and adaptation projects.

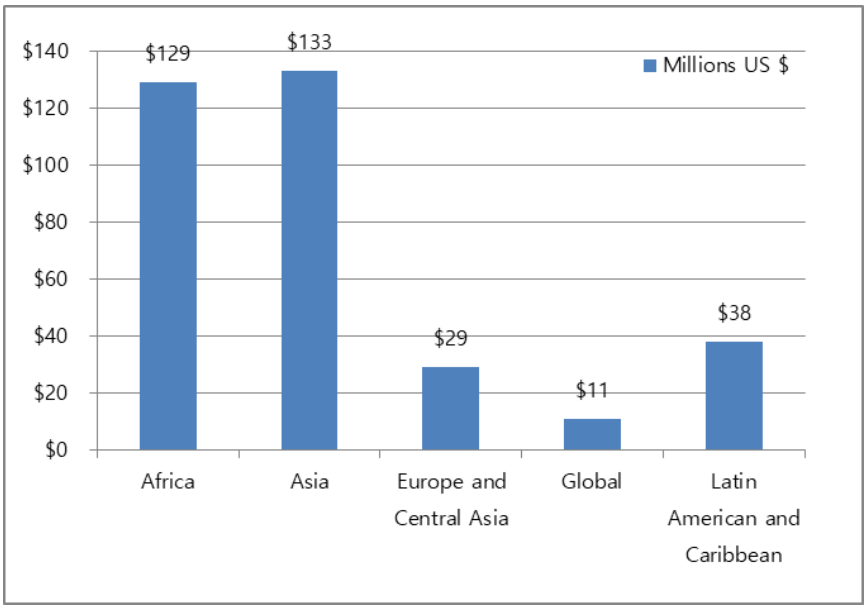
2. 3. 2. Adaptation and international cooperation

Biagini et al. (2014) investigated the operation of international adaptation projects funded by the multilateral funds specialized for adaptation. According to the study, the funds established under the UNFCCC and managed by the Global Environment Facility (GEF), the Least Developed Countries Fund (LDCF), the Special Climate Change Fund (SCCF) and the Strategic Priority for Adaptation (SPA), have approved financing for 133 adaptation projects in 70 countries with appropriate documents. In total, more than $340 million was allocated by the GEF to the 92 projects analyzed. <Figure 2.1> shows the total Global Environment Facility (GEF) funding allocated by region. <Figure 2.2>

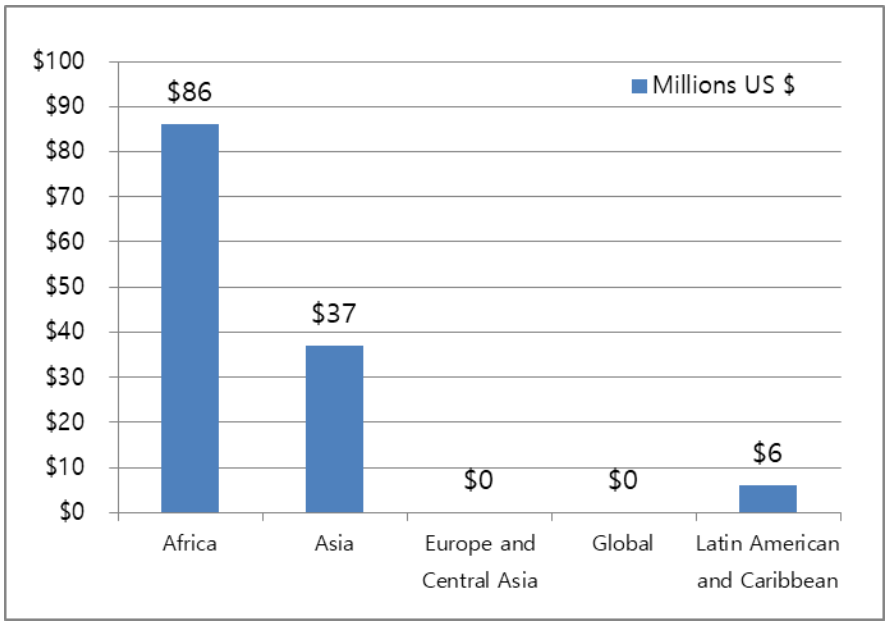
and <Figure 2.3> show the Least Developed Countries Fund (LDCF) funding and the Special Climate Change Fund (SCCF) funding allocated by region respectively. The LDCF allocated roughly $129.8 million to the 41 projects analyzed; and the SCCF allocated $96.9 million to the 21 projects analyzed.

Evidence has indicated that “the impacts of climate change are of greatest concern in the most vulnerable and poorest countries and regions within the developing world. These countries and regions are heavily affected by climate change, including extreme weather events, due to their disproportionate exposure to the impacts of climate change as well as a lack of adaptive capability – the funding, institutions, and technical capacity needed to mobilize when such events occur.” It was confirmed that Africa was one of the most vulnerable regions to climate variability and change because it faced multiple impacts, increasingly complicated by more droughts and more floods, and had low capacity to adapt to these events (Biagini, 2014).

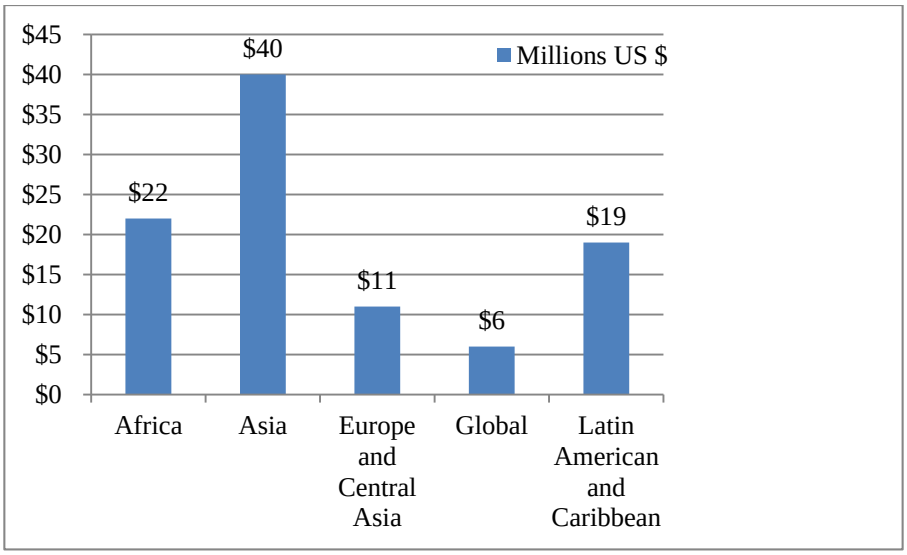
In the meantime, Aguiar (2018) investigated 147 local adaptation strategies in Europe and found that, while key factors were implementation of EU policies and the increasing frequency of extreme weather events, the main barriers are scant resources, capability, political commitment and uncertainty (Aguiar, 2018).



<Figure 2.2> Total GEF funding allocated by region
Source: Biagini(2014)



<Figure 2.3> Total least developed country fund financing allocated by region
Source: Biagini (2014).



<Figure 2.4> Total special climate change fund financing allocated by region.
Source: Biagini (2014).

Weiler et al. (2018) analyzed data on bilateral adaptation assistance from 2010 to 2015 in order to assess to what extent adaptation assistance was offered in response to host need rather than to host merit and donors' interests. In contrast to previous study, they found that donors partly considered the vulnerability of recipient countries. Countries that were physically more vulnerable to climate change tended to have better chance to receive some adaptation assistance and also receive more adaptation assistance per capita, as did poorer countries and small island developing states. Countries with lower adaptive capability, however, did not receive more adaptation assistance; instead, donors reward well-governed countries with adaptation assistance as well as use adaptation assistance to promote their own economic interests. Furthermore, adaptation assistance flows very closely followed general development assistance flows. The extent to which adaptation assistance was new and additional thus

remained unconfirmed (Weiler et al., 2018).

Meanwhile, more resources were needed for adaptation to climate change, particularly in developing countries. Mobilization of adaptation funding is difficult due to uncertainties related to frequency, severity and regional spread of climate change impacts, and intangibility due to a mismatch between long-term payback and the short-term horizon of private investors, difficulties in identifying climate change related adaptations from adaptations motivated by other factors (Pillay et al., 2017).

The previous studies showed that multilateral adaptation funds have played important role in assisting many poor countries heavily affected by the adverse impacts of climate change, and the adaptation needs have been an important factor for offering adaptation funding. However, other issues such as higher adaptive capability and good governance in the host countries were also important. Concerning the decision-making criteria for adaptation projects, it may be assumed that the project certainty of host country would be as important as its adaptation needs for attracting adaptation projects from developed countries or multilateral funds.

2.3.3. Precedent analytic researches using Analytic Hierarchy Process (AHP)

Ghimire and Kim identified 22 barriers to developing renewable energy in developing countries from the previous studies and categorized them into six groups of barriers: social, political and policy, technical, economic, administrative, and geographical ones. They used the analytic hierarchy process (AHP) methodology for evaluating and ranking the six barrier groups and then 22 barriers in the six groups for Nepal. They

calculated the overall priority weight of the 22 barriers by multiplying the priority weight of one barrier group with the priority weight of each barrier inside the relevant group. By doing this, they selected the most important barrier categories and the most important overall barriers (Ghimire and Kim, 2018).

Keeley and Matsumoto identified 18 determinants in the location decisions of foreign wind and solar energy investors. They categorized them into four groups: institutional environment, macroeconomic environment, natural conditions, and renewable energy policies. They evaluated the relative significance or weight of four groups by AHP methodology and the relative significance of determinants inside each of four groups separately. They calculated the relative significance of each determinant through multiplying each determinant's weight by the weight of the category of the determinant. For example, the weight of administrative procedure (48%) was multiplied by the weight of the institutional category (14%), which made the relative significance of administrative procedure 7% among all determinants (Keeley and Matsumoto, 2018).

Jang et al. selected four criteria to be used for setting priorities of policy measures to address Styrofoam buoy debris: effectiveness, efficiency, feasibility, and acceptability. They also used the AHP to evaluate the usefulness of 16 policy measures to address Styrofoam buoy debris by conducting survey on three groups: government (38 persons), business (21 persons), and experts (37 persons). They found that three groups agreed on the high ranked policy measures, while disagreeing on low ranked policy measures (Jang el al., 2013).

2.4 Selection of countries for survey on partner countries

Korean government has designated 24 ODA partner countries based on the coordinated assessment of the assistance needs, development level, governance on foreign assistance of the candidate recipient country, and its diplomatic and economic relations with Korea. The related information of 24 ODA partner countries – eleven countries from Asia, seven countries from Africa, two countries from the Commonwealth of Independent States (CIS), and four countries from Latin America – are shown in <Table 2.1> and <Table 2.2>. Seven Asian countries were selected as partner countries for this survey from the 24 ODA partner countries in view of their cooperation needs and geographical accessibility, and their economic relations with Korea. Additionally, North Korea was included in the list of partner counties because of its special relation with the Republic of Korea.

Generally speaking, the eight selected countries shaded in <table 2.1> show the needs of international cooperation on climate change in terms of the higher ranks in climate risk index (Vietnam, Philippines, Bangladesh, Pakistan, Myanmar), and the lower ranks in sustainable development index and global peace index (North Korea, Pakistan, Bangladesh).

<Table 2.1> Information on Korea's 24 ODA partner countries

Country	GDP 2017[a]	GHG Emissions 2014[b]	Trade volume with Korea 2017[c]	Climate Risk Index 2018[d]	Sustainable Development Index 2018[e]	Global Peace Index 2018[f]
Vietnam	647,368	256.7 (0.57%)	63,930	31.83 (8th)	69.7 (59th)	1.905 (60th)
Indonesia	3,242,768	744.3 (1.64%)	17,974	72.33 (70th)	62.8 (99th)	1.853 (55th)
Philippines	875,311	171.6 (0.38%)	14,296	20.17 (5th)	65.0 (85th)	2.512 (137th)
Bangladesh	637,078	163.6 (0.36%)	1,562	25.00 (6th)	59.3 (111th)	2.084 (93rd)
Mongolia	39,981	38.6 (0.09%)	242	60.17 (48th)	63.9 (95th)	1.821 (46th)
Pakistan	1,088,981	326.8 (0.72%)	1,324	30.50 (7th)	54.9 (126th)	3.079 (151st)
Myanmar	327,629	98.7 (0.22%)	1,036	14.00 (3rd)	59.0 (113th)	2.302 (122nd)
North Korea	27,647[g]	63.8 (0.14%)	N.A.	N.A.	N.A.	2.95 (150th
Cambodia	22,158	27.1 (0.06%)	865	38.00 (15th)	60.4 (109th)	2.101 (96th)
Laos	16,853	11.5 (0.03%)	119	109.5 (120th)	60.6 (108th)	1.821 (46th)
Nepal	24,472	36.0 (0.08%)	36	29.50 (14th)	62.8 (102nd)	2.053 (84th)
Sri Lanka	87,174	38.4 (0.08%)	371	11.50 (4th)	64.6 (89th)	1.954 (67th)
Ghana	47,330	30.9 (0.07%)	282	86.00 (101st)	62.8 (101st)	1.772 (41st)

a: World Bank Group(Unit: millionUSD)
b: World Resources Institute(Unit: millionMtCO2e; share of global emissions in parentheses)
c: Korea International Trade Association(Unit: millionUSD)
d: German Watch e.V.(Rank of 182 states)
e: Sustainable Development Index 2018. Bertelsmann Stiftung and Sustainable Development Solutions Network (Rank of 156 states)
f: Institute for Economics & Peace (Rank of 163 states)
g: Bank of Korea estimate

<Table 2.2> (continued)

Country	GDP 2017[a]	GHG Emissions 2014[b]	Trade volume with Korea 2017[c]	Climate Risk Index 2018[d]	Sustainable Development Index 2018[e]	Global Peace Index 2018[f]
Ethiopia	80,561	123.4 (0.27%)	176	41.67 (29th)	53.2 (128th)	2.524 (139th)
Mozambique	12,333	27.5 (0.06%)	206	38.00 (21st)	50.7 (138th)	2.056 (86th)
Rwanda	9,136	6.7 (0.01%)	74	45.83 (34th)	56.1 (120th)	2.140 (103rd)
Uganda	25,891	33.4 (0.07%)	23	51.00 (41st)	54.9 (125th)	2.168 (107th)
Tanzania	59,090	77.9 (0.17%)	165	68.00 (77th)	55.1 (123rd)	1.837 (51st)
Senegal	16,374	25.5 (0.06%)	140	59.67 (57th)	57.2 (118th)	1.849 (52nd)
Uzbekistan	48,717	225.8 (0.50%)	1,198	109.5 (120th)	70.3 (52nd)	2.144 (104th)
Azerbaijan	40,747	69.7 (0.15%)	54	87.50 (102nd)	70.8 (45th)	2.454 (132nd)
Colombia	309,191	159.6 (0.35%)	1,465	69.33 (83rd)	66.6 (74th)	2.729 (145th)
Peru	211,389	86.2 (0.19%)	3,047	47.67 (39th)	68.4 (64th)	1.986 (74th)
Bolivia	37,508	46.8 (0.10%)	498	19.33 (9th)	68.1 (66th)	2.092 (94th)
Paraguay	29,734	37.6 (0.08%)	245	89.17 (103rd)	67.2 (72nd)	1.997 (77th)

a: World Bank Group(Unit: million USD)

b: World Resources Institute(Unit: millionMtCO2e; share of global emissions in parentheses)

c: Korea International Trade Association(Unit: million USD)

d: German Watch e.V.(Rank of 182 states)

e: Sustainable Development Index 2018. Bertelsmann Stiftung and Sustainable Development Solutions Network (Rank of 156 states)

f: Institute for Economics & Peace (Rank of 163 states)

As shown in <Table 2.1> and <Table 2.2>, important determinants for international cooperation on climate change are assumed to be the size of GDP and GHG emissions, the close economic and political relations between donor and recipient countries, indices

related to sustainable development and global peace (Moon et al., 2016). In this context, further information on the political and economic outlook need to be provided.

2.4.1 Vietnam

The Economist Intelligence Unit (2018) expected Vietnam to remain a tightly controlled one-party state in 2019-2023. Anti-graft efforts will constitute the great risk to internal government stability, but it is not expected that the Communist Party of Vietnam (CPV) will fracture. Vietnam is expected to maintain its omnidirectional foreign policy, deepening ties with regional powers such as Japan and India, as well as the US. Ties with China may be prone to setbacks, owing to territorial disputes that will not be resolved in 2019-2023.

The Vietnamese government will continue to pursue economic liberalization in 2019-2023, and will prioritize international trade and the restructuring of state-owned enterprises (SOEs). Progress on SOEs will be uneven, owing to strong vested interests within the CPV. The Bank of Vietnam will raise interest rates over the forecast period. Real GDP growth will remain strong in 2019-2023. According to the EIU, Vietnam will remain one of the region's fastest-growing economies. Private consumption will be supported by robust real wage growth. Vietnam will be one of the main beneficiaries of the US-China trade war, and exports will grow robustly in 2019-2023. The current account will remain in surplus throughout our forecast period, but this will be tempered by a widening primary income account deficit (EIU, 2018).

<Table 2.3> Economic outlook of Vietnam

Economic Indicator	2018	2019	2020	2021	2022	2023
Real GDP growth(%)	6.9	6.7	6.1	6.2	6.3	6.2
Consumer price inflation (Average;%)	3.7	4.0	3.8	4.0	4.1	4.0
Government balance (% of GDP)	-6.1	-5.9	-6.0	-5.7	-5.3	-5.3
Current-account balance (% of GDP)	1.8	1.1	0.2	0.3	0.7	0.9
Money market rate(Average;%)	4.9	4.9	4.7	4.8	5.0	5.1
Unemployment rate(%)	3.2	3.3	3.5	3.5	3.4	3.3
Exchange rate D:US$(average)	23,055	23,267	23,777	24,375	25,131	25,913

Source: EIU (2018)

Vietnam announced its intended nationally determined contribution (INDC) to "reduce GHG emissions by 8% compared to BAU with domestic resources by 2030. The above-mentioned 8% contribution could be increased to 25% if international support is received through bilateral and multilateral cooperation, as well as through the implementation of new mechanisms under the Global Climate Agreement."

According to Vietnam's INDC, "adaptation measures to prevent future losses are technically possible, however, many measures to protect against floods, storm surges, saline water intrusion and drought, are needed to be implemented in the 21st century, which exceed the nation's capacity." (UNFCCC, 2018a)

2.4.2 Indonesia

The Economist Intelligence Unit (EIU) expected President Joko Widodo (known as Jokowi) to win the April 2019 election. In his second term, he will approach his anti-corruption agenda with new vigor. However, he will continue to face obstacles in the legislature. According to the EIU, fiscal prudence will be maintained for much of the forecast period assuming that Jokowi wins a second term. Bank Indonesia (BI) will continue to tighten monetary policy in 2019 to support the local currency, the rupiah. An economic slowdown in the US will affect global growth and require BI to hold rates in 2020, after which tightening will resume. Real GDP growth will average 5.1% a year in 2019-2023. Private consumption will remain the largest component of GDP, but investment spending will be the key driver of growth. Consumer price inflation will average 3.7% a year in 2019-2023, compared with an estimated 3.2% in 2018. The government's efforts to contain imported inflationary pressures will help to keep inflation at relatively low rates in the initial part of the forecast period. The current account will remain in the red throughout the period, owing to the wide deficit on the primary income account. The EIU expects the current-account shortfall to average 2.3% of GDP, slightly wider than 2.2% in the historical period.

<Table 2.4> Economic outlook of Indonesia

Economic Indicator	2018	2019	2020	2021	2022	2023
Real GDP growth(%)	5.3	5.0	4.9	5.0	5.1	5.2
Consumer price inflation (average: %)	3.2	3.6	3.3	3.5	4.0	4.3
Government balance (% of GDP)	-2.5	-2.2	-2.4	-2.2	-2.1	-2.0
Current-account balance (% of GDP)	-2.4	-2.6	-2.5	-2.1	-2.1	-2.0
Money market rate (average: %)	4.6	5.6	4.9	4.9	4.9	5.0
Unemployment rate(%)	5.5	5.3	5.5	5.3	5.3	5.2
Exchange rate Rp: US$(Average)	14,129	14,466	14,484	14,150	13,775	13,538

Source: EIU (2018)

Indonesia announced its intended nationally determined contribution (INDC) to "reduce unconditionally 26% of its greenhouse gases against the business as usual scenario and reduce emissions by 29% compared to the business as usual (BAU) scenario by 2030. Support from international cooperation is expected to help Indonesia to increase its contribution up to 41% reduction in emissions by 2030."

According to Indonesia's INDC, "it is believed that climate change will increase the risk of hydro-meteorological disasters, which make up 80% of disaster occurrences in Indonesia. The Indonesian government will implement enhanced actions to study and map regional vulnerabilities as the basis of adaptation information system, and to strengthen institutional capacity and promulgation of climate change sensitive policies and regulations by 2020." (UNFCCC, 2018a)

2.4.3 Philippines

The Economist Intelligence Unit (EIU) expected the six-year term of President Duterte to end in 2022. His popularity will wane over the early part of the forecast period (2019-2023) owing to his controversial policies and rhetoric. His efforts to deepen economic relations with China will bear fruit, despite the two countries' unresolved territorial disputes in the South China Sea. However, domestic political considerations will limit the prospect of a full pro-China tilt. In a bid to contain inflation, monetary policy will continue to be tightened up to 2019. Thereafter, the EIU expected the central bank of Philippines to keep the rate unchanged as global economic considerations weaken in 2020. The economy will grow at 5.9% a year in 2019-2023, slower than the 6.3% rate in 2014-2018. The slight slowdown will be driven by a cooling in domestic demand, from both the investment and consumption channels.

According to the EIU, the peso will continue to face depreciatory pressure in 2019, owing to the widening current-account deficit. A slowdown of the US economy in 2020 will ease pressures on the peso owing to the weakening of the US dollar. The trade deficit will continue to widen in the early part of the forecast period, owing to the weakness of the peso and elevated import prices. Accordingly, the current-account balance will fluctuate between a small deficit and a small surplus in 2019-2023.

<Table 2.5> Economic outlook of Philippines

Economic Indicator	2018	2019	2020	2021	2022	2023
Real GDP growth(%)	6.2	5.8	5.5	5.9	6.2	6.0
Consumer price inflation (average: %)	5.2	4.5	3.7	4.5	4.6	4.5
Government balance (% of GDP)	-2.7	-2.5	-2.5	-2.2	-2.5	-2.7
Current-account balance (% of GDP)	-1.5	-1.9	-1.5	0.7	1.4	1.2
Money market rate (average: %)	3.5	3.7	3.3	3.2	3.6	3.3
Unemployment rate(%)	5.5	5.4	5.4	5.2	5.2	5.1
Exchange rate P:US$(average)	52.92	55.27	55.15	53.86	55.00	52.50

Source: EIU(2018)

Philippines announced its intended nationally determined contribution (INDC) to "undertake GHG (CO_2e) emissions reduction of about 70% by 2030 relative to its BAU scenario of 2000-2030. Reduction of CO_2e emissions will come from energy, transport, waste, forestry and industry sectors. The mitigation contribution is conditioned on the extent of financial resources, including technology development & transfer, and capacity building, that will be made available to the Philippines."

According to Philippines's INDC, "it strives to ensure that climate change adaptation and disaster risk reduction are mainstreamed and integrated into the country's plans and programs at all levels. Financial resources, technology transfer and capacity building support for adaptation will ensure that the country's committed mitigation INDC will be attained." (UNFCCC, 2018a)

2.4.4 Bangladesh

The Economist Intelligence Unit (EIU) expected the ruling Awami League (AL) party of Bangladesh to dominate parliament until the general election in end-2018. The AL will win the next poll, helped by patronage at local level and because it has overseen solid economic growth. The political environment will be characterized by frequent bouts of social unrest over the 2019-2023 forecast period. Along with opposition-backed protests, the threat of terrorist attacks, labor strikes and public demonstrations will pose risks to political stability. Increased spending on infrastructure projects and slow progress on expanding the tax base will result in a budget deficit equivalent to 4.4% of GDP on average in fiscal years 2018/2019-2022/2023 (July-June), wider than the 3.7% average over the preceding five years.

According to the EIU, Bangladesh Bank (BB) will bring the repurchase (repo) rate back up to 6.75% and hold the reverse repo rate at 4.75% in 2019. From 2020 BB will ease monetary policy in order to stimulate economic growth, before raising rates again in 2022. The EIU forecasted that real GDP will grow by an average of 7.7% a year in 2018/2019-2022/2023, bolstered by strong increases in private consumption and investment. The economic growth will remain robust despite high levels of imports of goods and services. The current-account deficit will amount to the equivalent of 1.9% of GDP on average in 2019-2023, owing in large part to increased imports of inputs for infrastructure development, as well as oil imports. However, we expect the deficit to narrow gradually.

<Table 2.6> Economic outlook of Bangladesh

Economic Indicator	2018	2019	2020	2021	2022	2023
Real GDP growth (%)	6.9	6.7	6.1	6.2	6.3	6.2
Consumer price inflation (average: %)	3.7	4.0	3.8	4.0	4.1	4.0
Government balance (%of GDP)	-6.1	-5.9	-6.0	-5.7	-5.3	-5.3
Current-account balance (% of GDP)	1.8	1.1	0.2	0.3	0.7	0.9
Money market rate (average: %)	4.9	4.9	4.7	4.8	5.0	5.1
Unemployment rate(%)	3.2	3.3	3.5	3.5	3.4	3.3
Exchange rate Tk:US$(average)	23,055	23,267	23,777	24,375	25,131	25,913

Source: EIU (2018)

Bangladesh announced its intended nationally determined contribution (INDC) to "reduce its GHG emissions in the power, transport, and industry sectors by 12 $MtCO_2e$ or 5% below BAU emissions for those sectors by 2030, assuming no additional international support. Bangladesh will reduce its GHG emissions in the power, transport, and industry sectors by 36 $MtCO_2e$ by 2030 or 15% below BAU emissions for those sectors, assuming additional international support."

According to Bangladesh's INDC, "significant resources will be needed to support the implementation, both for adaptation and mitigation. It was estimated by the World Bank in 2010 that by 2050, adaptation costs of tropical cyclones and storm surges will be $5516 million and the annual recurrent cost will be $112 million, whereas for inland monsoon flooding, the cost will be $2671 million and the annual recurrent cost will be $54 million. Just taking these two sectors into consideration, the cost is estimated to be around $6.59 billion by 2030." (UNFCCC, 2018a)

2.4.5 Mongolia

The Economist Intelligence Unit (EIU) expected the Mongolian People's Party (MPP) to hold a large majority following the 2016 parliamentary poll. However, policymaking will continue to be hindered by factional rivalry within the MPP caucus in 2019-2020. An IMF-led concessional loan arrangement, agreed in early 2017 and scheduled to last until 2019, will help to contain the fiscal deficit and assist the government in repaying its external public-debt obligations in the forecast period. UK-headquartered Rio Tinto, the operator of Mongolia's biggest mine, OyuTolgoi (OT), will expand excavation activities there in 2019-20. Work on the project will lend considerable support to investment and economic growth in the forecast period.

According to the EIU, the rate of consumer price inflation will accelerate to 7.1% in 2019, from 6.4% in 2018, reflecting the rise in global oil prices and stronger household income growth. It will ease again in 2020, to 5.5%, as energy costs fall. The recent surge in global prices for coal, Mongolia's most valuable commodity export, will reverse in 2019-2020. Copper prices will also see slower growth than in 2017-2018. However, mining sector investment will be supported by a small number of large projects. Although the OT expansion and other mining projects suggest that Mongolia's external position will improve over the longer term, the balance-of-payments situation will remain fragile in 2019-20, owing in particular to the sizeable merchandise import bill.

<Table 2.7> Economic outlook of Mongolia

Economic Indicator	2017	2018	2019	2020
Real GDP growth(%)	5.9	5.8	6.7	6.6
Consumer price inflation(average;%)	4.1	6.4	7.1	5.5
Government balance(% of GDP)	-6.2	-1.8	-4.2	-4.5
Current-account balance(% of GDP)	-10.1	-10.4	-10.5	-9.8
Money market rate(average;%)	11.0	10.0	10.0	10.0
Exchange rate Tg:US$(average)	2,440	2,450	2,520	2,453

Source: EIU (2018)

Mongolia announced its intended nationally determined contribution (INDC) to "reduce its total national GHG emissions excluding Land use, land use change and forestry (LULUCF) by 14%, compared to the projected emissions under a business as usual scenario by 2030. Those and other potentially more ambitions commitments are contingent upon gaining access to new technologies and sources of finance through internationally agreed mechanisms and instruments under the auspices of the UNFCCC."

According to Mongolia's INDC, "the melting of permafrost and glaciers, surface water shortages, and soil and pasture degradation have been identified as particular challenges faced by Mongolia as a result of climate change. Due to a high degree of vulnerability to climate change, adaptation is particularly important for Mongolia, and as such a distinct adaptation component is therefore included in the INDC." (UNFCCC, 2018a)

2.4.6 Pakistan

The Economist Intelligence Unit (EIU) expected the new government, led by the Pakistan Tehreek-e-Insaf (PTI), to serve a full term until the next general election in 2023. The new administration faces the challenge of averting an impending balance-of-payments crisis. The outlook for political stability will remain poor in the forecast period. Disputes between political parties, terrorism and social unrest will keep political instability high in 2019-2023. The military will continue to shape much of the country's foreign and security policies, and the PTI-led coalition government will be largely amenable to this. As a result, ties between the civilian government and the military are likely to be positive.

The parlous domestic security situation will remain a key source of instability in 2019-2023, despite improvement. It will undermine economic growth potential by posing ongoing operational and strategic challenges to infrastructure projects and business investment. The real GDP (on an expenditure basis) will expand by an annual average of 2.9% in fiscal years 2018/2019-2022/2023 (July-June). Growth will slow owing to a reduction in government spending as Pakistan enters an IMF program. Pakistan will secure a financial assistance package from the IMF in the early 2019. This, complemented with loans from other bilateral and multilateral donors, will help to stabilize the strained balance-of-payments situation.

<Table 2.8> Economic outlook of Pakistan

Economic Indicator	2018	2019	2020	2021	2022	2023
Real GDP growth(%)	5.4	3.8	2.4	2.5	2.6	3.1
Consumer price inflation(average: %)	5.4	8.8	8.1	7.3	6.0	6.2
Government balance (%of GDP)	-5.4	-4.9	-4.8	-4.8	-4.9	-4.9
Current-account balance (% of GDP)	-5.8	-4.5	-3.6	-3.5	-3.6	-3.9
Money market rate (average: %)	7.3	10.4	13.1	11.5	8.7	7.6
Unemployment rate(%)	6.0	6.3	6.2	6.1	5.8	5.7
Exchange rate PRs: US$(average)	121.12	137.50	139.98	140.18	141.33	142.38

Source: EIU (2018)

Pakistan announced its intended nationally determined contribution (INDC) that "a reduction of up to 20 percent in the projected emission figures for 2030 would require an investment of approximately US$ 40 billion, calculated at current prices. Similarly, a reduction of 15 percent in GHG emissions amounts to US$ 15.6 billion; where a 10 percent reduction is calculated as US$ 5.5 billion. The indicated mitigation potential can only be realized through international support in the form of financial grants, technical assistance, technology development and transfer and capacity building."

According to Pakistan's INDC, "Pakistan is among the most severely threatened countries in terms of climate-induced challenges. Individual areas face unique stresses, which can be quite different depending on the geographical location and rate of urbanization of the individual administrative units within Pakistan. This requires a multifaceted approach to climate change at the national level as well as sub-national level." (UNFCCC, 2018a)

2.4.7 Myanmar

The Economist Intelligence Unit (EIU) expected that no progress on political reform will be made by the National League for Democracy (NLD) government before the 2020 election. By-elections due in November 2018 will show a slide in support for the NLD. Numerous conflicts with ethnic-minority armed groups will remain unresolved. However, the main business centers (Yangon, Mandalay and Naypyidaw) will remain secure, ensuring continued large inflows of foreign direct investment (FDI). Western governments will remain critical of the government's mistreatment of the ethnic-minority Rohingya in 2019-2023. There will be little progress towards resolution of the issue.

According to EIU, Myanmar's international relations will rebalance towards China over the next five years. Despite a recent softening of FDI flows into manufacturing, foreign funding for power generation and infrastructure projects will underpin continued strong GDP growth in fiscal years 2019/2020-2023/2024 (April-March), averaging 7.3% a year in real terms. Consumer price inflation will average 6.4% a year in 2019-2023, reflecting the weakness of the kyat and the partial monetization of the fiscal deficit. There will consequently be little scope for the Central Bank of Myanmar to loosen monetary policy. The current-account deficit will expand, owing to large imports for investment projects. This will be financed mainly by inflows of FDI. Services credits and workers' remittances will lend some support to the current-account balance, offset by rising income outflows.

<Table 2.9> Economic outlook of Myanmar

Economic Indicator	2018	2019	2020	2021	2022	2023
Real GDP growth(%)	6.9	7.2	7.0	7.4	7.3	7.5
Consumer price inflation (average: %)	6.8	6.5	6.3	6.0	6.6	6.8
Government balance (%of GDP)	-3.8	-4.1	-4.1	-4.4	-4.6	-4.7
Current-account balance (% of GDP)	-7.2	-8.1	-8.2	-8.0	-8.6	-8.7
Money market rate (average: %)	10.0	10.5	10.8	10.5	10.5	10.5
Unemployment rate(%)	4.0	3.9	3.9	3.8	3.8	3.8
Exchange rate Kt: US$(average)	1,422	1,616	1,679	1,708	1,744	1,789

Source: EIU (2018)

Myanmar announced its intended nationally determined contribution (INDC) that "the implementation of increasing forest land and improving energy efficiency in industry and cook-stoves will result in significant reductions in GHG emissions. The implementation of these actions will be contingent to a number of factors, including support for capacity building, technology development and transfer, and financial resources."

According to Myanmar's INDC, "Myanmar is inherently exposed to severe natural weather events over the last sixty years. The nation's coastal area covers more than 50% of the entire eastern side of the Bay of Bengal and Andaman Sea and is therefore prone to cyclones, heavy rains and storm surges. Droughts are frequent, particularly in central Myanmar. However the capacity to reduce risk and mitigate the effects of climate change is limited due to lack of technical, human resources, financial and legislative processes." (UNFCCC, 2018a)

2.4.8 North Korea

The Economist Intelligence Unit (EIU) expected the Domestic politics to remain stable in 2018-2019 under the leadership of Kim Jong-un. The young leader, whose position has been bolstered by the country's nuclear program, will focus on economic welfare to abide by the country's juche ideology. A flurry of diplomatic summits between North Korea and South Korea, China and the US has significantly reduced tensions on the Korean peninsula. However, prospects for the long-term denuclearization of the North remain elusive.

The EIU expected a continued thawing of inter-Korean relations in 2018-2019. This is likely to translate into a resumption of economic co-operation by the South to the North. Chinese-North Korean commercial ties will remain strong. The risk of economic collapse in the isolated state is remote, as it remains resilient in the face of sanctions. However, it will experience a short recession in 2018 owing to lower trade with China, before recovering to post economic growth of 2% in 2019. The black-market exchange rate for North Korea's currency, the won, will remain weak, reflecting a lack of confidence in the authorities' ability to maintain a stable currency.

<Table 2.10> Economic outlook of North Korea

Economic Indicator	2016	2017	2018	2019
Real GDP growth(%)	3.9	1.1	-1.0	2.0
Exchange rate Won: US$(average)[a]	107.8	135.0	140.0	130.0

a: Official rate variable; black-market rates of up to Won 10,000:US$1 also exist.
Source: EIU (2018)

North Korea announced its intended nationally determined contribution (INDC) to "reduce GHG emissions by 8% compared to BAU scenario with domestic resources by 2030. North Korea could achieve the additional contribution equivalent to 32.25% of the GHG emission in the BAU scenario by 2030 if international support is received through international cooperation including the financial support under the Paris Agreement."

According to North Korea's INDC, "the general goal of adaptation strategy to climate change in North Korea is to recover degraded natural eco-environment, improve its function, establish economic, social and environmental structures coping with climate change, and raise up adaptation capacity to negative impacts of climate change into the advanced level. However, international support has a great potential to help implementation of adaptation measures in DPR Korea in terms of financial resource, capacity building and technology transfer." (UNFCCC, 2018a)

Chapter 3. Methodology of Evaluating Decision-making Criteria and its Implications

3.1 Analytic Hierarchy Process (AHP)

As the aforementioned precedent researches conducted surveys on various groups using the AHP methodology to evaluate the determinants of renewable energy projects or the policy measures of environmental policies, this study selected four groups to compare their relative significance of five decision-making criteria for international cooperation on climate change and then assess the appropriateness of international cooperation options and partner countries – foreign negotiators from developed countries (16 persons); foreign negotiators from developing countries (16 persons); Korean negotiators (34 persons); and Korean experts (43 persons).

The Analytic Hierarchy Process (AHP) is a general theory of measurement. “It is used to derive ratio scales from both discrete and continuous paired comparisons. These comparisons may be taken from actual measurements or from a fundamental scale which reflects the relative strength of preferences and feelings.” The AHP is a method that can be used to establish measures in both the physical and social domains. The elements of a hierarchy are grouped in clusters according to homogeneity and a level may consist of one or several homogeneous clusters. The consistency index (CI) of a matrix of comparisons is given by

$CI = (\lambda max - n)/(n - 1)$.

The consistency ratio (CR) is obtained by comparing the CI with the appropriate one of the following set of numbers, each of which is an average random consistency index (RI) derived from a sample of size 500, of which a randomly generated reciprocal matrix using the scale l/9, l/8,…1, ...8, 9 in <Table 3.1> to see if it is about 0.10 or less (Saaty, 1987).

<Table 3.1> Analytic hierarchy measurement scale

Reciprocal Measure of Intensity of Importance	Definition
1	Two criteria are equally important
3	One criterion is weakly important over another
5	One criterion is moderately important over another
7	One criterion is strongly important over another
9	One criterion is absolutely important over another

Source: Saaty (1987)

3.2 Friedman Test and Weighted Kappa Index

The data used for statistical analysis are generally randomly sampled from the population. The population is deduced on the basis of the information obtained from the data according to the purpose of the research. Under the assumption that the shape of the population follows the normal distribution; a statistical test is conducted to confirm the population distribution. The statistical test method can be roughly divided into parametric and nonparametric tests. The parametric test method is based on the assumption that the population is normally distributed and has equidistant distribution. The nonparametric test method is not restricted by the distribution, and can be used when the population is not normally distributed or when the distribution of the population is not known. In this study, the nonparametric statistical method was used because the samples of all subjects were not from any known distribution like normal distribution.

3.2.1 Friedman Test

The Friedman test is used for the nonparametric sample and has the same usage as the one-way Repeated-Measures (RM) ANOVA test of the parametric methods. The Friedman test is a more extended method than Wilcoxon signed rank test which is used for comparing two groups (Hollander and Wolfe, 2014). The Friedman test is similar to the Kruskal-Wallis test in that it is a nonparametric method of comparing three or more samples and assigns a rank order to the group samples. However, while the Kruskal-

Wallis test corresponds to the One-way ANOVA method which measures the results once for each group, while the Friedman test corresponds to One-way Repeated-Measures ANOVA (RM ANOVA) method which measures the results repeatedly for the same subject over the passage of time.

The null hypothesis is that no differences in location affect the medians (or means) of the k treatments within each of the blocks. The alternatives considered here correspond to either general or ordered differences between the treatment effects (medians or means) (Hollander and Wolfe, 2014). The procedure involves ranking each row (or *block*) together, then considering the values of ranks by columns. Applicable to complete block designs, it is thus a special case of the Durbin test.

A more detailed verification procedure is described below. First, the structure of the observed data is converted into ranked data.

[Observed data]

		Treatment				
		1	2	⋯	k	Mean
Block	1	X_{11}	X_{12}	⋯	X_{1k}	$\overline{X_{1.}}$
	2	X_{21}	X_{22}	⋯	X_{2k}	$\overline{X_{2.}}$
	⋮	⋮	⋮		⋮	⋮
	n	X_{n1}	X_{n2}	⋯	X_{nk}	$\overline{X_{n.}}$
	Mean	$\overline{X_{.1}}$	$\overline{X_{.2}}$	⋯	$\overline{X_{.k}}$	$\overline{X_{..}}$

[Ranked data]

		Treatment			
		1	2	⋯	k
Block	1	R_{11}	R_{12}	⋯	R_{1k}
	2	R_{21}	R_{22}	⋯	R_{2k}
	⋮	⋮	⋮	R_{ij}	⋮
	n	R_{n1}	R_{n2}	⋯	R_{nk}
	Mean	$\overline{R_{.1}}$	$\overline{R_{.2}}$	⋯	$\overline{R_{.k}}$

Then, when the number of the population is k and the number of samples in each processing population is n, the reaction values in the corresponding variable item are ranked from 1 to k in the order of magnitude. If there are equal values, the average ranking is given. Then, after finding the rank sum of the reaction values belonging to each group R_1, R_2, ... R_k, the statistical test is conducted by using a chi-square (χ^2) distribution with the degree of freedom k-1.

The test statistic of the Friedman test is shown in the following equation (1).

$$F = \sum_{i=1}^{k} R_i^2 \frac{12}{nk(K+1)} - 3n(k+1) \quad (1)$$

Where, F: test statistic

$\sum_{i=1}^{k} R_i^2$: Sum of squares for rank at each population level

Finally, we compare the above test statistic with the critical value in the given test table to determine whether the null hypothesis is rejected (Song et al., 2015)..

The Friedman test was performed using SPSS 25 in order to check whether the mean values of importance for five decision-marking criteria are the same – for adaptation

needs, mitigation potential, project certainty, economic development and global peace.

3.2.2 Weighted Kappa

Kappa coefficient was first introduced by Cohen (1960) and thus are called Cohen's Kappa coefficient. The Cohen's Kappa coefficient is the method used to determine the agreement between the two evaluators. The Kappa coefficient uses a match that corrects the probability that the evaluators randomly group the data into the same category (Cohen, 1960).

The definition of is:

$$\mathrm{K} = \frac{p_0 - p_e}{1 - p_e} = 1 - \frac{1 - p_0}{1 - p_e} \tag{2}$$

where, p_o is the relative observed agreement among raters (identical to accuracy), and p_e is the hypothetical probability of chance agreement, using the observed data to calculate the probabilities of each evaluators randomly seeing each category. If the raters are in complete agreement then . If there is no agreement among the raters other than what would be expected by chance (as given by p_e), . It is possible for the statistic to be negative, which implies that there is no effective agreement between the two raters or the agreement is worse than random.

Kappa coefficient is defined as the ratio of the observed coincidence rate minus the coincidence by chance, to the chance out of 1 that the evaluators' scores would be identical. Evaluators performed the evaluation independently, and the subjects

evaluated were also independent and do not overlap each other. Kappa coefficient can be interpreted in various ways depending on the study. Among them, the classification proposed by Landis and Koch (1977) is widely used. This value is calculated by dividing the K value by six steps to evaluate the coincidence level. A Kappa coefficient of ≤0 is poor, 0.0-0.20 slight, 0.21-0.40 fair, 0.41-0.60 moderate, 0.61-0.80 substantial, 0.81-1.0 almost perfect (Landis and Koch, 1977). Altman (1991) calculated the K value by five steps. A Kappa coefficient of ≤0.20 is poor, 0.21-0.40 fair, 0.41-0.60 moderate, 0.61-0.80 good, 0.81-1.00 very good. This study followed Altman's criteria.

In 1968, about eight years after the announcement of the Kappa coefficient, Cohen added a weighted kappa statistic (Cohen, 1968), which weighs the categorical data of the order scale to measure agreement. Weighted kappa is a match that reflects the degree of discrepancy when evaluators do not agree, and is widely used in clinical assessment, test-retest reliability, and social research (Um, 2016). When two evaluators categorize the n subjects into one of the k categories of ordered scales, the evaluation results can be summarized as k × k slices. Here, let n_{ij} be the frequency of subjects whose subjects are classified into the i-th category and the j-th category, the number of the subjects classified into the i-th category by the first evaluator, n_i. The weighted kappa agreement KW of Cohen (1968) is defined by the following equation (3).

$$KW = 1 - \frac{\sum_{i=1}^{k}\sum_{j=1}^{k} w_{ij}p_{ij}}{\sum_{i=1}^{k}\sum_{j=1}^{k} w_{ij}p_{i.}p_{.j}} \quad (3)$$

Where, KW: weighted kappa agreement,

P_{ij}: a weight indicating the degree of discrepancy between the two evaluators

W_{ij}:0 a weight between 0 and 1 ($w_{ij} = 0$ if $i = j$, $w_{ij} > 0$ if $i \neq j$),

$\sum_{i=1}^{k} \sum_{j=1}^{k} w_{ij} p_{ij}$: the rate of agreement between the two evaluators

$\sum_{i=1}^{k} \sum_{j=1}^{k} w_{ij} p_{i.} p_{.j}$: the rate at which the evaluation between the two evaluators coincide under the null hypothesis ($H_0 : p_{ij} = p_{i.} p_{.j}$, i, j = 1, ⋯ , k)

3.3 Conduct of Surveys and Interviews

3.3.1 Surveys on foreign negotiators, Korean negotiators and experts

The analytic hierarchy process (AHP) was used to assess the relative importance of five decision-making criteria –adaptation needs; mitigation potential; project certainty; economic development; and global peace. In addition, this study was also designed to apply the mean value of importance of five decision-making criteria to evaluating the appropriateness of three international cooperation options stipulated in the article 6 of the Paris Agreement – cooperative approaches (CA), sustainable development mechanism (SDM) and non-market approaches (NMA) – and gauging the suitability of eight Asian countries as cooperation partners. The eight Asian countries are Vietnam, Indonesia, Philippines, Bangladesh, Mongolia, Pakistan, Myanmar and North Korea.

The survey questionnaire carried the related information and the definition of five decision-making criteria in the head as follows:

Korea has completed the first phase of the nation-wide emissions trading system without allowing emission reductions achieved abroad from 2015 to 2017. From its second phase starting in 2018, Korea allows domestic participating entities to use emission reductions achieved by their own international cooperation projects abroad.

In this regard, the questionnaire aims to explore decision-making criteria which is used by entities when selecting foreign partners or cooperation options such as the three options of international cooperation – "cooperative approaches" (Art. 6.2-3),

"sustainable development mechanism" (Art. 6.4-7) and "non-market approaches" (Art.6.8-9) - as stipulated in the Paris Agreement (even though the operational rules are still under discussion).

The decision-making criteria of this questionnaire are defined as follows:

- ***Adaptation Needs**: How much does the host country require adaptation measures to address the adverse effects of climate change?*
- ***Mitigation Potential**: How much mitigation performance can be achieved by the cooperation project?*
- ***Project Certainty**: How certain are the internationally established guidelines and procedures on the specific cooperation project, and the general circumstances such as the stability and political commitment of the host country to implement the project, and the social and cultural compatibility between the cooperating countries?*
- ***Economic Development**: How much does the project contribute to the economic development (i.e. economic growth and improvement in social welfare for its people) of the host country?*
- ***Global Peace**: How much does the project contribute to reducing conflicts among cooperating countries and further promoting global peace?*

The respondents were requested to compare the five decision-making criteria pairwise by rating 5, 4, 3, 2, and 1, which were converted to 9, 7, 5, 3, and 1 respectively with the analytic hierarchy measurement scale for the statistical analysis (Saaty, 1987).

The surveys were conducted in three ways: a Korean-language survey regarding the relative importance of five decision-making criteria, the appropriateness of three international cooperation options, and on the suitability of eight Asian countries as cooperation partners of mitigation or adaptation projects was administered to 34 Korean negotiators before they departed for Bangkok Climate Change Conference held on

September 3-7, 2018. Meanwhile, 32 foreign negotiators, who participated in the aforementioned conference, answered an English-language survey questionnaire on the relative importance of five decision-making criteria and appropriateness of three international cooperation options during the period of the conference. Of these, 16 were from developed countries and the remainder from developing countries. In addition, 43 Korean experts answered the same Korean language survey questionnaire as the Korean negotiators by email during a month after the Bangkok conference.

With reference to the threshold of passing the consistency ratio, only 18 from 109 respondents could pass the consistency test if those who had the consistency ratio of 0.1 or less were supposed to pass, as recommended by Saaty (1987). It could be perceived that the five decision-making criteria for this study were very discrete to compare one another with high degree of consistency.

In order to decide the appropriate cut-off line for consistency test in this study, five people who had at least 5 years of experience participating in international climate change negotiations were selected from the group of Korean experts who sent their response of survey questionnaire by e-mail. Naturally, their answers on AHP showed consistency ratios from 0.080 to 0.294, meaning that their answers were reliable, despite the five decision-making criteria being rather difficult to compare with one another. In this regard, the maximum consistency ratio from the group of five experts served as the cut-off line for weeding out inconsistent participants. By this standard, 20 foreign negotiators (12 and 8 from developed and developing countries respectively), 22 Korean negotiators and 34 Korean experts were deemed consistent enough to be used, as shown in <Table 3.2>.

<Table 3.2> Summary of survey respondents

Group	Number of Those Who Responded the Survey	Number of Those Who Passed the Consistency Test	The Rate of Passing the Consistency Test
Negotiators from developed countries	16	12	75%
Negotiators from developing countries	16	8	50%
Korean Negotiators	34	22	65%
Korean Experts	43	34	79%
Total	109	76	70%

3.3.2 Interviews with Korean executive experts

15 Korean executive experts were selected for a structured interview on the interpretation of survey results, with a view to getting objective interpretation on and exploring undiscovered explanations of survey results. All of them have an experience of at least 10 years in international negotiations, domestic implementation and policy making on addressing climate change. Some of them served as the chief negotiator of Korean delegation to climate change negotiations or the head of the national Greenhouse Gas Inventory and Research Center (GIR). 13 Korean executive experts answered the written questionnaire on different evaluations of five decision-making criteria among survey groups; assessments of three international options; evaluations of eight Asian countries for international cooperation; and appropriate ways of cooperation with North Korea.

Chapter 4. Results of Surveys and Interviews

4.1. Surveys on Foreign Negotiators, Korean Negotiators and Experts

4.1.1 Different preferences on five decision-making criteria by groups

The six groups – the combined group of foreign negotiators from developed and developing countries; foreign negotiators from developed countries; foreign negotiators from developing countries; the combined group of foreign negotiators from developing countries and Korean negotiators; Korean negotiators; and Korean experts – took on different preference patterns with respect to the five decision-making criteria. In <Figure 4.1>, all the groups generally showed stronger preferences towards the criteria of project certainty (PC) and mitigation potential (MP), compared to those of adaptation needs (AN), economic development (ED) and global peace (GP). Meanwhile, each group put the highest value on the different criteria showing its different preference towards the criteria. Foreign negotiators from developed countries (FN Dvlped) preferred mitigation potential (MP), while foreign negotiators from developing countries (FN Dvlping) preferred adaptation needs (AN) and economic development (ED). Korean negotiators (KN) preferred project certainty (PC), while Korean experts (KE) preferred global peace (GP).

The combined group of foreign negotiators from developed and developing countries

(FN All) did not show the most or the least importance to any criteria among the break-out groups, which means the two groups of negotiators from developed (FN Dvlped) and that of negotiators from developing countries (FN Dvlping) cancelled out the differences of their assessments each other. Similarly, the combined group of foreign negotiators from developing countries and Korean negotiators (FN Dvlping & KN) did not put the most or the least importance to any criteria because of the same reason as for the other combined group of foreign negotiators from developed and developing countries.

In this context, those two combined groups have been removed from <Figure 4.2> afterwards so that the four remaining groups can show their characteristic patterns of preference more clearly, with respect to the appropriateness of international cooperation options and the suitability of eight Asian countries as cooperation partners in climate change projects.

With respect to adaptation needs in <Table 4.1>, foreign negotiators from developing countries put the highest value (0.192), while foreign negotiators from developed countries put the lowest value (0.061). To the contrary, with reference to mitigation potential, foreign negotiators from developed countries put the highest value (0.346), while those from developing countries put the second lowest value (0.218) after Korean experts which put the lowest value (0.214). In regard to project certainty, Korean negotiators and foreign negotiators from developed countries put the highest values (0.381 and 0.370 respectively), while foreign negotiators from developing countries put the lowest value (0.230). With reference to economic development, foreign negotiators

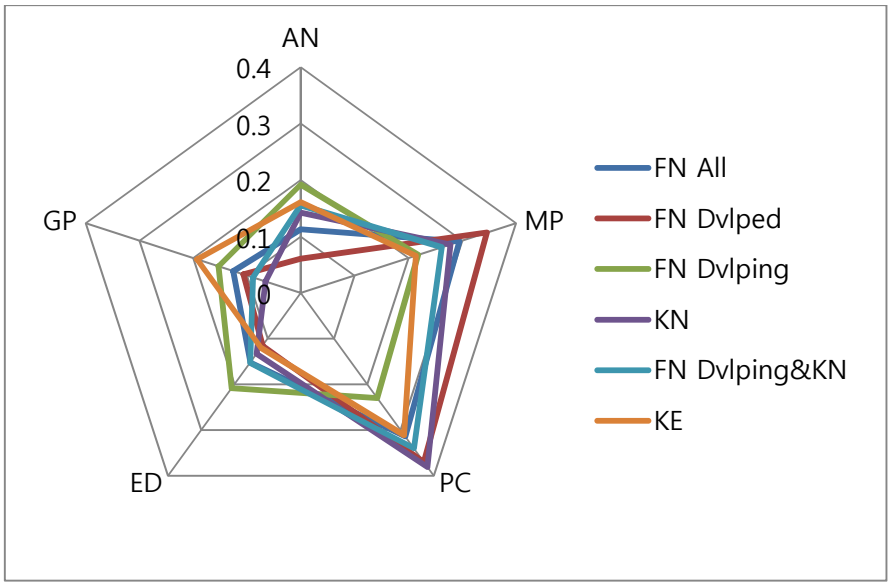
from developing countries put the highest value (0.208), while foreign negotiators from developed countries put the lowest value (0.115). In regard to global peace, Korean Experts and foreign negotiators from developing countries put the highest values (0.193 and 0.153 respectively), while Korean negotiators put the lowest value (0.066).

Negotiators from developed countries put more importance to project certainty (0.370) and mitigation potential (0.346), while negotiators from developing countries relatively attached more importance to economic development (0.208), adaptation needs (0.192) and global peace (0.153). Generally, Korean negotiators answered in between negotiators from developed and developing countries with respect to the criteria of adaptation needs, mitigation potential and economic development, while Korean negotiators attached the most importance to project certainty (0.381) and the least importance to global peace (0.066).

Korean experts and negotiators generally showed the similar preferences to adaptation needs, economic development and project certainty, but the two groups notably put the highest and the lowest values on the same criterion of global peace respectively. Obviously, Korean experts seemed to pay more attention to possible peaceful developments to be ensued from forestation projects and other climate related cooperation with North Korea in view of the recent positive development of South-North Korea relations since the early 2018. Meanwhile, Korean negotiators may have focused on the unconvincing record of cooperation with North Korea in the past with a view to maximizing the outcomes from international cooperation on climate change.

The null hypothesis that the means of importance are the same for the five decision-

making criteria was rejected by Friedman test under the level of significance at 0.05 (p-value: 0.011). By post hoc comparison with Bonferroni correction, there was the statistical difference between global peace and project certainty (adjusted p-value=0.037<0.05). It supported the biggest difference in the relative importance of both foreign negotiators from developing countries and Korean negotiators between project certainty (0.230 and 0.381 respectively) and global peace (0.153 and 0.066 respectively).



<Figure 4.1> Importance of decision-making criteria for international cooperation on Climate Change

Note: FN All (The combined group of foreign negotiators from developed and developing countries); FN Dvlped (Foreign negotiators from developed countries); FN Dvlping (Foreign negotiators from developing countries); KN (Korean negotiators); FN Dvlping & KN (The combined group of foreign negotiators from developing countries and Korean negotiators); KE (Korean experts); AN (Adaptation Needs); MP (Mitigation Potential); PC (Project Certainty); ED (Economic Development); GP (Global Peace)

<Table 4.1> Importance of decision-making criteria for international cooperation on Climate Change

Group	Adaptation Needs	Mitigation Potential	Project Certainty	Economic Development	Global Peace
Foreign Negotiators (n=20)	0.113	0.295	0.314	0.152	0.126
Foreign Negotiators fromDeveloped Countries(n=12)	0.061	0.346	0.370	0.115	0.107
Foreign Negotiators from Developing Countries (n=8)	0.192	0.218	0.230	0.208	0.153
Korean Negotiators (n=22)	0.142	0.278	0.381	0.133	0.066
Negotiators from Developing Countries and Korean Negotiators (n=30)	0.155	0.262	0.340	0.153	0.089
Korean Experts (n=34)	0.161	0.214	0.311	0.120	0.193
All Respondents (n=76)	0.143	0.255	0.335	0.132	0.137

4.1.2 Assessment on the appropriateness of international cooperation options for all the respondents

The values of appropriateness for each cooperation option were calculated by multiplication of the mean value (integer from 1 to 5) for the appropriateness of international cooperation option with the mean value of importance for the corresponding item of five decision-making criteria by the four groups – negotiators from developed countries, negotiators from developing countries, Korean negotiators

and Korean experts. The mean weights of five decision-making criteria for different groups are shown in <Table 4.1>. Discussions on the operational rules of three international cooperation options has been made within the framework of climate change negotiation on the rulebook of the Paris Agreement and will be continued until the 25th session of Conference of Parties (COP 25) to be held in Chile in November 2019. In this sense, it was too early to ask respondents to assess the appropriateness of each cooperation options. However, the Paris Agreement stipulated the basic nature of three cooperation options in the article 6.

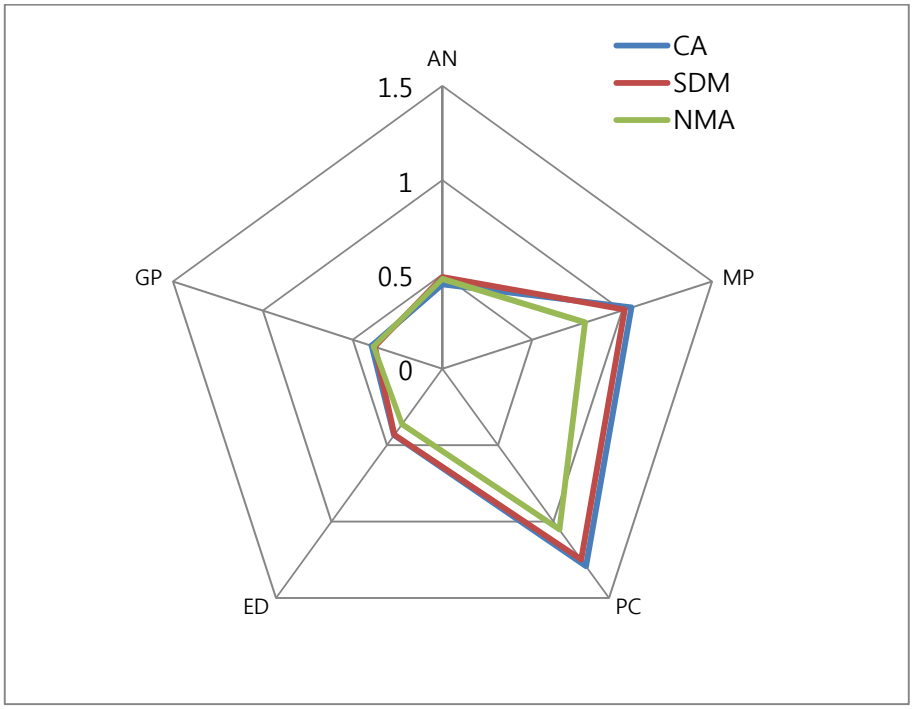
In addition, many international negotiators and experts also share the common understanding on the general validity of three cooperation options over the course of long negotiations. According to this framework, cooperative approaches (CA) refer to a voluntary form of crediting and emission trading mechanism for international cooperation on climate change. Sustainable Development Mechanism (SDM) refers to a centralized form of crediting mechanism under the guidance of the conference of Parties to the UNFCCC (COP). Meanwhile, non-market approaches (NMA) refer to a variety of international cooperation measures that happen outside of market, such financial assistance, capacity building, training, public awareness etc.

In <Figure 4.2>, the group of all respondents put more values on cooperative approaches (CA) and sustainable development mechanism (SDM) quite equally than non-market approaches (NMA). Generally, their values on project certainty (PC) and mitigation potential (MP) are high regardless of three cooperation options.

With respect to the sum of three international cooperation options in <Table 4.2>, the

combined group of all respondents put the highest value on cooperative approaches (3.625) and the lowest value on non-market approaches (3.070). With respect to five decision-making criteria, the combined group put the highest value on project certainty (1.199), followed by mitigation potential (0.954), adaptation needs (0.470), economic development (0.410) and global peace (0.385). The combined group put similar values from 0.486 to 0.447 on adaptation needs regardless of international cooperation options. To the contrary, the combined group put higher values on CA and SDM than NMA with respect to mitigation potential, project certainty and economic development. With respect to global peace, the combined group put values in the order of CA, NMA and SDM with a narrow margin from 0.395 to 0.377.

The null hypothesis that the means of importance are the same for the five decision-making criteria was rejected by Friedman test under the level of significance at 0.05 (p-value: 0.022). By post hoc comparison with Bonferroni correction, there was the statistical difference between global peace and project certainty (adjusted p-value=0.045<0.05). It supported the biggest difference in the average of three cooperation options between project certainty (1.199) and global peace (0.385) in <Table 4.2>.



<Figure 4.2> Appropriateness of international cooperation options, with reference to five decision-making criteria for all the respondents

Note: CA (Cooperative Approaches); SDM (Sustainable Development Mechanism); NMA (Non-market Approaches); AN (Adaptation Needs); MP (Mitigation Potential); PC (Project Certainty); ED (Economic Development); GP (Global Peace)

<Table 4.2> Appropriateness of international cooperation options, with reference to five decision-making criteria for all the respondents

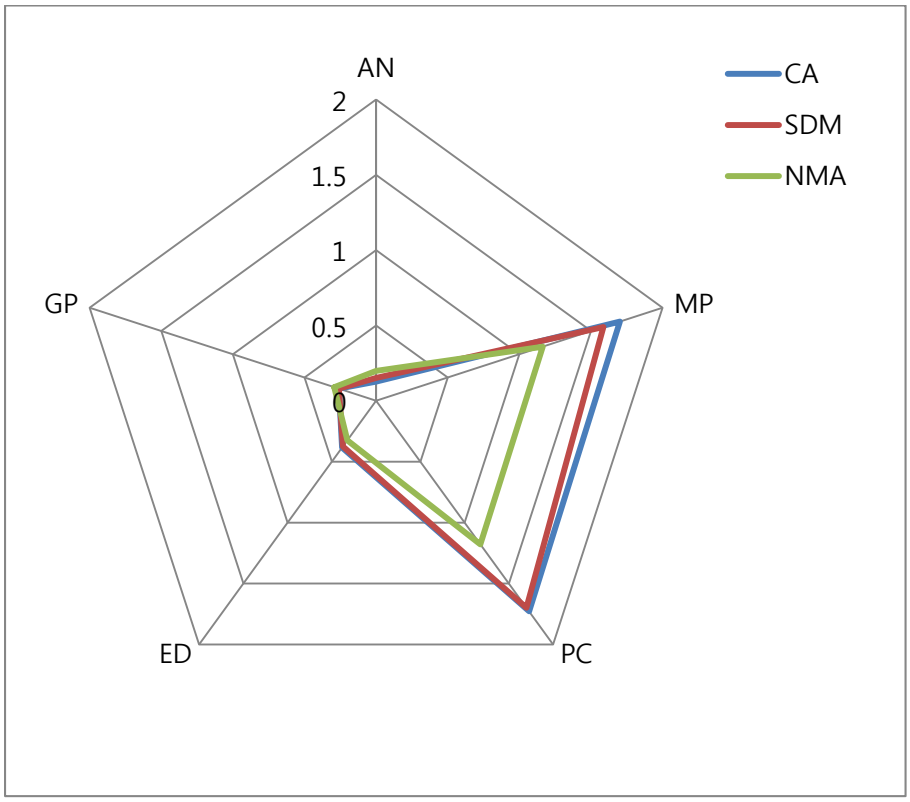
Cooperation option	Adaption needs	Mitigation potential	Project certainty	Economic Development	Global Peace	Sum
Cooperative Approaches (CA)	0.447	1.052	1.294	0.436	0.395	3.625
Sustainable Development Mechanism (SDM)	0.486	1.015	1.250	0.433	0.377	3.562
Non-Market Approaches (NMA)	0.476	0.794	1.053	0.363	0.384	3.070
Average	0.470	0.954	1.199	0.410	0.385	

4.1.3 Assessment on the appropriateness of international cooperation options by foreign negotiators from developed countries

In <Figure 4.3>, foreign negotiators from developed countries put more value on the appropriateness of cooperative approaches (CA), followed by sustainable development mechanism (SDM) and non-market approaches (NMA). The values of project certainty and mitigation potential for cooperative approaches are much higher (1.728 and 1.702 respectively) than the others. On the other hand, this group put the lower values on adaptation needs for cooperative approaches (0.127), global peace for cooperative approaches and sustainable development mechanism (0.260), and economic development for non-market approaches (0.325), as shown in <Table A1> of Appendix 2.

The null hypothesis that the means of importance are the same for the five decision-making criteria was rejected by the Friedman test under the level of significance at 0.05

(p-value: 0.017). By post hoc comparison with Bonferroni correction, there was a statistical difference between global peace and project certainty (adjusted p-value=0.019<0.05). It supported the biggest difference in the average of three cooperation options between project certainty (1.535) and adaptation needs (0.159), as shown in <Table A1> of Appendix 2.



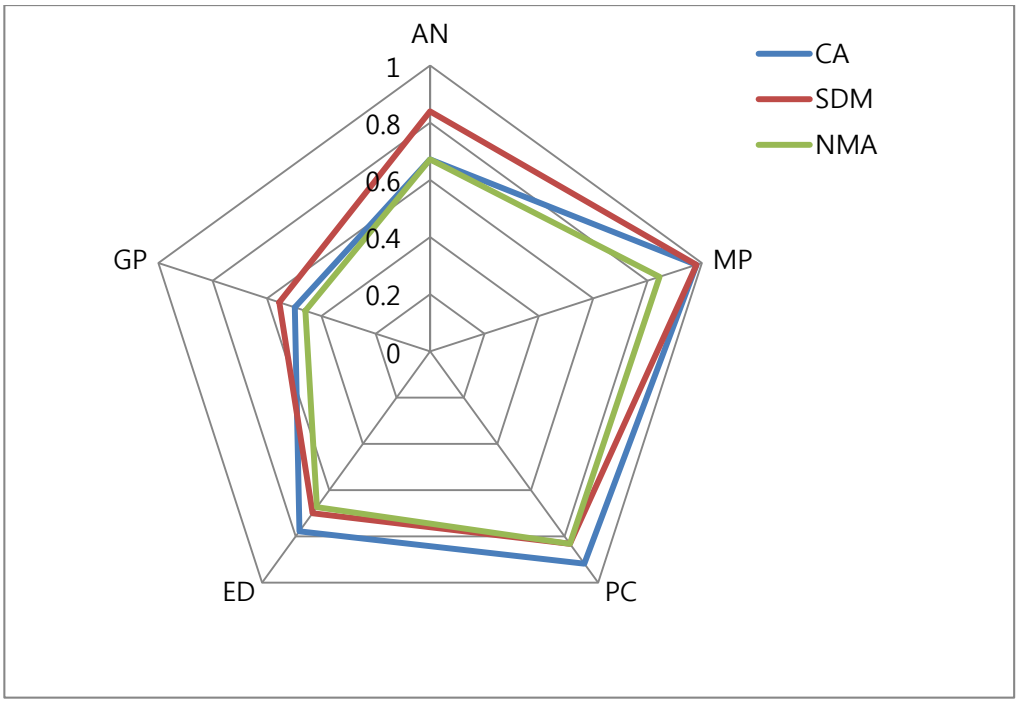
<Figure 4.3> Appropriateness of international cooperation options, with reference to five decision-making criteria for negotiators from developed countries

Note: CA (Cooperative Approaches); SDM (Sustainable Development Mechanism); NMA (Non-market Approaches); AN (Adaptation Needs); MP (Mitigation Potential); PC (Project Certainty); ED (Economic Development); GP (Global Peace)

4.1.4 Assessment on the appropriateness of international cooperation options by foreign negotiators from developing countries

In <Figure 4.4>, foreign negotiators from developing countries put more values on sustainable development mechanism (SDM), followed by cooperative approaches (CA) and non-market approaches (NMA). Meanwhile, the values of mitigation potential (MP) and project certainty (PC) for all three options are quite high. The values of adaptation needs (AN), economic development (ED) and global peace (GP) are significantly high compared to those by foreign negotiators from developed countries in <Figure 4.3>.

The null hypothesis that the means of importance are the same for the five decision-making criteria was rejected by Friedman test under the level of significance at 0.05 (p-value: 0.034). By post hoc comparison with Bonferroni correction, there was the statistical difference between global peace and project certainty (adjusted p-value=0.019<0.05). It supported the biggest difference in the average of three cooperation options between mitigation potential (0.935) and global peace (0.504), as shown in <Table A2> of Appendix 2.



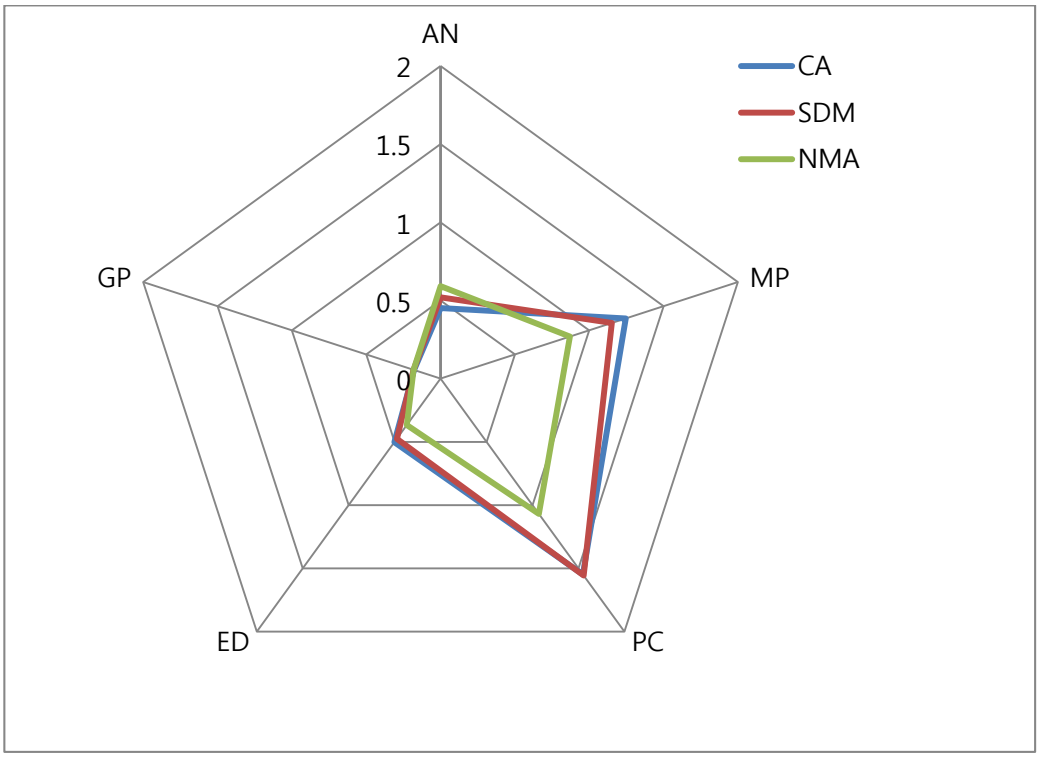
<Figure 4.4> Appropriateness of international cooperation options, with reference to five decision-making criteria for negotiators from developing countries

Note: CA (Cooperative Approaches); SDM (Sustainable Development Mechanism); NMA (Non-market Approaches); AN (Adaptation Needs); MP (Mitigation Potential); PC (Project Certainty); ED (Economic Development); GP (Global Peace)

4.1.5 Assessment on the appropriateness of international cooperation options by Korean negotiators

In <Figure 4.5>, Korean negotiators put more values on project certainty (PC) and mitigation potential (MP) for both cooperative approaches (CA) and sustainable development mechanism (SDM). While their values on adaptation needs (AN) and economic development(ED) are higher than those of negotiators from developed countries in <Figure 4.3>, they are lower than those by negotiators from developing countries overall across the three cooperation options in <Figure 4.4>.

The null hypothesis that the means of importance are the same for the five decision-making criteria was rejected by Friedman test under the level of significance at 0.05 (p-value: 0.022). By post hoc comparison with Bonferroni correction, there was the statistical difference between global peace and project certainty (adjusted p-value=0.019<0.05). It supported the biggest difference in the average of three cooperation options between project certainty (1.392) and global peace (0.181), as shown in <Table A3> of Appendix 2.



<Figure 4.5> Appropriateness of international cooperation options, with reference to five decision-making criteria for Korean Negotiators

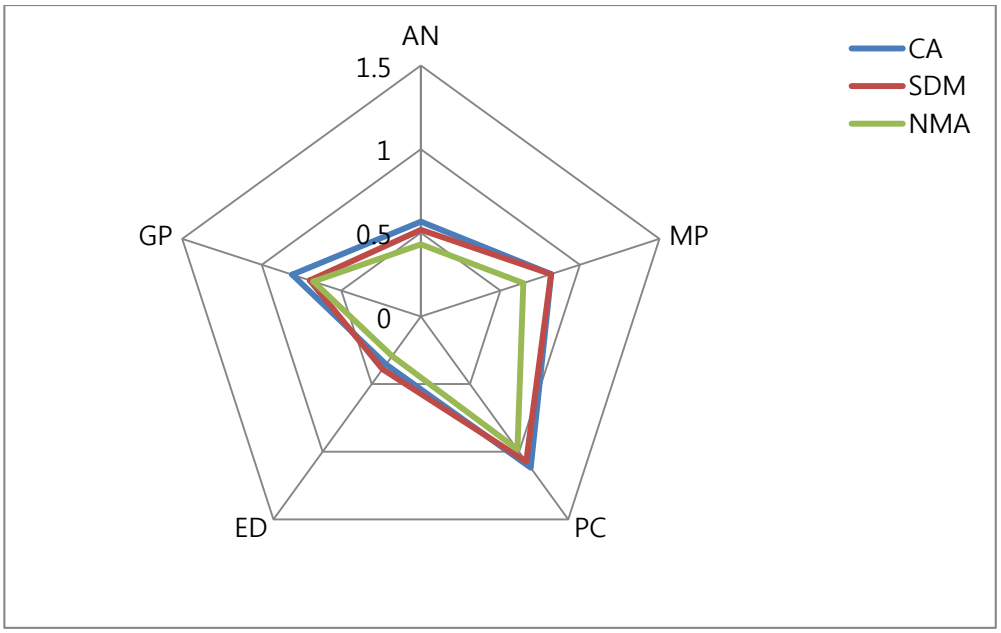
Note: CA (Cooperative Approaches); SDM (Sustainable Development Mechanism); NMA (Non-market Approaches); AN (Adaptation Needs); MP (Mitigation Potential); PC (Project Certainty); ED (Economic Development); GP (Global Peace)

4.1.6 Assessment on the appropriateness of international cooperation options by Korean experts

In <Figure 4.6>, Korean experts put more values on cooperative approaches (CA), followed by sustainable development mechanism (SDM) and non-market approaches (NMA). Obviously, they put the highest values on global peace (GP) across the three cooperation options compared to the other groups.

The null hypothesis that the means of importance are the same for the five decision-making criteria was rejected by Friedman test under the level of significance at 0.05 (p-value: 0.022). By post hoc comparison with Bonferroni correction, there was the statistical difference between global peace and project certainty (adjusted p-value=0.019<0.05). It supported the biggest difference in the average of three cooperation options between project certainty (1.058) and economic development (0.346).

The null hypothesis that the means of importance are the same for the five decision-making criteria was rejected by Friedman test under the level of significance at 0.05 (p-value: 0.015). By post hoc comparison with Bonferroni correction, there was the statistical difference between global peace and project certainty (adjusted p-value=0.013<0.05). It supported the big difference in the sum of five decision-making criteria between cooperative approaches (3.666) and non-market approaches (3,027), as shown in <Table A4> of Appendix 2.



<Figure 4.6> Appropriateness of international cooperation options, withreference to five decision-making criteria for Korean experts

Note: CA (Cooperative Approaches); SDM (Sustainable Development Mechanism); NMA (Non-market Approaches); AN (Adaptation Needs); MP (Mitigation Potential); PC (Project Certainty); ED (Economic Development); GP (Global Peace)

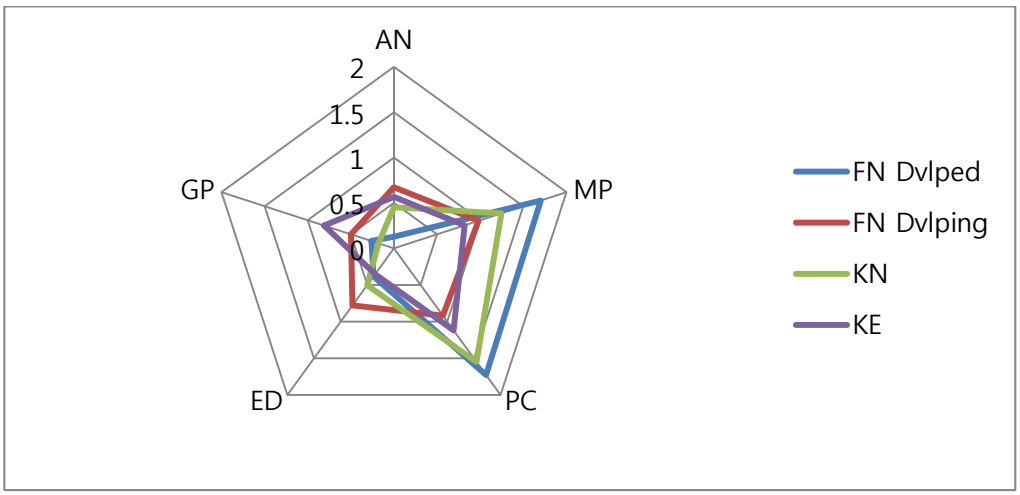
4.1.7 Assessment on the appropriateness of Cooperative Approaches by four groups

Focusing on cooperative approaches, all the groups put more values on project certainty (PC) and mitigation potential (MP) than three other criteria, as shown in <Figure 4.7>. Particularly, foreign negotiators from developed countries (FN Dvlped) put the highest values on project certainty (PC; 1.728) and mitigation potential (MP; 1.702) among four groups. Negotiators from developing countries (FN Dvlping) attached more importance to adaptation needs (AN; 0.672) and economic development (ED; 0.778) than the other groups. Meanwhile, Korean experts (KE) put higher value

on global peace (GP; 0.809), compared to other groups. On the other hand, Korean negotiators (KN) attached the lowest value to global peace (GP; 0.179) among the groups.

In addition, a weighted Kappa test was conducted to check the evaluation agreement of three international cooperation options with reference to five decision-making criteria between Korean negotiators and experts. In case of cooperative approaches, weighted Kappa was 0.196 (p-value = 0.159) for project certainty, which means poor agreement between the two groups in this regard.

In case of non-market approaches, weighted Kappa was 0.364 (p-value = 0.006) for economic development, which means fair agreement between the two group for this decision-making criterion (Altman, 1991).

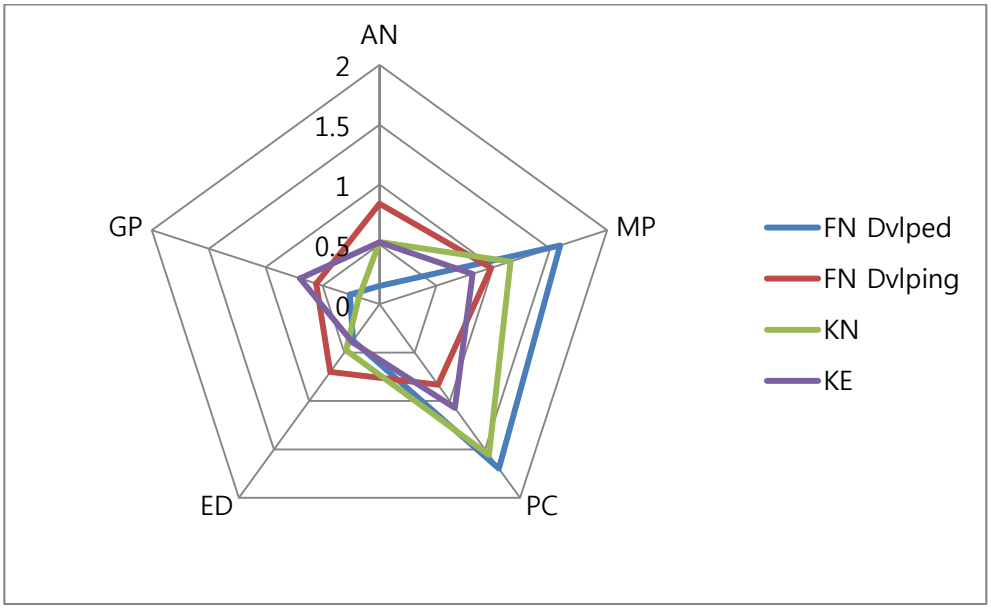


<Figure 4.7> Appropriateness of Cooperative Approaches, with reference to five decision-making criteria

Note: FN Dvlped (Foreign negotiators from developed countries); FN Dvlping (Foreign negotiators from developing countries); KN (Korean negotiators); KE (Korean experts); AN (Adaptation Needs); MP (Mitigation Potential); PC (Project Certainty); ED (Economic Development); GP (Global Peace)

4.1.8 Assessment on the appropriateness of sustainable development mechanism by four groups

With respect to sustainable development mechanism, most groups put more importance to project certainty (PC) and mitigation potential (MP) similarly to cooperative approaches. In <Figure 4.8>, while negotiators from developed countries (FN Dvlped) attached more values to project certainty (PC) and mitigation potential (MP), negotiators from developing countries (FN Dvlping) put more values on adaptation needs (AN) and economic development (ED). Korean experts (KE) put more value on global peace (GP) and Korean negotiators (KN) attached more value to project certainty (PC).

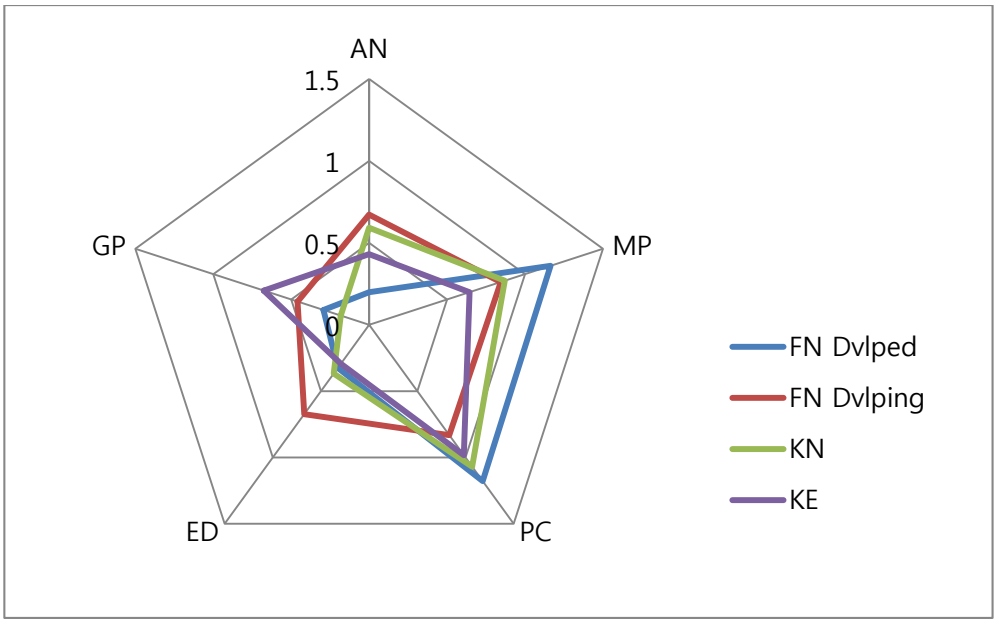


<Figure 4.8> Appropriateness of Sustainable Development Mechanism,with reference to five decision-making criteria

Note: FN Dvlped (Foreign negotiators from developed countries); FN Dvlping (Foreign negotiators from developing countries); KN (Korean negotiators); KE (Korean experts); AN (Adaptation Needs); MP (Mitigation Potential); PC (Project Certainty); ED (Economic Development); GP (Global Peace)

4.1.9 Assessment on the appropriateness of non-market approaches by four groups

In relation to non-market approaches, most groups put more importance to project certainty (PC) and mitigation potential (MP), although the absolute values are relatively lower in comparison to those for cooperative approaches and sustainable development mechanism. In <Figure 4.9>, while negotiators from developed countries (FN Dvlped), Korean negotiators (KN) and experts (KE) attached their highest value to project certainty (PC), negotiators from developing countries (FN Dvlping) put their lowest value to mitigation potential (MP) across the five criteria. Whereas negotiators from developing countries (FN Dvlping) put the highest value on adaptation needs (AN) and economic development (ED), Korean experts (KN) put the highest value on global peace (GP) among the four groups.



<Figure 4.9> Appropriateness of Non-market Approaches, with reference to five decision-making criteria

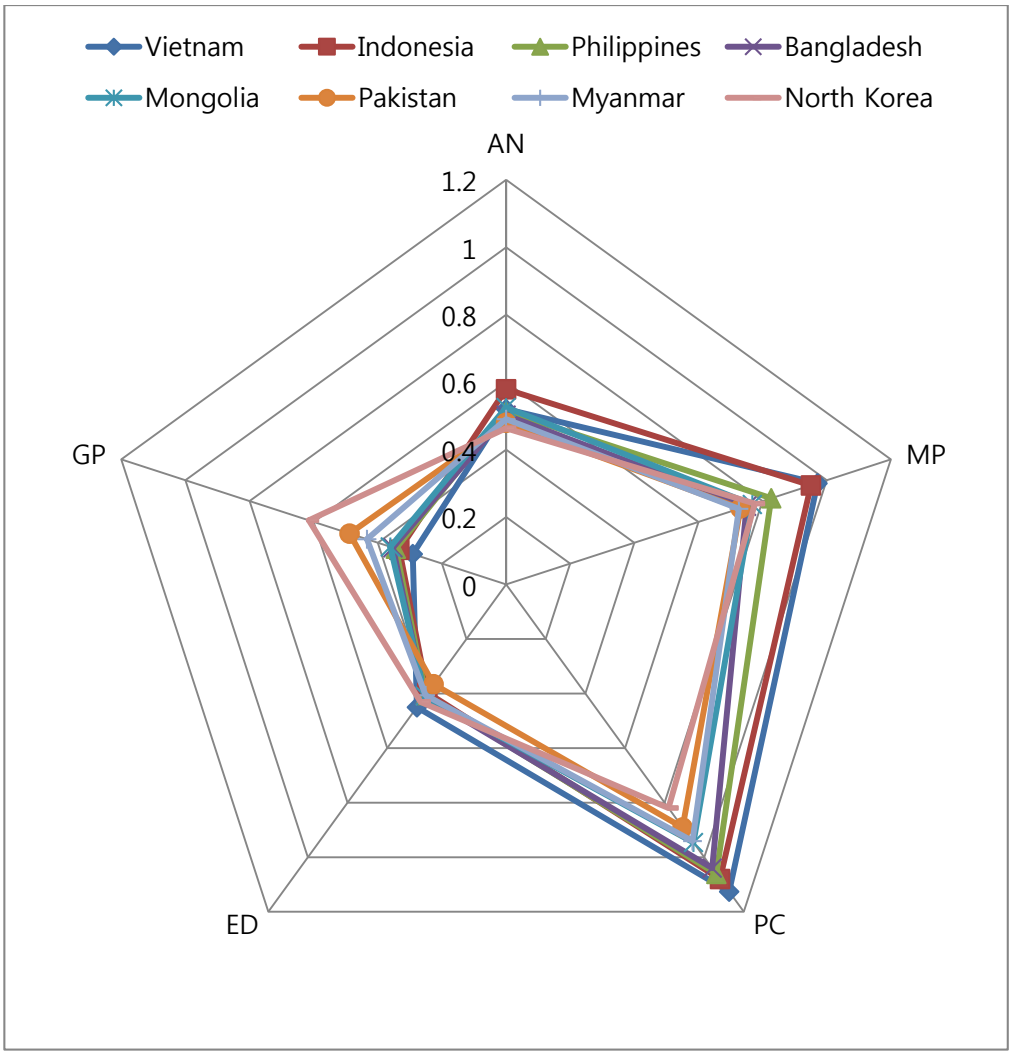
Note: FN Dvlped (Foreign negotiators from developed countries); FN Dvlping (Foreign negotiators from developing countries); KN (Korean negotiators); KE (Korean experts) AN (Adaptation Needs); MP (Mitigation Potential); PC (Project Certainty); ED (Economic Development); GP (Global Peace)

4.1.10 Assessment on the appropriateness of eight Asian countries by all the Korean respondents

Eight Asian countries were selected in view of the cooperation needs and geographical accessibility of partner country and its close relations with Korea. In <Figure 4.10>, the combined group of Korean negotiators and experts put more importance to project certainty (PC) and mitigation potential (MP), while putting less importance to global peace (GP), economic development (ED) and adaptation needs(AN) in assessing the suitability of eight Asian countries with respect to five

decision-making criteria. In <Figure 4.11>, the combined group selected Vietnam, Indonesia and Philippines as the most suitable cooperation partners, which is closely related to their economic relations with Korea. While the group gave North Korea the 4th place and attached the highest value to North Korea with reference to global peace (GP), they attached the second highest value to it with reference to economic development (ED) and adaptation needs (AN). However, the combined group put the lowest value on North Korea with respect to project certainty (PC) and a modest value on it with respect to mitigation potential (MP).

The null hypothesis that the means of importance are the same for the five decision-making criteria was rejected by Friedman test under the level of significance at 0.05 (p-value: 0.000). By post hoc comparison with Bonferroni correction, there was the statistical difference between global peace and project certainty (adjusted p-value=0.016<0.05). The statistical difference was also confirmed between project certainty and economic development (adjusted p-value=0.016<0.05), and between project certainty and global peace (adjusted p-value: 0.003<0.05). These supported the big differences in the average of eight Asian countries between mitigation potential (0.813) and global peace (0.402), between project certainty (0.988) and economic development (0.409), and between project certainty (0.988) and global peace (0.402), as shown in <Table 4.3>.



<Figure 4.10> Appropriateness of eight Asian countries, with reference to five decision-making criteria for all the Korean respondents

Note: AN (Adaptation Needs); MP (Mitigation Potential); PC (Project Certainty); ED (Economic Development); GP (Global Peace)

Adaption needs	Mitigation potential	Project certainty	Economic development	Global Peace	Rank
Indonesia	Vietnam	Vietnam	Vietnam	North Korea	Vietnam
Vietnam	Indonesia	Indonesia	North Korea	Pakistan	Indonesia
Mongolia	Philippines	Philippines	Bangladesh	Myanmar	Philippines
Philippines	North Korea	Bangladesh	Mongolia	Mongolia	North Korea
Bangladesh	Mongolia	Mongolia	Myanmar	Bangladesh	Bangladesh
Myanmar	Bangladesh	Myanmar	Philippines	Philippines	Mongolia
Pakistan	Pakistan	Pakistan	Indonesia	Indonesia	Myanmar
North Korea	Myanmar	North Korea	Pakistan	Vietnam	Pakistan

<Figure 4.11> Ranking chart of appropriateness of eight Asian countries, with reference to five decision-making criteria for all the Korean respondents

<Table 4.3> Appropriateness of eight Asian countries, with reference to five decision-making criteria for all the Korean respondents

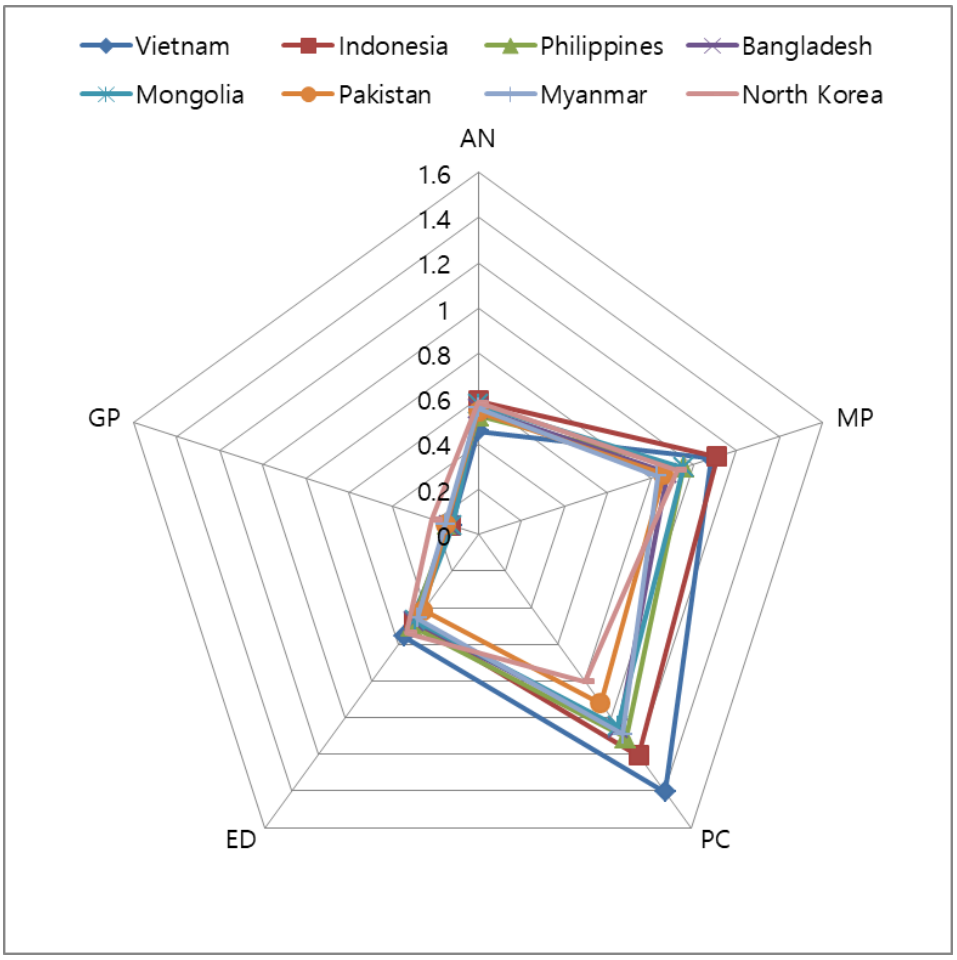
Country	Adaption needs	Mitigation potential	Project certainty	Economic Development	Global Peace	Sum	Rank
Vietnam	0.520	0.971	1.126	0.450	0.291	3.358	1
Indonesia	0.579	0.951	1.080	0.397	0.333	3.340	2
Philippines	0.513	0.827	1.061	0.405	0.344	3.150	3
Bangladesh	0.502	0.750	1.040	0.410	0.353	3.054	5
Mongolia	0.525	0.768	0.946	0.409	0.361	3.009	6
Pakistan	0.480	0.731	0.891	0.366	0.488	2.956	8
Myanmar	0.490	0.726	0.941	0.406	0.434	2.997	7
North Korea	0.463	0.776	0.820	0.431	0.615	3.106	4
Average	0.509	0.813	0.988	0.409	0.402		

4.1.11 Assessment on the appropriateness of eight Asian countries by Korean negotiators

In <Figure 4.12>, while Korean negotiators put the highest values on project certainty (PC) and modest values on mitigation potentials (MP), adaptation needs (AN) and economic development (ED) across the countries, they attached the highest value on North Korea with respect to global peace (GP). In <Figure 4.13>, Korean negotiators selected Vietnam, Indonesia and Philippines as the most suitable cooperation partners, like the combined group of Korean negotiators and experts. Although this group gave North Korea merely the 7th place, they attached the highest value to North Korea with reference to global peace and the second highest values to North Korea with reference to adaptation needs as well as economic development. On the other hand, Korean negotiators put the lowest value on North Korea with reference to project certainty.

The null hypothesis that the means of importance are the same for the five decision-making criteria was rejected by Friedman test under the level of significance at 0.05 (p-value: 0.000). By post hoc comparison with Bonferroni correction, there was the statistical difference between global peace and project certainty (adjusted p-value=0.001<0.05). The statistical difference was also confirmed between project certainty and economic development (adjusted p-value=0.005<0.05), and between project certainty and global peace (adjusted p-value: 0.000<0.05). These supported the big differences in the average of eight Asian countries between mitigation potential (0.950) and global peace (0.145), between project certainty (1.080) and economic development (0.487), and between project certainty (1.080) and global peace (0.145),

as shown in <Table A8> of Appendix 2.



<Figure 4.12> Appropriateness of eight Asian countries, with reference to five decision-making criteria for Korean negotiators

Note: AN (Adaptation Needs); MP (Mitigation Potential); PC (Project Certainty); ED (Economic Development); GP (Global Peace)

Adaption needs	Mitigation potential	Project certainty	Economic development	Global Peace	Rank
Indonesia	Indonesia	Vietnam	Vietnam	North Korea	Vietnam
North Korea	Vietnam	Indonesia	North Korea	Myanmar	Indonesia
Mongolia	Mongolia	Philippines	Philippines	Pakistan	Philippines
Myanmar	Philippines	Myanmar	Bangladesh	Philippines	Mongolia
Bangladesh	North Korea	Bangladesh	Indonesia	Bangladesh	Bangladesh
Pakistan	Bangladesh	Mongolia	Mongolia	Indonesia	Myanmar
Philippines	Pakistan	Pakistan	Myanmar	Vietnam	North Korea
Vietnam	Myanmar	North Korea	Pakistan	Mongolia	Pakistan

<Figure 4.13> Ranking chart of appropriateness of eight Asian countries, with reference to five decision-making criteria for Korean negotiators

4.1.12 Assessment on the appropriateness of eight Asian countries by Korean experts

In <Figure 4.14>, while Korean experts put much more value on global peace (GP) than Korean negotiators, the former generally put less values on the other four criteria than the latter – economic development (ED), mitigation potential (MP), project certainty (PC) and adaptation needs (AN).

In <Figure 4.15>, Korean experts selected Indonesia and Vietnam as the most suitable cooperation partners with focusing on their economic size and relations with Korea. Surprisingly, they chose North Korea as the third most suitable cooperation partner. Because they put more importance to global peace rights after project certainty and mitigation potential as important decision-making criteria to assess the suitability of cooperation partners. Moreover, the group attached the highest value to North Korea

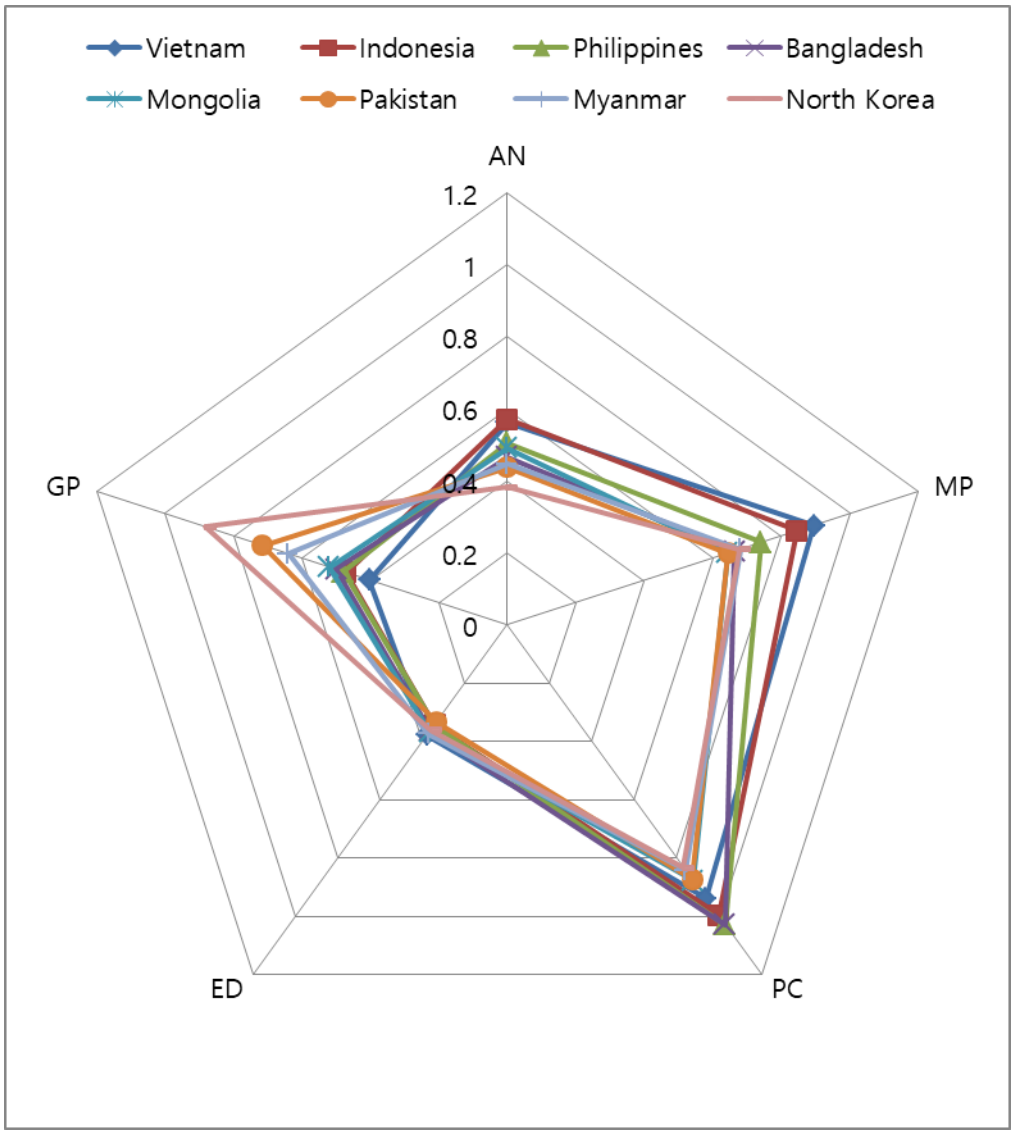
with reference to global peace (0.882), as shown in <Table A9> of Appendix 2. On the other hand, the group put the lowest value on North Korea with reference to project certainty (0.833).

The null hypothesis that the mean values of importance are the same for the five decision-making criteria was rejected by Friedman test under the level of significance at 0.05 (p-value: 0.000). By post hoc comparison with Bonferroni correction, there was the statistical difference between global peace and project certainty (adjusted p-value=0.016<0.05). The statistical difference was also confirmed between mitigation potential and economic development (adjusted p-value=0.005<0.05), and between project certainty and economic development (adjusted p-value: 0.000<0.05). These supported the big differences in the average of eight Asian countries between project certainty (0.927) and adaptation needs (0.483), between mitigation potential (0.724) and economic development (0.358) and between project certainty (0.927) and economic development (0.358), as shown in <Table A9> of Appendix 2. .

In addition, a weighted Kappa test was conducted to check the evaluation agreement of eight Asian countries with reference to five decision-making criteria between Korean negotiators and experts. In case of Vietnam, weighted Kappa was 0.294 (p-value = 0.013) for project certainty, 0.127 (p-value: 0.411) for mitigation potential, 0.0897 (p-value: 0.441) for economic development. While it means fair agreement between the two groups for project certainty, it means relatively poor agreement between the two groups for mitigation potential and economic development.

In case of Indonesia, the weighted Kappa value was 0.173 (p-value = 0.216) for

project certainty and 0.154 (p-value: 0.152) for economic development. It means relatively poor agreement between the two groups for project certainty and economic development. In case of North Korea, weighted Kappa was 0.139(p-value = 0.283) for project certainty, which means relatively poor agreement between two groups for this criterion (Altman, 1991).



<Figure 4.14> Appropriateness of eight Asian countries, with reference to five decision-making criteria for Korean experts

Note: AN (Adaptation Needs); MP (Mitigation Potential); PC (Project Certainty); ED (Economic Development); GP (Global Peace)

Adaption needs	Mitigation potential	Project certainty	Economic development	Global Peace	Rank
Indonesia	Vietnam	Philippines	Vietnam	North Korea	Indonesia
Vietnam	Indonesia	Bangladesh	Myanmar	Pakistan	Vietnam
Philippines	Philippines	Indonesia	Mongolia	Myanmar	North Korea
Mongolia	Myanmar	Vietnam	Bangladesh	Mongolia	Philippines
Bangladesh	North Korea	Mongolia	North Korea	Bangladesh	Bangladesh
Myanmar	Bangladesh	Pakistan	Indonesia	Philippines	Pakistan
Pakistan	Pakistan	Myanmar	Philippines	Indonesia	Myanmar
North Korea	Mongolia	North Korea	Pakistan	Vietnam	Mongolia

<Figure 4.15> Ranking chart of appropriateness of eight Asian countries, with reference to five decision-making criteria for Korean experts

4.2. Interview with Korean Executive Experts

4.2.1 Different views of the four groups on five criteria

As shown in <Figure 4.1>, all the groups put the biggest importance on both criteria of project certainty and mitigation potential. It seems that foreign negotiators from developed countries put relatively more importance to mitigation potential; foreign negotiators from developing countries, to economic development and adaptation needs; Korean negotiators, to project certainty; and Korean experts, to global peace. In this regard, Korean executive experts appraised that each group attached the relative importance to different decision-making criteria from the perspective of its own interest and priority concern. For example, foreign negotiators from developed countries put priority on meeting their mitigation targets, while foreign negotiators from developing countries have a keen interest in resolving their urgent needs of poverty eradication and adaptation to adverse impacts of climate change. Meanwhile, Korean negotiators paid a special attention to project certainty for accomplishing their 2030 mitigation target. Korean experts put emphasis on alleviating conflicts and promoting peace with North Korea.

Expert B mentioned “the fact that most participants selected mitigation potential and project certainty as important factors signals that most of the negotiators and experts surveyed – both Korean and foreign – are well aware of the importance of making actual progress in reduction efforts.” Meanwhile, Expert D mentioned “Korean negotiators seem to emphasize project certainty as they are working at the forefront of efforts to

secure the viability of any reduction deal, while Korean experts may be less aware of the realities of international negotiation and thus prioritize the alleviation of inter-Korea tensions and international peace."

Expert F commented "developed countries have more reason to want reductions while developing countries are facing more pressing adaptation needs and demands for poverty relief." Whereas, Expert I mentioned "if one considers everything in context, Korea prioritizes projects that can actually produce CERs and those that have low certainty. With Korea's experience of providing loans to international cooperation schemes, concern may be high about uncertain cooperation projects with developing countries." On the other hand, Expert L answered "this does not stray too far from what has been expected. The Korean negotiators seem to be approaching the issue from a more pragmatic angle, while Korean experts seem to focus more on value judgments." And Expert M said "Korea values concrete, certain results from its investments. The fact that this wasn't seen with negotiators from developed nations seems to mean that they seek to achieve certainty from further bilateral agreements with their partner countries."

4.2.2. The intermediate position of Korean negotiators between those of negotiators from developed and developing countries

With reference to <Figure 4.1>, negotiators from developed countries put more importance to project certainty and mitigation potential, while negotiators from developing countries relatively attached more importance to economic development,

adaptation needs and global peace. Generally, Korean negotiators answered in between negotiators from developed and developing countries with respect to the criteria of adaptation needs, mitigation potential and economic development, while Korean negotiators attached the most importance to project certainty and the less importance to global peace.

Korean executive experts analyzed that Korean negotiators took intermediate positions between foreign negotiators from developed and developing countries with reference to mitigation potential, adaptation needs and economic development. Their positioning may have reflected the realistic needs of their home country or may have been aligned with their long claimed role of mediator's role between developed and developing countries in international climate negotiations. Expert B mentioned "Korean negotiators seem to be well aware – as with those from developed countries – of the importance of actual greenhouse gas reduction, yet are cognizant of and sympathize with the needs of developing nations. This reflects their determination to act as mediators between developed and developing countries during the negotiation process." In this regard, Expert C suggested that it was time for Korean negotiators to consider taking the same positions as the developed countries. Expert H commented "Korean negotiators seem to have the perspective that they should act as intermediaries between developed and developing countries. Also Korea feels that both greenhouse gas reduction and economic development should be in parallel. If most governments in developing nations place more importance on adaptation to climate change, Koreans seem to be different in that they prioritize economic development above all other issues,

which may lead to the differences observed." Expert M mentioned "the intermediate stance of Korean negotiators stems from their understanding of the importance of adaptation and mitigation, but also their belief that climate change could be an opportunity for developing countries to grow economically."

4.2.3 Assessment on international cooperation options by four groups

In relation to <figure 4.2>, all the respondents put cooperative approaches (CA), sustainable development mechanism (SDM) and non-market approaches (NMA) in the order of the appropriateness for international cooperation on climate change. Korean executive experts generally assessed that CA would be the most flexible, effective and accessible among the three options.

Expert A appraised "as the new climate regime is a bottom-up approach regarding greenhouse gas reduction, most governments will prefer cooperation projects that ensure national autonomy – CA." Expert C mentioned "the fact that participants prioritized CA means that they put importance on practical aspects of managing projects. If Korea can act as an example for NMA, then it can act as a bridge between developed and developing countries." Meanwhile, Expert D commented "anyway the results show there is a broad consensus that climate change cannot be addressed without cooperation and that there needs to be a balance between adaptation efforts and sustainable development."

Expert E mentioned "I think this is based on current realities. SDM can only be realized in 2023-2024, which means that more expedient and flexible CAs will be

prioritized, while nonmarket approaches have less feedback from execution." And Expert H commented "while SDM are contingent on CDM, which was well defined and operates properly, CA has many regulations and procedures to be newly defined and can be developed drawing on the JI (Joint Implementation) of Kyoto Protocol. Expert J mentioned "this reflects the priorities of the specific group of negotiators. When it comes to the issuance and trading of CER, developed and developing countries as sellers and buyers respectively have relatively similar interests."

4.2.4 Appropriateness of North Korea as cooperation partner

While Korean negotiators gave North Korea merely the 7th place, Korean experts chose North Korea as the third most suitable cooperation partner. In this regard, Korean experts attached the highest value to North Korea with reference to global peace, while Korean negotiators put modest values to it with reference to adaptation needs, mitigation potential and economic development but attached the lowest value to North Korea with respect to global peace.

Many executive experts appraised that Korean experts put emphasis on the cooperation potential of North Korea, including in the area of reforestation, amidst the recently increasing prospect of better relations with North Korea, while Korean negotiators focused on the practical difficulties of cooperation with North Korea based on the political risk and the previous frustrating experience. Expert A mentioned "if economic considerations take precedence in cooperation, DPRK will be low on the list of appropriate partners, while if humanitarian and peace-related concerns are

emphasized its suitability will be correspondingly higher."

Expert C commented "Korean experts seem to be ambivalent about the subject. They do agree that cooperation with DPRK can contribute to global peace, but the time and effort required to develop its economy will be longer and costlier. In addition, though DPRK has a sufficient mitigation potential, its contribution to GHG reductions will be very meager in view of the bad economic conditions."

Expert F commented "DPRK's past behavior has been very erratic and uncertain. For project certainty, US-DPRK relations need to improve among other conditions." Meanwhile, Expert G mentioned "Korean negotiators are aware and concerned that the DPRK has been reluctant or unenthusiastic about climate change negotiations, and may have doubted its feasibility as a partner. On the other hand, Korean experts are positive about prospects with DPRK. DPRK certainly has a lot of potential for economic development and climate change mitigation, as its energy production industry is outdated and there is a lot of room for modernization". And Expert I commented "Korean negotiators are expressing doubts about the appropriateness of DPRK as a partner as the uncertainty is too high, while Korean experts may have been more hopeful of DPRK because of increased North-South cooperation of late.

Expert L appraised "Korean experts are affording more importance to global peace, which means they approve of inter-Korea projects. Although the negotiators in charge of such policies are still approaching denuclearization and US-DPRK relations from a conservative viewpoint, experts seem to be more cognizant of possibilities than realistic limitations." In this regard, Expert M mentioned "the expert group seems to be more

positive about DPRK as a dialogue and investment partner than the negotiator group is in general."

4.2.5 Ways to enhance the project certainty of North Korea

The combined group of all the respondents of survey put the most importance to the criterion of project certainty in implementing international cooperation on climate change. In the meantime, Korean negotiators and experts attached the lowest values to North Korea with respect to project certainty. In this regard, most prominent experts agreed on the low evaluation of North Korea's project certainty by Korean negotiators and experts. In this regard, Expert C suggested "the most practical way of ensuring project certainty would be to cooperate closely with China and Russia while providing legal mechanisms leveraged by international law. Another possibility is to negotiate a US-China-Russia-Korea-DPRK economic agreement. Of course, this would have to be preceded by negotiations for denuclearization efforts." Expert E mentioned "DPRK has high potential, but there is a lack of data and thus a lack of certainty. I believe that more data on its situation will strengthen DPRK's case." And Expert H commented "Adaptation to climate change means that the world should cooperate on environmental issues, and thus can act as a legitimate cause for DPRK-Korea cooperation in the context of the international embargo. If environmental cooperation is exempted from the current sanctions, then prospects will improve. If one applies Article 6 of the Paris Agreement on DPRK, it would be an appropriate partner of cooperative approaches (CA)."

Expert J commented "there seems to be a consensus that project certainty is the most

important criterion, and there is too much uncertainty with DPRK for most. Thus the restoration of trust with the North is the most urgent obstacle. This can be achieved via small scale collaboration projects." And Expert K mentioned "Project certainty regarding collaboration with DPRK rests on its government's openness. The best manner in which to do this is to induce DPRK to respect multilateral agreements as a member of the international community."

4.2.6 General suggestions in relation to international cooperation on climate change

Korean executive experts were requested to suggest appropriate ways of conducting international cooperation on climate change. Expert A suggested "government-led cooperation projects can showcase Korea's technologies for potential trading partners, and thus requires incentives for active participation from private companies. Climate change should be brought to the mainstream in providing aid to developing countries, especially with adaptation efforts in the said countries; this will bring about respect from the international community." And Expert G mentioned "technology is the most important factor in greenhouse gas reduction and climate change adaptation. This means that any support to developing economies should be in the form of technological transfers. To ensure that such a transfer occurs smoothly and effectively, the mechanisms stipulated by the Paris Agreement are the most efficient. Mechanisms such as CA will aid technology dispersal, and must be coupled with direct technical support and transfers of operational knowhow."

Expert J commented “international cooperation on climate change can take the forms of bilateral cooperation between governments, public-private partnerships (PPP), and cooperation in international organizations. I believe that PPP is the most efficient and effective manner in which to do this. Korea should place more emphasis on adaptation and technological cooperation if it is to collaborate with developing nations.” And Expert K suggested “international cooperation regarding climate change can take many bilateral, multilateral formats. The most important aspect is a basis of cooperation. With Korea, it is engaged in plenty of multilateral arrangements but has a lack of bilateral relationships (because of differing opinions among ministries, agencies etc). There needs to be a government-wide clarification of stance on such issues.”

This study elicited that the mitigation potential and project certainty of host countries are important determinants to attract international cooperation on climate change and that market based mechanisms such as cooperative approaches and sustainable development mechanism are more popular than non-market approaches as international cooperation options. In this sense, Korean negotiators did not consider North Korea as a favorite partner for international cooperation because of its low level of project certainty.

One executive expert mentioned that the suitability of North Korea as cooperation partner would be increased if Korea conducts climate change projects with North Korea in favor of global peace and humanitarianism, not in the mode of commercial market-based approaches. Another executive expert suggested that Korea could play a bridging role between developed and developing countries if Korea presents a good practice of NMA which does not seem to be practical and fruitful at the moment.

Chapter 5. Discussion

5.1 The Relative Importance of Five Decision-making Criteria

It seems that foreign negotiators from developed countries put relatively more importance to mitigation potential; foreign negotiators from developing countries, to economic development and adaptation needs; Korean negotiators, to project certainty; and Korean experts, to global peace. In this regard, Korean executive experts appraised that each group attached the relative importance to different decision-making criteria from the perspective of its own interest and priority concern.

However, <Figure 4.1> illustrates that all the four groups put more importance to project certainty and mitigation potential than adaptation needs, economic development and global peace. This trend may have a close relation to the unequal geographical distribution of CDM projects. The Asia and the Pacific region has 83% of the global CDM projects, where China, India and Vietnam account for the major share. These countries had comparative advantage in the size of GDP, greenhouse gas emission levels and human capital (Winkelman et al., 2011). Even in case of adaption projects, project certainty is an important factor. According to Weiler et al. (2018), Countries with lower adaptive capacity receive less adaptation aid. Instead, donors reward well-governed countries with adaptation aid as well as use adaptation aid to promote their own economic interests.

It is worth noting that Korean negotiators paid a special attention to project certainty

for accomplishing their 2030 mitigation target, while Korean experts put emphasis on alleviating conflicts and promoting peace with North Korea. In this regard, one executive expert commented that Korean negotiators seemed to emphasize project certainty as they were working at the forefront of efforts to secure the viability of any reduction deal, while Korean experts may have been less aware of the realities of international negotiation and thus prioritized the alleviation of inter-Korea tensions and international peace. This may have indicated a perception gap between the policy makers and the public within a country. This kind of perception gap could be narrowed through close consultation and information sharing between them in a continuous manner.

5.2 The Implication of Different Criteria Evaluation on International Cooperation

In <figure 4.2>, all the respondents put cooperative approaches (CA), sustainable development mechanism (SDM) and non-market approaches (NMA) in the order of the appropriateness for international cooperation on climate change. Korean executive experts generally assessed that CA has comparative advantage in that it would be the most flexible, effective and accessible among the three options. One executive expert pointed out as the merit of CA its nature of bottom-up approach, while another expert noted CA's practical aspects of managing projects under the national autonomy. The other expert mentioned "if Korea can present an example for NMA which is currently less attractive, then it may act as a bridge between developed and developing countries."

In this regard, Park et al. (2010) found that international cooperation on climate change adaptation in the Asian region could develop a reciprocally complementary and integrated partnership in business, research, education, and other areas and that Korean could also participate in the development of common issues as landmark projects attracting global interest with developing countries.

Regarding non-market approaches (NMA), the Seoul metropolitan city has operated an "eco-mileage system" in order to motivate households and organization to reduce greenhouse gas emissions by offering gifts and other incentives for their reduction efforts (SMC, 2018). Whereas, African Development Bank designed the "Adaptation Benefit Mechanism (ABM)" as part of the work program under the Article 6.8 of the

Paris Agreement. ABM offers developed country governments, corporate social responsibility actors, philanthropies and others a way of providing context and project-specific levels of grant finance to invest in technologies of adaptation benefits and mitigation co-benefits (AfDB, 2018). Ways of overcoming barriers to international cooperation with partner countries lacking business environment can be developed drawing on these endeavors.

In this regard, it is worth noting that the final text of work program for non-market approaches referred to in Article 6.8 of the Paris Agreement in the so- called “Katowice texts” illustrates “Adaptation Benefit Mechanism” as an “example of potential activities that are considered to be NMAs.” (UNFCCC, 2018b)

5.3 The Implication of Different Criteria Evaluation on Selection of Partner Countries

Eight Asian countries were selected from Korea's 24 priority ODA partners and North Korea, in view of their geographical accessibility and needs related to climate change as well as their current relations with Korea. The combined group of Korean negotiators and experts selected Vietnam, Indonesia and Philippines as the most suitable cooperation partners, which seemed to reflect their close economic relations with Korea. Although Korean negotiators selected Vietnam, Indonesia and Philippines as the most suitable cooperation partners and gave North Korea merely the 7th place, the group attached its highest value to North Korea with reference to global peace and the second highest values to North Korea with reference to adaptation needs as well as global peace among the four groups.

As Korean experts chose North Korea as the third most suitable cooperation partner, the group attached the highest value to North Korea with reference to global peace among the four groups. Many executive experts appraised in their interviews that the group of Korean experts put emphasis on the cooperation potential with North Korea, including in the area of reforestation, amidst the recently increasing prospect of better relations with North Korea, while Korean negotiators focused on the practical difficulties of cooperation with North Korea based on the political risk and the previous frustrating experience. One executive experts questioned the validity of the higher value attached to North Korea with reference to mitigation potential by the group of Korean

experts.

Another executive expert mentioned that the appropriateness of North Korea as cooperation partner would be increased if Korea conducts climate change projects with North Korea in favor of global peace and humanitarianism, not in the mode of commercial market-based approaches. In this regard, Son et al (2015) proposed that, from the perspective that environment and economy could not be separate but that the two can complement and be pursued harmoniously, hostile relations between South and North Koreas should be resolved through environmental and economic cooperation and thus those environmental, economic and energy communities should be established at the same time and expanded to cover the Northeast Asian region.

5.4 Ways of Enhancing Cooperation with North Korea

The combined group of all the survey respondents put the most importance to the criterion of project potential, highlighting the importance of project certainty in implementing international cooperation on climate change. In the meantime, Korean negotiators and experts attached the lowest values to North Korea with respect to project certainty. In this regard, most executive experts agreed on the low evaluation of North Korea's project certainty made by the combined group of Korean negotiators and experts. As ways of enhancing the project certainty of North Korea, many executive experts suggested (1) the execution of long-term and socio-economic approaches incorporating scientific platform, such as observation and statistics; (2) the development of special mechanism tailored to North Korea, which may internationally recognized in cooperation with UNFCCC; (3) the collection and sharing of relevant information on projects with North Korea; (4) the development of safeguard measures based on the international law; (5) the execution of climate projects in cooperation with China and Russia; (6) the development and operation of economic cooperation projects to be concluded among the USA, China, Russia, South and North Koreas; and (7) the early implementation of North Korea's denuclearization.

According to the announcement by the Presidential office in November 2018, the United Nations Security Council (UNSC) issued the sanctions waiver to an inter-Korean railway project surveying tracks running in both countries that had been stalled for weeks. The breakthrough for cross-border initiative was made by close consultation between Korea and the USA, and general supports from other members of UNSC

(Korea Joongang Daily, 2018). This recent development seemed to elicit possible ways forward in climate change cooperation with North Korea. As some executive experts suggested, Korean government may explore ways of developing and executing various projects related to climate change, including reforestation in North Korea. As some executive experts suggested, some special mechanism could be developed and internationally recognized in cooperation with UNFCCC, while other cooperation projects could be executed in cooperation with China and Russia, or more complicated arrangements among the USA, China, Russia, South and North Koreas.

In this regard, Im and Hong (2017) also suggested that exchange and cooperation projects with North Korea require engaging its neighboring countries, which would strengthen the stability and sustainability of projects. For that purpose, anyone of such ways as establishing trilateral cooperation projects among South and North Koreas and its neighboring countries, inviting North Korea to a North East Asian cooperation project, and expanding cooperation between South and North Koreas to the dimension of North East Asia would be possible.

Yeo and Kim (2016) found that North Korea has shown sincere interests in CDM projects by suggesting the establishment of CDM development strategies and plans as priority areas of capacity building for implementing the UNFCCC, after it had ratified the Paris Agreement and submitted its Intended Nationally Determined Contribution (INDC) in 2016. Myeong et al (2013) also suggested that when direct exchange between South and North Koreas is possible in practice, Joint cooperation projects need to be executed in association with the existing climate change related projects and the goal of

addressing climate change need to be mainstreamed for various South and North cooperation projects in preparation for counteracting the worsening climate change on the Korean peninsula by way of timely information sharing of weather forecast, strengthening water management and reforestation and so on.

Chapter 6. Conclusion

6.1 Summary of Study

The Intergovernmental Panel on Climate Change (IPCC) estimated in its recent special report that human activities have caused approximately 1.0℃ of global warming above pre-industrial levels. It also predicted that global warming is likely to reach 1.5 ℃ between 2030 and 2052 if it continues to increase at the current rate. (IPCC, 2018). In response to the unprecedented extent of climate change, the international community has taken various policies and measures to reduce greenhouse gas emissions and relieve the impacts of climate change domestically as well as it has also executed international cooperation projects in accordance with the related international treaties.

Korea has announced its commitment to reduce greenhouse gas emissions by 37 percent from business as usual (BAU) levels by 2030. The recently revised national roadmap for greenhouse gas reduction encompasses mainly domestic reduction policies and measures to cover 32.5 percent of the total 37 percent reductions and partly the share of international cooperation and forest sinks to cover 4.5 percent reductions. It means that the expected amount of reduction from international cooperation activities still reaches up to 38.3 $MtCO_2e$ at the end of 2030 (MoE, 2018).

In this context, this study aimed to assess the relative importance of five decision-making criteria for international cooperation on climate change – adaptation needs, mitigation potential, project certainty, economic development, and global peace. In

addition, this study was designed to apply the relative importance of five decision-making criteria to evaluating the appropriateness of three international cooperation option stipulated in the article 6 of the Paris Agreement – cooperative approaches (CA), sustainable development mechanism (SDM) and non-market approaches (NMA) – and gauging the suitability of eight Asian countries as cooperation partners. The eight Asian countries are Vietnam, Indonesia, Philippines, Bangladesh, Mongolia, Pakistan, Myanmar and North Korea.

The analytic hierarchy process (AHP) was used to assess the relative importance of five decision-making criteria. The English language questionnaire addressed the relative importance of five decision-making criteria and the appropriateness of three international cooperation options for 32 foreign negotiators. Korean language questionnaire addressed the suitability of eight Asian countries as cooperation partners, in addition to the relative importance of five decision-making criteria and the appropriateness of three international cooperation options for 34 Korean negotiators and 43 Korean experts respectively.

The four groups – foreign negotiators from developed countries; foreign negotiators from developing countries; Korean negotiators; and Korean experts – took on different preference patterns respectively. Foreign negotiators from developed countries put the most importance to the criterion of mitigation potential and the least importance to that of adaptation needs among the groups. Foreign negotiators from developing countries put the most importance to the criteria of economic development and adaptation needs, while attaching the least importance to that of project certainty among the groups.

Korean negotiators put the most importance to the criterion of project certainty, while Korean experts attached the most importance to the criterion of global peace and the least importance to that of mitigation potential among the groups.

Negotiators from developed countries put more importance to project certainty and mitigation potential, while negotiators from developing countries relatively attached more importance to economic development, adaptation needs and global peace. Generally, Korean negotiators answered in between negotiators from developed and developing countries with respect to the criteria of adaptation needs, mitigation potential and economic development.

Foreign negotiators from developed countries put more values on the appropriateness of cooperative approaches, followed by sustainable development mechanism and non-market approaches. Korean negotiators put more values on project certainty and mitigation potential for both cooperative approaches and sustainable development mechanism, while Korean experts put the highest values on global peace across the three cooperation options compared to the other groups.

The combined group of Korean negotiators and experts put more importance to project certainty and mitigation potential, while putting less importance to global peace, economic development and adaptation needs in assessing the suitability of eight Asian countries. Korean negotiators selected Vietnam, Indonesia and Philippines as the most suitable cooperation partners, while Korean experts selected Indonesia, Vietnam and North Korea as the most suitable cooperation partners. In this regard, Korean experts attached the highest value to North Korea with reference to global peace among the four

groups.

13 Korean executive experts, who have an experience of at least 10 years as negotiators or executives in international negotiations and domestic implementation, answered the structured interview on the interpretation of survey results. They appraised that each group attached different importance to five decision-making criteria from the perspective of its own interest and priority concern. For example, foreign negotiators from developed countries put priority on meeting their mitigation targets, while foreign negotiators from developing countries have a keen interest in resolving their urgent needs of poverty eradication and adaptation to adverse impacts of climate change. Meanwhile, Korean negotiators paid a special attention to project certainty for accomplishing their 2030 mitigation target and Korean experts put emphasis on alleviating conflicts and promoting peace with North Korea.

Korean executive experts analyzed that Korean negotiators took intermediate positions between foreign negotiators from developed and developing countries with reference to mitigation potential, adaptation needs and economic development. According to the executive experts, their positioning may have reflected the practical needs of the home country or may have been aligned with the long claimed role of mediator between developed and developing countries in international climate negotiations.

Many executive experts, as a way forward of the low evaluation of North Korea's project certainty, suggested (1) the development of special mechanism tailored to North Korea, which may internationally recognized in cooperation with UNFCCC; (2) the

development of safeguard measures based on the UNFCCC; (3) the execution of climate projects in cooperation with China and Russia and so on.

<Figure 4.1> illustrates that all of the four groups put more importance to project certainty and mitigation potential than adaptation needs, economic development and global peace. This trend may have a close relation to the unequal geographical distribution of CDM projects. The Asia and the Pacific region has 83% of the global CDM projects, where China, India and Vietnam account for the major share. These countries had comparative advantage in the size of GDP, greenhouse gas emission levels and human capital (Winkelman et al., 2011).

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efforts (SMC, 2018). Whereas, African Development Bank designed the "Adaptation Benefit Mechanism (ABM)" as part of the work program under the Article 6.8 of the Paris Agreement (AfDB, 2018). Ways of overcoming barriers to international cooperation with partner countries lacking business environment can be developed drawing on these endeavors.

Regarding the selection of country partners for international cooperation, Korean negotiators selected Vietnam, Indonesia and Philippines as the most suitable partners and gave North Korea merely the 7th place. Meanwhile, Korean experts chose North Korea as the third most suitable partner among eight countries by attaching the highest value to North Korea with reference to global peace. Many executive experts appraised that Korean experts put emphasis on the cooperation potential with North Korea, including in the area of reforestation, amidst the recently increasing prospect of better relations with North Korea, while Korean negotiators focused on the practical difficulties of cooperation with North Korea based on the political risk and the previous frustrating experience. One executive expert mentioned that the appropriateness of North Korea as cooperation partner would be increased if Korea conducts climate change projects with North Korea in favor of global peace and humanitarianism, not in the mode of commercial market-based approaches. In this regard, Son et al (2015) proposed that, from the perspective that environment and economy could not be separate, but could be pursued harmoniously, hostile relations between South and North Koreas should be resolved through environmental and economic cooperation and thus those environmental, economic and energy communities should be established at the same

time.

Korean negotiators and experts attached the lowest values to North Korea with respect to project certainty. In this regard, most executive experts agreed on the low evaluation of North Korea's project certainty. As ways forward of enhancing the project certainty of North Korea, many executive experts suggested (1) the execution of long-term and socio-economic approaches incorporating scientific platform, such as observation and statistics; (2) the development of special mechanism tailored to North Korea, which may internationally recognized in cooperation with UNFCCC; (3) the execution of climate projects in cooperation with China and Russia; (4) the development and operation of economic cooperation projects to be concluded among the USA, China, Russia, South and North Koreas, and so on.

According to the announcement by the Presidential office in November 2018, the United Nations Security Council (UNSC) issued the sanctions waiver to an inter-Korean railway project surveying tracks running in both countries that had been stalled for weeks. The breakthrough for cross-border initiative was made by close consultation between Korea and the USA, and general supports from other members of UNSC (Korea Joongang Daily, 2018). This recent development seemed to elicit possible ways forward in climate change cooperation with North Korea. As some executive experts suggested, some special mechanism could be developed and internationally recognized in cooperation with UNFCCC, while other cooperation projects could be executed in cooperation with China and Russia, or more complicated arrangements among the USA, China, Russia, South and North Koreas.

Myeong et al (2013) also suggested that when direct exchange between South and North Koreas is possible in practice, Joint cooperation projects need to be executed in association with the existing climate change related projects and the goal of addressing climate change need to be mainstreamed for various South and North cooperation projects in preparation for counteracting the worsening climate change on the Korean peninsula.

6.2 Limitations of Study and Future Research

This study aimed to develop appropriate decision-making criteria for selecting international cooperation options and partner countries in a balanced consideration of mutually conflicting interests and concerns between donor and recipient sides, producing new set of five criteria – adaptation needs, mitigation potential, project certainty, economic development and global peace.

It also involved the rare combination of two research tools: firstly, research surveys were administered towards the groups of 34 Korean negotiators, 32 foreign negotiators and 43 Korean experts respectively. Secondly, structured interviews were conducted with 13 Korean executive experts with at least 10 years of experience as national negotiators, and/or executives in charge of domestic implementation related to climate change. The interviews secured objective interpretations of the survey results and produced valuable suggestions for international cooperation with North Korea and other countries.

However, this study had some limitations in its research approach and access to the ground data.

Firstly, the number of samples is quite small. Since research surveys on national negotiators were conducted basically during the period of international negotiations, and accessibility to national negotiators was very limited. Consequently, 32 survey responses by foreign negotiators were obtained, of which 20 responses passed the consistency test (8 and 12 from developed and developing countries respectively) .

Secondly, because of the limited time period during which the survey was conducted,

the questionnaire was shorter and simpler in terms of the number and length of questions. In case of the English language questionnaire, the questions about the relative importance of five decision-making criteria and the appropriateness of three international cooperation options were addressed. In case of the Korean language questionnaire, the additional question about the suitability of eight Asian countries as cooperation partners inevitably excluded many eligible candidates from Africa, Latin America and Asia. Neither were any questions about the specific situations of countries in issue included in the questionnaire, nor any proper research work conducted to get the ground information and data of the countries concerned.

Accordingly, this study can be extended to investigate the chain of consequences from the collective evaluation of decision-making criteria, the assessment on the appropriateness of international cooperation options and the suitability of partner countries, and then an examination of the ground situation and developments related to these issues.

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Appendix

<Appendix 1> Survey Questionnaire on International Cooperation on Climate Change: Questionnaire on the options of international cooperation stipulated in the article 6 of the Paris Agreement.

<Appendix 2 > Results of Surveys by Foreign Negotiators, Korean Negotiators and Experts

<Appendix 3 > Form of Written Questions and Information Material for Interview with Korean Executive Experts

<Appendix 4 > Written Answers from Korean Executive Experts

<Appendix 1> Survey Questionnaire on Int'l Cooperation on Climate Change: Questionnaire on the options of international cooperation stipulated in the article 6 of the Paris Agreement.

This survey is being conducted only for research purposes. Your individual answers per se will not be open to the public.

Korea has completed the first phase of the nation-wide emissions trading system without allowing emission reductions achieved abroad from 2015 to 2017. From its second phase starting in 2018, Korea allows domestic participating entities to use emission reductions achieved by their own international cooperation projects abroad.

In this regard, the questionnaire aims to explore decision-making criteria which is used by entities when selecting foreign partners or cooperation options such as the three options of international cooperation – *"cooperative approaches"* (Art. 6.2-3), *"sustainable development mechanism"* (Art. 6.4-7) and "*non-market approaches"* (Art.6.8-9) - as stipulated in the Paris Agreement (even though the operational rules are still under discussion).

The decision-making criteria of this questionnaire are defined as follows:

- Adaptation Needs: How much does the host country require adaptation measures to address the adverse effects of climate change?
- Mitigation Potential: How much mitigation performance can be achieved by the cooperation project?
- Project Certainty: How certain are the internationally established guidelines and procedures on the specific cooperation project, and the general circumstances such as the stability and political commitment of the host country to implement the project, and the social and cultural compatibility between the cooperating countries?
- Economic Development: How much does the project contribute to the economic development (i.e. economic growth and improvement in social welfare for its people) of the host country?
- Global Peace: How much does the project contribute to reducing conflicts among cooperating countries and further promoting global peace?

Mark – according to your own opinion - one circle of each line comparing the relative importance of two criteria in efforts for international cooperation to address climate change.

Criteria Assessed	Left one is important ← ⑤ ④ ③ ②	Equal ①	Right one is important→ ② ③ ④ ⑤	Criteria Assessed
Adaptation Needs	O O O O	O	O O O O	Mitigation Potential
Adaptation Needs	O O O O	O	O O O O	Project Certainty
Adaptation Needs	O O O O	O	O O O O	Economic Development
Adaptation Needs	O O O O	O	O O O O	Global Peace

Criteria Assessed	Left one is important ← ⑤ ④ ③ ②	Equal ①	Right one is important→ ② ③ ④ ⑤	Criteria Assessed
Mitigation Potential	O O O O	O	O O O O	Project Certainty
Mitigation Potential	O O O O	O	O O O O	Economic Development
Mitigation Potential	O O O O	O	O O O O	Global Peace
Project Certainty	O O O O	O	O O O O	Economic Development
Project Certainty	O O O O	O	O O O O	Global Peace
Economic Development	O O O O	O	O O O O	Global Peace

How appropriate are the assessed criteria with respect to the following options of international cooperation stipulated in the Article 6 of the Paris Agreement? Please write a one-digit number from "5 (Extremely Appropriate)" to "1 (Minimally Appropriate)" in each space.

Option of International Cooperation	Adaptation Needs	Mitigation Potential	Project Certainty	Economic Development	Global Peace
Cooperative Approaches					
Sustainable Development Mechanism					
Non-market Approaches					

Which country (or sub-region) are you from?:

//Thank you very much!//

기후변화 관련 국제협력에 관한 설문조사

기후변화관련 국제협력에 관한 의사결정에 있어서 아래 제시하는 평가지표 중 어느 것이 상대적으로 중요하다고 생각하시는지 동그라미 한 군데에 체크해주십시오.

평가지표	좌측지표가 더 중요← ⑤ ④ ③ ②	동등 ①	→우측지표가 더 중요 ② ③ ④ ⑤	평가지표
적응필요성	O O O O	O	O O O O	감축잠재력
적응필요성	O O O O	O	O O O O	사업확실성
적응필요성	O O O O	O	O O O O	경제발전
적응필요성	O O O O	O	O O O O	세계평화
감축잠재력	O O O O	O	O O O O	사업확실성
감축잠재력	O O O O	O	O O O O	경제발전
감축잠재력	O O O O	O	O O O O	세계평화
사업확실성	O O O O	O	O O O O	경제발전
사업확실성	O O O O	O	O O O O	세계평화
경제발전	O O O O	O	O O O O	세계평화

다음 기후변화 관련 국제협력의 대상국가가 각 의사결정기준에 어느 정도 적합하다고 생각하시는지 "5(아주적합)"에서 "1(약간적합)"까지 한 자리 숫자로 모든 칸에 기입하여 주십시오.

국가	적응필요성	감축잠재력	사업확실성	경제발전	세계평화
베트남					
인도네시아					
필리핀					
방글라데시					
몽골					
파키스탄					
미얀마					
북한					

다음의 파리협정 6조에 규정된 기후변화 관련 국제협력 사업방식이 각 의사결정기준에 어느 정도 적합하다고 생각하시는지 "5(아주적합)" 에서 "1(약간적합)"까지 한 자리 숫자로 모든 칸에 기입하여 주십시오.

사업방식	적응필요성	감축잠재력	사업확실성	경제발전	세계평화
협력적 접근 (Cooperative Approaches: 협정6.2-3조)					
지속가능 발전체제 (sustainable Development Mechanism: 협정6.4-7조)					
비시장접근 (Non-market Approaches: 협정6.8-9조)					

설문응답자소속/직업: 국가기관/공기업( ), 연구기관( ), 일반기업( ), NGO( ),

교수( ), 학생( ), 기타( )

//대단히 감사합니다//

Translation of Korean language survey on the suitability of partner countries

How suitable are the assessed criteria with respect to the following possible partner countries of international cooperation? Please write a one-digit number from “5 (Extremely Suitable)” to “1 (Minimally Suitable)” in each space.

Partner Country	Adaptation Needs	Mitigation Potential	Project Certainty	Economic Development	Global Peace
Vietnam					
Indonesia					
Philippines					
Bangladesh					
Mongolia					
Pakistan					
Myanmar					
North Korea					

<Appendix 2> Results of Surveys by Foreign Negotiators, Korean Negotiators and Experts

<Table A1> Appropriateness of international cooperation options, with reference to five decision-making criteria for negotiators from developed countries

Cooperation option	Adaption needs	Mitigation potential	Project certainty	Economic Development	Global Peace	Sum
Cooperative Approaches (CA)	0.127	1.702	1.728	0.384	0.260	4.201
Sustainable Development Mechanism (SDM)	0.152	1.587	1.698	0.375	0.260	4.072
Non-Market Approaches (NMA)	0.199	1.164	1.178	0.325	0.293	3.160
Average	0.159	1.484	1.535	0.361	0.271	

<Table A2> Appropriateness of international cooperation options, with reference to five decision-making criteria for negotiators from developing countries

Cooperation option	Adaption needs	Mitigation potential	Project certainty	Economic Development	Global Peace	Sum
Cooperative Approaches (CA)	0.672	0.980	0.918	0.778	0.498	3.846
Sustainable Development Mechanism (SDM)	0.840	0.980	0.832	0.700	0.555	3.908
Non-Market Approaches (NMA)	0.672	0.844	0.832	0.674	0.459	3.482
Average	0.728	0.935	0.861	0.717	0.504	

<Table A3> Appropriateness of international cooperation options, with reference to five decision-making criteria for Korean Negotiators

Cooperation option	Adaption needs	Mitigation potential	Project certainty	Economic Development	Global Peace	Sum
Cooperative Approaches (CA)	0.451	1.246	1.549	0.503	0.179	3.928
Sustainable Development Mechanism (SDM)	0.520	1.152	1.557	0.476	0.182	3.887
Non-Market Approaches (NMA)	0.592	0.870	1.069	0.367	0.182	3.080
Average	0.521	1.089	1.392	0.449	0.181	

<Table A4> Appropriateness of international cooperation options, with reference to five decision-making criteria for Korean experts

Cooperation option	Adaption needs	Mitigation potential	Project certainty	Economic development	Global Peace	Sum
Cooperative Approaches (CA)	0.567	0.819	1.118	0.354	0.809	3.666
Sustainable Development Mechanism (SDM)	0.518	0.818	1.072	0.390	0.698	3.497
Non-Market Approaches (NMA)	0.431	0.644	0.983	0.293	0.676	3.027
Average	0.505	0.760	1.058	0.346	0.728	

<Table A5> Appropriateness of Cooperative Approaches, with reference to five decision-making criteria

Group	Adaption needs	Mitigation potential	Project certainty	Economic development	Global Peace	Sum
Negotiators from developed countries	0.127	1.702	1.728	0.384	0.260	4.200
Negotiators from developing countries	0.672	0.980	0.918	0.778	0.498	3.846
Korean negotiators	0.451	1.246	1.549	0.503	0.179	3.928
Korean Experts	0.567	0.819	1.118	0.354	0.809	3.666
Average	0.454	1.187	1.328	0.505	0.437	

<Table A6> Appropriateness of Sustainable Development Mechanism, with reference to five decision-making criteria

Group	Adaption needs	Mitigation potential	Project certainty	Economic development	Global Peace	Sum
Negotiators from developed countries	0.152	1.587	1.698	0.375	0.260	4.070
Negotiators from developing countries	0.840	0.980	0.832	0.700	0.555	3.908
Korean Negotiators	0.520	1.152	1.557	0.476	0.182	3.887
Korean Experts	0.518	0.818	1.072	0.390	0.698	3.497
Average	0.508	1.134	1.290	0.485	0.424	

<Table A7> Appropriateness of Non-market Approaches, with reference to five decision-making criteria

Group	Adaption needs	Mitigation potential	Project certainty	Economic development	Global Peace	Sum
Negotiators from developed countries (n=20)	0.199	1.164	1.178	0.325	0.293	3.160
Negotiators from developing countries	0.672	0.844	0.832	0.674	0.459	3.482
Korean Negotiators	0.592	0.870	1.069	0.367	0.182	3.080
Korean Experts (n=34)	0.431	0.644	0.983	0.293	0.676	3.027
Average	0.474	0.881	1.016	0.415	0.403	

<Table A8> Appropriateness of 8 Asian countries, with reference to five decision-making criteria for Korean negotiators

Country	Adaption needs	Mitigation Potential	Project Certainty	Economic Development	Global Peace	Sum	Rank
Vietnam	0.456	1.083	1.407	0.558	0.124	3.628	1
Indonesia	0.589	1.110	1.206	0.478	0.126	3.507	2
Philippines	0.523	0.955	1.110	0.500	0.140	3.229	3
Bangladesh	0.555	0.878	1.057	0.478	0.131	3.098	5
Mongolia	0.575	0.955	1.049	0.470	0.122	3.172	4
Pakistan	0.543	0.860	0.920	0.415	0.148	2.885	8
Myanmar	0.557	0.833	1.089	0.456	0.152	3.086	6
North Korea	0.583	0.923	0.801	0.538	0.214	3.059	7
Average	0.548	0.950	1.080	0.487	0.145		

<Table A9> Appropriateness of 8 Asian countries, with reference to five decision-making criteria for Korean experts

Country	Adaption needs	Mitigation Potential	Project Certainty	Economic Development	Global Peace	Sum	Rank
Vietnam	0.562	0.895	0.939	0.378	0.403	3.178	2
Indonesia	0.572	0.845	0.997	0.343	0.471	3.228	1
Philippines	0.506	0.741	1.029	0.342	0.480	3.098	4
Bangladesh	0.467	0.664	1.029	0.364	0.500	3.025	5
Mongolia	0.492	0.644	0.877	0.368	0.520	2.900	8
Pakistan	0.438	0.645	0.873	0.334	0.714	3.003	6
Myanmar	0.446	0.680	0.842	0.373	0.641	2.982	7
North Korea	0.383	0.679	0.833	0.360	0.882	3.137	3
Average	0.483	0.724	0.927	0.358	0.576		

<Table A10> Results of Weighted Kappa on Evaluation Agreement between Korean Negotiators and Experts in Relation to their Survey on the Appropriateness of 8 Asian Countries for International Cooperation

Country	Adaptation N	Mitigation P	Project C	Economic D	Global P
Vietnam	Kappa =-0.285 z = -2.42 p-value = 0.0155	Kappa = 0.127 z = 0.822 p-value = 0.411	Kappa = 0.294 z = 2.5 p-value = 0.0125	Kappa =0.0897 z = 0.771 p-value = 0.441	Kappa =-0.187 z = -1.26 p-value = 0.207
Indonesia	Kappa =-0.331 z = -2.42 p-value = 0.0157	Kappa =-0.208 z = -1.6 p-value = 0.109	Kappa = 0.173 z = 1.24 p-value = 0.216	Kappa = 0.154 z = 1.43 p-value = 0.152	Kappa =0.0875 z = -0.61 p-value = 0.542
Philippines	Kappa = -0.0694 z = -0.577 p-value = 0.564	Kappa = -0.124 z = -0.906 p-value = 0.365	Kappa = -0.0127 z = -0.135 p-value = 0.892	Kappa = -0.198 z = -1.76 p-value = 0.078	Kappa = -0.118 z = -0.773 p-value = 0.439
Bangladesh	Kappa = -0.135 z = -1.31 p-value = 0.189	Kappa = -0.196 z = -1.63 p-value = 0.103	Kappa = 0.0409 z = 0.447 p-value = 0.655	Kappa = -0.04 z = -0.299 p-value = 0.765	Kappa = -0.0761 z = -0.551 p-value = 0.582
Mongolia	Kappa = 0.0326 z = 0.289 p-value = 0.772	Kappa = 0.0108 z = 0.0818 p-value = 0.935	Kappa = 0.0601 z = 0.583 p-value = 0.56	Kappa = 0 z = 0 p-value = 1	Kappa = -0.0126 z = -0.0872 p-value = 0.93
Pakistan	Kappa = -0.0345 z = -0.341 p-value = 0.733	Kappa = -0.183 z = -1.58 p-value = 0.115	Kappa = -0.1 z = -0.76 p-value = 0.447	Kappa = -0.245 z = -1.95 p-value = 0.0511	Kappa = -0.17 z = -1.33 p-value = 0.185
Myanmar	Kappa = -0.0365 z = -0.34 p-value = 0.734	Kappa = -0.105 z = -0.795 p-value = 0.427	Kappa = -0.207 z = -1.53 p-value = 0.127	Kappa = 0.00752 z = 0.059 p-value = 0.953	Kappa = -0.0891 z = -0.665 p-value = 0.506
North Korea	Kappa = -0.16 z = -1.47 p-value = 0.141	Kappa = -0.0841 z = -0.639 p-value = 0.523	Kappa = 0.139 z = 1.07 p-value = 0.283	Kappa = 0.0448 z = 0.359 p-value = 0.719	Kappa = -0.124 z = -0.757 p-value = 0.449

Option of International Cooperation	Adaptation Needs	Mitigation Potential	Project Certainty	Economic Development	Global Peace
Cooperative Approaches	Kappa = 0.0917 z = 0.804 p-value = 0.421	Kappa = -0.0261 z = -0.207 p-value = 0.836	Kappa = 0.196 z = 1.41 p-value = 0.159	Kappa = -0.021 z = -0.169 p-value = 0.866	Kappa = -0.00457 z = -0.0371 p-value = 0.97
Sustainable Development Mechanism	Kappa = -0.152 z = -1.15 p-value = 0.248	Kappa = -0.00704 z = -0.054 p-value = 0.957	Kappa = 0.0357 z = 0.269 p-value = 0.788	Kappa = -0.203 z = -1.52 p-value = 0.129	Kappa = 0.0423 z = 0.3 p-value = 0.764
Non-market Approaches	Kappa = 0.0216 z = 0.236 p-value = 0.813	Kappa = 0.0833 z = 0.659 p-value = 0.51	Kappa = 0.121 z = 0.979 p-value = 0.328	Kappa = 0.364 z = 2.71 p-value = 0.00683	Kappa = -0.229 z=-1.62 p-value = 0.104

<Appendix 3> Form of Written Questions and Information Material for Interview with Korean Executive Experts

서면 인터뷰 질문서

첨부한 설문조사 결과와 국문설문조사서 양식을 참고하여 아래 질문에 응답하여 주시기 바랍니다.

1. <표 1>에서 5 개 의사결정기준에 대한 중요도 평가에 있어서 선진국 협상가 그룹은 감축잠재력에, 개도국 협상가 그룹은 적응필요성과 경제발전에, 한국협상가 그룹은 사업확실성에, 한국 전문가 그룹(대학, 연구소 등에서 주로 근무)은 세계평화에 상대적인 비중을 두었습니다 (의사결정기준에 대한 정의는 첨부 설문서 참조). 이에 대해 어떻게 평가하시는지요.

2. <표 1>에서 한국 협상가 그룹은 적응필요성, 감축잠재력, 경제발전 등 3 개 의사결정기준의 중요도 평가에 있어서 선진국 협상가 그룹과 개도국 협상가 그룹의 평균값과 비교하여 그 중간 정도의 평균값을 부여하였습니다. 이에 대해 어떻게 평가하시는지요.

3. <표 2>의 3 개 국제협력 옵션에 대한 적합도 평가 값은 평가그룹의 각 칸에 부여한 값 (5 에서 1 의 정수)에 해당 평가그룹의 의사결정기준별 평균값 (5 개 기준 평균값의 합은 1)을 곱하여 구하였습니다. 전체 응답자 (선진국 및 개도국 협상가, 한국 협상가 및 전문가를 합하여 총 76 명)는 3 개

국제협력 옵션의 적합도 평가에 있어서 Cooperative Approaches (CA), Sustainable Development Mechanism (SDM), Non-market Mechanism 순으로 답하였는데, 이에 대해 어떻게 평가하시는지요.

4. <표 3>과 <표 4>에서 한국 협상가 그룹은 북한의 국제협력 적합도 평가에서 7 위를 부여한 반면, 한국 전문가 그룹은 북한의 적합도 평가에서 3 위를 부여하였습니다. 이는 한국 전문가 그룹이 세계평화 항목에서 북한에 최대값을 부여하였고, 감축잠재력과 경제개발 항목에서도 대체로 큰 값을 부여하였기 때문으로 보입니다. 이에 대해 어떻게 평가하시는지요.

5. <표 2>에서 전체 응답자가 5 개 의사결정기준별 평가에서 사업확실성에 최대값을 부여하여 그 중요성을 부각시키고 있는 가운데, 표 3 과 표 4 에서 한국 협상가 그룹과 한국 전문가 그룹 모두 북한의 사업확실성에 대해 8 개국중 최소값을 부여하였습니다. 이에 대해 어떻게 평가하시는지요. 그리고 북한과의 협력 시 사업확실성을 제고할 수 있는 방안이 있다면 무엇이라고 생각하시는지요.

6. 기후변화 관련 국제협력의 바람직한 방안 등에 대해 자유롭게 제언하여 주시기 바랍니다.

<Table 1> Importance of decision- making criteria for international cooperation on Climate Change

Group	Adaptation Needs	Mitigation Potential	Project Certainty	Economic Development	Global Peace
Foreign Negotiators from Developed Countries (n=12)	0.061	0.346	0.370	0.115	0.107
Foreign Negotiators from Developing Countries (n=8)	0.192	0.218	0.230	0.208	0.153
Korean Negotiators (n=22)	0.142	0.278	0.381	0.133	0.066
Korean Experts (n=34)	0.161	0.214	0.311	0.120	0.193
All Respondents (n=76)	0.143	0.255	0.335	0.132	0.137

<Table 2> Appropriateness of international cooperation options, with reference to 5 decision-making criteria for all the respondents

Cooperation option	Adaption needs	Mitigation potential	Project certainty	Economic development	Global Peace	Sum
Cooperative Approaches (CA)	0.447	1.052	1.294	0.436	0.395	3.625
Sustainable Development Mechanism (SDM)	0.486	1.015	1.250	0.433	0.377	3.562
Non-Market Approaches (NMA)	0.476	0.794	1.053	0.363	0.384	3.070
Sum	1.409	2.861	3.597	1.232	1.156	

<Table 3> Appropriateness of 8 Asian countries, with reference to 5 decision-making criteria for Korean negotiators

Country	Adaption needs	Mitigation potential	Project certainty	Economic development	Global Peace	Sum	Rank
Vietnam	0.456	1.083	1.407	0.558	0.124	3.628	1
Indonesia	0.589	1.110	1.206	0.478	0.126	3.507	2
Philippines	0.523	0.955	1.110	0.500	0.140	3.229	3
Bangladesh	0.555	0.878	1.057	0.478	0.131	3.098	5
Mongolia	0.575	0.955	1.049	0.470	0.122	3.172	4
Pakistan	0.543	0.860	0.920	0.415	0.148	2.885	8
Myanmar	0.557	0.833	1.089	0.456	0.152	3.086	6
North Korea	0.583	0.923	0.801	0.538	0.214	3.059	7
Sum	4.381	7.597	8.639	3.893	1.157		

<Table 4> Appropriateness of 8 Asian countries, with reference to 5 decision-making criteria for Korean experts

Country	Adaption needs	Mitigation potential	Project certainty	Economic development	Global Peace	Sum	Rank
Vietnam	0.562	0.895	0.939	0.378	0.403	3.178	2
Indonesia	0.572	0.845	0.997	0.343	0.471	3.228	1
Philippines	0.506	0.741	1.029	0.342	0.480	3.098	4
Bangladesh	0.467	0.664	1.029	0.364	0.500	3.025	5
Mongolia	0.492	0.644	0.877	0.368	0.520	2.900	8
Pakistan	0.438	0.645	0.873	0.334	0.714	3.003	6
Myanmar	0.446	0.680	0.842	0.373	0.641	2.982	7
North Korea	0.383	0.679	0.833	0.360	0.882	3.137	3
Sum	3.866	5.793	7.419	2.862	4.611		

기후변화 관련 국제협력에 관한 설문조사서: <Appendix 1>참조

<Appendix 4> Written Answers from Korean Executive Experts

기후변화 국제협력에 관한 전문가 의견서 (Expert A: 기후변화협상 및 국제협력에 지속 참여)

국제협력 방안에 관한 질 문	의 견
의사결정 기준에 대한 그룹별 입장	o 협상가 그룹과 전문가 그룹이 동일한 설문의 대상이 되기는 어려움. o 협상가 그룹의 경우 선진국, 개도국, 한국의 경우 예상되는 반응임. o 전문가 그룹 내에서는 성향에 따라 다른 반응이 있었을 것 같음.
한국 협상가 그룹의 중간적 입장	o 협력 사업을 바라보는 시각은 크게는 선진국과 개도국, 세부적으로는 개별 국가의 현실적인 필요에 따라 다를 것임. 한국도 나름의 필요에 따라 활용할 것이며, 이 입장은 선진국과 개도국의 중간적인 입장이 됨. o 기후변화협상에서 한국과 같은 “독특한” 처지에 있는 국가를 발견하기가 쉽지 않음.
3개 국제협력 옵션에 대한 평가	o 신기후 체제에서는 CA>SDM>NM 순으로 활용될 것임. o 신기후 체제는 온실가스 감축에 있어 bottom-up 접근이므로, 협력 사업도 개별 국가가 자율성을 최대한 활용할 수 있는 CA 가 대세일 것임.
북한의 적합도에 대한 입장	o 협력 사업을 어떻게 추진할 것인가에 따라 평가가 달라질 것임. o 대북한 사업을 통해 경제성을 따지면서 실질적인 이익을 얻고자 한다면 적합도는 낮을 것이며, 국제평화, 인도주의 등의 다른 시각에서 본다면 적합도는 높아질 것임.

북한과 협력 시 사업 확실성 제고방안	o 북한과의 사업에 있어 확실성이 낮다고 평가한 결과는 적절하다고 봄. o 경제성을 따지면서 사업을 하기보다는, 경제성은 다른 목적으로 사업을 추진하다가 따라오는 부수적인 편익으로 생각하는 것이 좋을 것 같음.
국제협력 방안에 대한 제언	o 협력사업은 온실가스 감축 크레딧을 획득하기 위해 많은 노력과 시간이 소요될 것임. 일본도 이 점을 깨닫고 JCM 을 통한 크레딧 확보에 대한 기대를 많이 접은 상황임. o 정부가 나서서 하는 협력사업은 우리나라의 우수한 기술을 보여주고 이를 통해 잠재적 고객을 확보하는 차원에서 추구하고, 민간 차원에서 개별 기업들이 하는 사업은 적극 장려하는 것이 필요함. o 온실가스 감축은 국내적인 노력을 통해 추구하되, 국제협력 사업은 부수적이면서 제한적인 (marginal) 수단으로 활용하는 것이 바람직함. o 개도국에 대한 원조에 기후변화를 주류화하고 (mainstream), 개도국 들이 필요로 하는 적응 분야에 많은 지원을 하게 될 경우, 국제사회에서 존경 받는 리더가 될 수 있을 것임.

기후변화 국제협력에 관한 전문가 의견서 (Expert B: 기후변화협상 및 국제협력 등에 지속 참여)

국제협력 방안에 관한 질 문	의 견
의사결정 기준에 대한 그룹별 입장	o 답변자들의 대부분이 감축 잠재력과 사업 확실성을 중요하게 선택한 것은 기본적으로 기후변화 이슈 관련 협상가, 전문가, 국외, 국내를 막론하고 모두 다른 일반인에 비해서 기후변화 대응에서 감축 이슈가 가장 중요하다는 점을 잘 인식하고 있는데 기인하는 것으로 보임. o 개도국 협상가들이 감축을 우선적으로 선택하면서도 선진국 협상가에 비해 상대적으로 적응 필요성, 경제개발에 중요성을 부여한 것은 현재 협상의 판도를 반영하고 있으며, 개도국들의 현실적인 인식을 정확하게 반영하고 있다고 보여짐. o 한국전문가들이 상대적으로 평화 문제에 더 많은 선호를 보이고 있는 것은 한국 협상가 (주로 공무원)들에 비해 산림, 농업, 교통 등 분야별 전문가로서 최근의 남북 관계 개선과 협력 진전 과정에서 좀 더 관여도가 높고 관심을 많이 가지고 있는데 기인하는 것으로 유추됨.
한국 협상가 그룹의 중간적 입장	o 한국 협상가들의 선호가 다른 그룹에 비해 사업 확실성에 우선순위를 부여하고 감축, 적응, 경제개발에 비교적 균형적인 선호를 나타내는 것은 기후협상에서 한국이 처한 위치를 정확하게 반영하고 있는 것으로 보임. o 선진국과 유사하게 감축의 중요성을 인식하고 있지만 동시에 개도국들의 필요에 대한 이해와 공감도가 높으며, 협상 과정에서 선진국과 개도국간 중재적 역할을 수행하려고 하는 기본적인 인식을 반영하고 있는 것으로 보임.

3개 국제협력 옵션에 대한 평가	o 대부분의 답변자들이 기후변화 협상과 내용에 대해 전문적인 지식과 경험을 가지고 있다는 것을 전제할 때 자발적 협력(CA), SDM, 비시장적 협력(NMA) 등이 모두 기본적으로 감축 행동을 촉진하기 위한 메커니즘으로 이해하고 있으므로 감축과 사업의 확실성에 선호가 많이 표명된 것은 당연한 결과로 보여짐. o 통상적으로 선진국 전문가들은 자발적 협력(CA) 또는 SDM, 개도국 전문가들은 SDM 또는 비시장적 접근(NMA)을 선호하기 때문에 동 3 가지 접근에 대해 균형적인 선호가 나온 것으로 보여지지만 답변자의 성분과 표명된 선호의 관계를 세부적으로 분석해 볼 필요가 있다고 봄.
북한의 적합도에 대한 입장	o 한국전문가들이 상대적으로 평화 문제에 더 많은 선호를 보이고 있는 것은 한국 협상가 (주로 공무원)들에 비해 산림, 농업, 교통 등 사업분야 전문가로서 최근의 남북 관계 개선과 협력 진전 과정에서 좀 더 관심을 많이 가지고 있는데 기인하는 것으로 유추됨. o 특히, 협상가들은 한국의 협상가들은 현재 협상과정에서 향후 한국의 NDC 이행에 필수적인 시장적 접근법에 초점을 맞추고 있기 때문에 현실적으로 북한과의 협력 가능성에 대해 회의적일 수 있으나, 산림 등 남북한간 구체적인 협력 문제에 관심을 갖고 있는 해당분야 전문가들은 북한과의 협력 가능성에 보다 큰 가능성과 기대를 가지고 있는 것으로 해석됨.
북한과 협력 시 사업 확실성 제고방안	o 한국 협상가와 전문가 그룹은 다른 대상국가들과 비교할 때 북한과의 협력 가능성과 전망에 대해서 장기적인 접근이 필요하다는 점과 공산주의

	통제경제의 현실적 한계, 폐쇄성 등을 잘 인식하고 있으므로 최소값 부여는 당연한 결과로 보여짐. o 북한과의 협력은 측정, 통계 등 과학적 기반 및 인프라 개발이 선행되어야 하는 장기적인 계획과 사회, 경제 전반적인 접근이 필요할 것이므로 일본의 JCM 방식과 같이 북한의 특수성을 고려한 맞춤형 사업방식을 개발하고 UNFCCC 와의 협력, 당사국 총회 등의 승인을 통해 국제적 인정을 받는 것을 대안으로 검토해 볼 수 있을 것임.

기후변화 국제협력에 관한 전문가 의견서 (Expert C: 기후변화정책 관련 연구, 심의 등에 지속 참여)

국제협력 방안에 관한 질 문	의 견
의사결정 기준에 대한 그룹별 입장	o 전반적으로 각자의 이익이나 관심에 맞게 선정되었다고 봄. 개도국의 경우 적응이 강조되는 상황을 잘 반영하였으며, 선진국의 경우도 감축이 반영된 것은 타당하다고 보임. o 개인적으로 한국 전문가의 경우 다소 흥미로운 것은 세계평화에 상대적인 비중을 둔 것이며 다소 의외로 봄.
한국 협상가 그룹의 중간적 입장	o 한국의 경우 선진국과 개도국의 중간 입장을 고수한다는 입장에서 이 두 개 그룹의 중간값을 일반적으로 받아 들이는 것은 무리는 없다고 보임. o 그러나 이제는 한국이 선진국으로 인식되고 있다는 점도 고려하여 선진국의 협상 기준을 한번 시도하는 것도 좋다고 보임.
3개 국제협력 옵션에 대한 평가	o 적합도 평가에서 전체적으로 CA, SDM, 그리고 NMA 순으로 응답한 것은 타당하다고 보임. 비시장 접근(NMA)의 경우 아직 구체성이 적으며 개도국에서 주로 주장하고 있다는 점에 비추어 볼 때 우선순위에서 계속 하위에 있을 것임. o 응답자들이 CA 에 우선순위를 둔 것은 실질적인 운영상의 실효성을 더 강조한 측면이 있다고 보임. 한국이 NMA 에 대한 좋은 사례를 제시한다면 개도국의 브릿지 역할을 할 수 있는 가능성은 있다고 보임.
북한의 적합도에 대한 입장	o 협상가 들의 경우 현실성에 근거하여 판단하였기 때문에 북한에 7 순위를 부여하는 결과를 가져왔으며,

	전문가들은 현실성보다는 미래성을 고려하여 판단한 것으로 보임. o 전문가들의 의견에는 이중성이 있는 것으로 판단됨. 북한과의 협력이 세계평화에는 기여할 수 있다고 보이나 북한의 경제 개발에는 상당한 시간과 비용이 필요할 것으로 보임에 따라 실제 경제개발 효과에 시간이 오래 걸릴 것으로 판단됨. 실제 감축 잠재력에서도 이미 경제 여건이 좋지 않은 북한이 감축할 수 있는 여력은 충분히 있으나 기여도는 높지 않을 것임.
북한과 협력 시 사업 확실성 제고방안	o 북한 사업확실성에 대한 낮은 평가결과는 불확실성이 크다는 점에 기인한 것으로 보임. 특히 한국의 전문가들이 보는 입장은 보수적인 시각을 반영한 것으로 보이지만, 여전히 사업확실성은 낮은 것이 사실이며, 과거의 통계나 사업 추진의 역사에서 보여준 것에 기인하는 점도 있음. o 사업 확실성을 보장하는 방안은 명확하게 중국이나 러시아와 공동으로 사업을 추진하고 국제법적인 보장을 받을 수 있도록 각종 제도적 장치를 마련할 때 가능하다고 보임. 다른 하나는 미국-중국-러시아-한국-북한 간 경제협력 협정을 체결하는 방안도 고려해볼 수 있다고 생각됨. 단 이러한 경우에도 비핵화 협력이 전제되어야 할 것임.
국제협력 방안에 대한 제언	o 민간협력 활성화부터 추진하면서 공공부문 협력으로 확산하는 방안이 바람직함. 민간 자본 금융이나 자본의 투자 활성화를 위한 방안 마련 및 인센티브 제공을 검토해볼 수 있음.

기후변화 국제협력에 관한 전문가 의견서 (Expert D: 온실가스 감축 관련 연구, 국제협력, IPCC 보고서 작성 등에 지속 참여)

국제협력 방안에 관한 질 문	의 견
의사결정 기준에 대한 그룹별 입장	o 각 그룹의 입장에서 볼 때 중요도 평가에 있어 특별히 이해하기 어려운 선택은 없다고 생각함. 다만, 한국협상가 그룹은 국제협상의 최전방에서 온실가스 감축과 관련한 국제적인 약속의 이행에 방점을 두어서 사업확실성을 선택한 것 같고, 한국전문가 그룹은 국제협상을 직접 느끼지 못하기 때문에 북한과의 사업이 북한의 개방, 남한과의 교류 협력 등을 촉진함으로써 가져올 긴장완화 및 평화분위기 제고에 더 큰 중요도를 부여한 것 같음.
한국 협상가 그룹의 중간적 입장	o 각 그룹의 입장에서 생각해 볼 때, 예견된 결과라고 생각되며, 특이 사항은 없는 것 같음.
3개 국제협력 옵션에 대한 평가	o CA 와 SDM 이 통계적으로 유의미한 차이가 있는 지에 대해서는 검토가 필요할 것 같음. 값의 차이가 크지 않아서 오차 범위 내에 있을 수도 있고, 그 경우 어떤 것이 더 적합하다고 말하기는 어려움. o 어쨌든 기후변화는 모든 나라의, 특히 선진국과 개도국 간에 협조가 없으면 풀기 어려운 문제라는 인식을 보여 주고 있는 동시에, 기후변화와 지속가능발전이 긴말하게 연결되어 있다는 응답자들의 생각을 보여 주고 있는 것 같음. 비시장접근은 시장접근과 비교하면 더 흥미가 있었을 텐데, 비교 대상이 달라서 쉽게 단언하기 어려움.
북한의 적합도에 대한 입장	o 전문가 그룹의 평가는 본인 평가와 달라서, 약간 의아함. 북한의 감축잠재량이 크다고 평가한 것이 의문이고, 경제개발은 기후변화 협력사업이 북한의 경제개발에 기여하는 입장에서 대답한 것 같음.
북한과 협력 시 사업	o 북한에 대한 정보가 상대적으로 많은 한국 협상가와 전문가 그룹의 판단에 동의함.

확실성 제고방안	o 북한과의 사업은 항상 높은 불확실성과 정치적 위험성이 내재되어 있음. 사업이 상호이익이 된다는 점을 확실히 보여 주고, 제 3 국 (특히 중국이나 유럽)과의 공동 사업 등을 통해 북한이 일방적으로 계약을 파기하기 어려운 구조를 만들어야 할 것으로 생각됨.
국제협력 방안에 대한 제언	o 경제학을 공부한 입장에서 볼 때, 인센티브를 제공하는 시장접근적 방법이 가장 바람직할 것으로 생각됨. 비시장적 접근이나 강제적인 접근은 규모와 지속성에 있어 한계가 있고, 적극적인 참여를 유도하기도 어려움. o 사업의 결과가 기후변화 대응뿐만 아니라 참여자에게 이익이 됨을 명확히 보여주고, 시장에서의 자발적 거래를 유도하는 것이 바람직함. 인위적인 계획은 시장의 힘을 능가할 수 없을 것임.

기후변화 국제협력에 관한 전문가 의견서 (Expert E: 기후변화 감축정책 관련 연구, 국제협상 등에 지속 참여)

국제협력 방안에 관한 질 문	의 견
의사결정 기준에 대한 그룹별 입장	o 눈높이가 다를 수 밖에 없음. 선진국은 감축을 통한 국가목표 달성을, 개도국은 적응역량 증대를 통한 기후변화 취약사항의 극복을 원함. o 한국에서는 국제협력을 국가 감축목표 달성목적에서 접근하고 있지만, 한국협상가 그룹은 개도국 사업경험이 없는 관계로 불확실성을, 전문가 그룹은 이론적 접근을 하고 있다고 판단됨.
한국 협상가 그룹의 중간적 입장	o 우리나라가 개도국인가 선진국인가에 대한 인식과 유사한 인식을 하고 있다고 판단됨.
3개 국제협력 옵션에 대한 평가	o 현 단계에서의 접근가능성을 기준으로 평가하였다고 생각됨. SDM 은 2023-24 년 경에야 현실화될 수 있기 때문에 이보다는 유연하고 빠르게 시작할 수 있는 CA 에 더 비중을 두고 있고, 비시장의 경우 시행에 따른 feedback 이 낮을 수 밖에 없기에 선호가 낮다고 생각함.
북한의 적합도에 대한 입장	o 협상그룹은 국가간 적합도 측면 (정치 리스크), 파리협정 상의 규정상 북한의 이행 달성여부)에서 상대적으로 낮은 등급을 부여하였고, 전문가 그룹은 개별사업의 관점에서 잠재력을 본 것 같음. 거시경제와 미시경제의 차이로 보임.
북한과 협력 시 사업 확실성 제고방안	o 북한의 잠재력은 높다고 판단하지만, 정보 부족으로 인한 막연한 기준이 적용되었기 때문임. 따라서 정보 부족의 해소가 사업 확실성을 제고할 수 있는 선결조건이 될 수 밖에 없음.
국제협력 방안에 대한 제언	o 특정부처가 진행하는 방식이 아닌 전 부처 차원의 공동대응 형태로 추진하는 것이 바람직하며, 국제협력의 목적이 명확해야만 불필요한 비용지출을 최소화할 수 있음.

기후변화 국제협력에 관한 전문가 의견서 (Expert F: 기후변화 감축정책 관련 연구, 국제협상, 국내감축 이행 등에 지속 참여)

국제협력 방안에 관한 질 문	의 견
의사결정 기준에 대한 그룹별 입장	o 선진국은 기후변화 완화를 위한 온실가스 감축에 대한 수요가 큰 반면 개도국은 선진국의 책임과 보상에 관련된 적응 문제와 빈곤퇴치를 더 중요한 문제로 인식하고 있음이 반영된 것으로 평가됨.
한국 협상가 그룹의 중간적 입장	o 협상에서 한국의 입장인 선진국과 개도국의 중간적 상황에 처했기 때문인 것으로 평가됨.
북한과 협력 시 사업 확실성 제고방안	o 과거 북한의 행태가 매우 큰 불확실성을 나타내 왔기 때문으로 평가됨. 북한과의 사업확실성 제고를 위해서는 북미관계 개선 등 여건의 변화가 선행되어야 할 것으로 판단됨.

기후변화 국제협력에 관한 전문가 의견서 (Expert G: 온실가스 감축 관련 연구, 국제협상, 국가정책 입안 등에 지속 참여)

국제협력 방안에 관한 질 문	의 견
의사결정 기준에 대한 그룹별 입장	o 선진국은 감축 잠재력이 낮고 대신 감축비용이 높기 때문에 이를 통하여 감축여력이 없다는 점을 강조하려는 의지로 보이며, 개도국의 경우에는 적응을 통한 선진국으로부터의 지원을 강조하고 선진국의 지원과 협력을 통해 경제발전을 도모하려는 의지로 해석이 됨. o 한국 협상가 그룹이 사업 확실성에 중점을 두는 이유는 우리나라의 온실가스 감축목표를 달성하는 것이 가장 시급한 과제이기 때문에 확실한 사업의 중요성이 부각되었기 때문으로 풀이되며, 한국의 전문가들이 세계 평화를 강조한 점은 기후변화 문제를 개도국이나 북한과 같은 국가에 대한 평화의 도구로 활용할 수 있다는 점을 염두에 두고 있는 것으로 풀이됨.
한국 협상가 그룹의 중간적 입장	o 우리나라는 선진국과 개도국의 중간에 위치해 있는 국가라는 점이 여실히 드러나고 있는 것으로 해석됨. 협상에 참여하고 있는 그룹은 우리나라의 위치를 국제무대에서 보다 명확하게 이해하고 있기 때문에 우리나라가 선진국과 개도국의 중간입장을 취할 수 밖에 없다는 점을 잘 알고 있기 때문임. o 우리나라는 여러 지표에서 이미 선진국의 대열에 합류한 것이 사실이지만 기후변화협약에서는 개도국으로 분류되어 있다는 점을 충분하게 활용하는 것이 필요함. 우리나라와 경제수준이 비슷하거나 우수한 국가들 (싱가포르 등)도 여전히 개도국으로 분류되어 있고 스스로 개도국으로서 행동하고 있기 때문에 우리나라도 개도국으로서의 지위를 인정받도록 지속적으로 노력해야 할 것으로 사료됨. 선진국으로

	분류되면 재정적 및 기술적으로 부담해야 하는 수준이 매우 높을 것으로 예상됨.
3개 국제협력 옵션에 대한 평가	o 파리협정에서는 세계 모든 국가가 온실가스 감축을 비롯한 기후변화 대응노력에 참여해야 하기 때문에 교토의정서 체제에서의 청정개발제도(CDM)와 같이 선진국이 개도국을 지원할 수 있는 시스템 (sustainable development mechanism)이 약화되고 상대적으로 모든 국가가 참여하는 제도(cooperative approaches)가 활성화될 것으로 예상되기 때문임. o 지속가능메커니즘은 여전히 개도국을 지원할 수 있는 역할을 수행할 수 있을 것으로 예상되며, 비시장 메커니즘은 일본과 같은 일부 국가가 활용할 수 있다는 점에서 지지도가 가장 낮은 것으로 풀이됨.
북한의 적합도에 대한 입장	o 한국의 협상가 그룹은 북한이 유엔의 기후변화협약 활동에 소극적으로 임하고 있는 점을 알고 있기 때문에 적합도 평가에서 불안한 마음을 감출 수 없었던 점이 낮은 적합도 평가점수를 부여한 것으로 풀이됨. o 반면 한국 전문가 그룹은 감축 잠재력과 경제개발 측면을 매우 긍정적으로 보고 있는 점은 협상가 그룹이 긍정적으로 보고 있지 않다는 점을 말해준다고 보기 보다는 상대적으로 전문가 그룹이 긍정적인 생각이 강하다고 해석할 수 있음. o 북한은 앞으로 경제발전과 온실가스 감축 잠재력이 매우 높은 국가로 사료됨. 에너지 시스템이 노후화되었고 효율도 낮기 때문에 앞으로 시스템의 현대화와 신기술을 도입하면 온실가스를 감축할 수 있는 여력이 높고, 현재 경제수준이 너무 낮기 때문에 북한이 한국이나 미국 등의 자본주의 국가와 경제교류와 협력을 시작하면 매우 빠른 속도록 경제성장을 이룩할 수 있을 것으로 예상됨.
북한과 협력 시 사업	o 사업 확실성의 측면에서는 북한에 높은 점수를 부여하기 어려울 것으로 생각됨. 북한은 그 동안

확실성 제고방안	한국과 미국 등 외부 국가와의 약속을 수시로 번복했기 때문에 (개성공단 등) 북한에서 사업을 한다는 것은 불확실성이 매우 높다는 점을 말해주고 있음. 따라서 향후 북한과 사업을 전개할 경우에는 제도를 확실하게 확립할 필요가 있음. o 북한이 약속을 번복한다는 것은 자본주의 시각에서 바라본 입장일 수 있으며, 북한과 같은 사회주의 국가에서는 대수롭지 않은 의사결정일 수 있기 때문임. 따라서 향후 사업의 불확실성을 줄일 수 있도록 제도를 강력하게 구축할 필요가 있음.
국제협력 방안에 대한 제언	o 온실가스 감축과 기후변화 대응에는 무엇보다 기술이 가장 중요하다고 생각됨. 따라서 향후 개도국에 대한 지원 등은 주로 기술위주로 추진될 필요가 있음. 새로운 기술이나 선진국에서 운용되고 잇는 기존 기술들이 개도국에 잘 이전되고 개도국에서 잘 운용되기 위해서는 파리협정의 메커니즘을 통해서 추진하는 것이 가장 효율적임. 협력적 접근법과 같은 메커니즘은 기술확산에 크게 도움이 될 것이며, 직접적인 기술지원과 기술을 운용할 수 있는 노하우 이전도 동시에 이루어질 필요가 있음.

기후변화 국제협력에 관한 전문가 의견서 (Expert H: 온실가스 감축 관련 연구, 국제협상 및 국제협력, 국내 이행 등에 지속 참여)

국제협력 방안에 관한 질 문	의 견
의사결정 기준에 대한 그룹별 입장	o 그룹의 특성을 반영한 적절한 답변이라고 생각됨. 한국의 협상가 그룹이 사업확실성에 비중을 둔 것은 현재 협상의 내용과 속도를 국내 기후변화 정책 (2030 감축 로드맵과 특히 배출권거래제)의 속도 및 강도와 비교할 때 국제협력 사업을 위한 modalities 와 procedures 가 정해지지 않았기 때문일 것으로 생각됨. 전문가 그룹은 향후 국제협력활동이 기후변화로 인하여 발생할 가능성이 있는 갈등을 해결하는 방안이 될 수 있을 것이라는 기대감을 반영하고 있다고 생각됨. 특히 북한과의 협력은 남북관계를 진전시킬 수 있는 중요한 방안으로서 기후변화 대응 (특히 공동 대응)을 고려할 수 있으며, 북한에 대한 국제제재에 대해 기후변화 대응이라는 평화 이슈를 활용할 가능성을 기대하는 것으로 생각됨.
한국 협상가 그룹의 중간적 입장	o 한국 협상가 그룹이 항상 협상에서 선진국과 개도국의 중간그룹으로서 역할을 해야 한다는 관점을 가지고 있다는 점도 반영되었다고 생각됨. 또한 한국은 감축의 중요성과 경제발전이 병행되어야 한다는 중간적 관점도 반영되었을 것임. o 일반적으로 개도국 협상가 그룹이 적응의 중요성을 강조하는 반면, 한국은 전통적으로 경제성장이 국내외의 어떤 이슈에도 선행되는 중요성을 가지는 것으로 간주하고 있는 점이 반영된 것으로서 개도국 협상그룹의 성향과는 다소 다를 수도 있다고 판단함.

3개 국제협력 옵션에 대한 평가	o 파리협정 6 조의 활용에 있어서 2 항 ‘협력적 접근’은 새로운 협력방안으로의 기대를 가지고 있는 것으로 평가되고 있다고 생각됨. o 반면 4 항의 소위 ‘SDM’은 기존 CDM 의 변형 또는 전환이라는 이미지가 강하여 활용성이 떨어진다고 생각하는 경향이 있을 것임. 8 항의 ‘비시장 접근’은 아직도 협력 개념이 손에 잡히지 않고 있어서 활용성이 낮은 것으로 평가하고 있다고 보임. o 그러나, 현실적으로는 4 항의 ‘SDM’이 CDM 이라는 잘 정의되고 진행되는 CDM 에 기초하고 있는 반면, 2 항의 ‘협력적 접근’은 새로이 정의할 규정과 절차가 많고, 개인적으로는 교토의정서의 JI 에서 출발하는 협력 형태가 될 수 있을 것으로 생각됨. 이는 협력 절차에 대해 더 큰 유연성을 제공할 수 있지만 이전 가능한 감축실적의 정의를 국제적으로 공인하는 것에서는 부족함이 발생할 수 있어서, 감축실적의 정의에 대해서는 4 항의 ‘SDM(기본적으로 CDM 이 사용하고 있는 방법론에 기초하는)’에서 사용하는 방안을 활용하게 된다면 처음 기대했던 유연성은 상당히 감소할 것으로 전망됨. o 또한 `협력에 참여하는 당사국들의 공동위원회(가칭)’가 여러 개 필요하고 이를 운영하기 위하여 참여하는 당사국들이 시간과 비용 및 인력을 지불하게 되므로 비효율이 발생할 수 있을 것임. 이에 반해 4 항의 ‘SDM’은 감축실적의 발급까지 UN 이 관리감독을 대행하므로 실적의 가치에 대한 신뢰도를 확보할 수 있고, 참여 당사국들이 별도의 운영비를 지불하지 않아도 되는 이점이 있음. o 8 항의 ‘비시장 접근’은 현재 운영중인 ‘NAMA Approach’와 유사한 성격을 가지고 있다고 생각됨. 개도국이 필요한 사업을 NAMA 로 정의하여 지원을 요청하면 관심을 가진 측에서 재원을 지원하지만 감축실적을 시장 유통용으로 정의하거나 거래하지는 않는 것임. 현재 운영 현황을 고려한다면 활용성은 낮을 것이며, 특히 한국의 경우 반대급부가 없이 NAMA 를 지원하려는 동기가 별로 없을 것이라는 설문 참여자들의 견해가 반영된 것으로 생각됨.

북한의 적합도에 대한 입장	o 협상 측면에서 보면, 북한은 수많은 개도국 중의 하나이며 파리협정의 이행을 위한 규정과 지침을 활용하더라도 다른 국가보다 협력을 더 활발하게 하기는 어렵다고 평가됨. 특히 정치적 위험도는 협력 적합도를 높이기에 어려움. 그러나 전문가 그룹은 북한을 기후변화에 대한 파리체제의 관점으로 보기보다는 남북관계의 일부로 기후변화체제를 활용하는 방안을 보고 있는 것으로 생각됨. o 기후변화 대응은 환경문제에 대해 전세계가 함께 협력하자는 것이므로 UN 제재와 같은 현재 상황에서 남북관계를 진전시킬 수 있는 방안의 하나로 볼 수 있음. 기후변화 대응을 경제제재 대상에서 면제함으로써 현 상황을 진전시킬 수 있을 것임. o 파리협정 6 조를 북한의 경우에 활용한다면, 2 항의 '협력적 접근'을 사용하기에 가장 적절한 대상국이 될 수 있을 것으로 생각함. 양국간 공동위원회를 구성하기 용이하고 사업에 참여하는 모든 사업자들에게 언어문제가 장애물이 되지 않으며, 양국간 공동위원회의 운영을 위한 비용이 남북협력을 위한 비용으로 가능할 것으로 기대할 수 있음. 따라서 다른 나라와는 달리 2 항을 활용하는 것이 4 항을 활용하는 것보다 유리할 것이며, 8 항을 활용하여 실적에 대한 거래 없이 사업을 진전시키는 것은 더욱 많은 사업을 추진하는 방안이 될 수 있을 것으로 생각함.
북한과 협력 시 사업 확실성 제고방안	o 대 북한 사업의 불확실성은 기후변화 문제가 아니라 정치적 불확실성일 것임. 특히 미국의 대북제재를 가장 큰 불확실성으로 볼 것임. 따라서 북한과의 협력사업을 수행함에 있어서 파리협정의 6 조를 활용하는 방안이 좋을 것임. o 6 조 2 항을 활용하는 것이 효과적일 수 있지만 초기에는 UN 이 관리 감독하는 4 항의 'SDM'을 활용하여

	남북한 2 개국의 문제가 아니라 유엔이 인정하는 기후변화 대응체제 아래서 이루어지는 사업임을 보이는 것이 사업확실성을 제고하는 방안일 수 있음. 이는 대북 사업에 참여하는 남한의 사업자들에게도 안정성을 보장하는 방안일 수 있을 것임. o 만일 사업이 CDM 이나 SDM 으로 진행된다면 사업의 중단 여부에는 UNFCCC 의 결정이 관여하므로 안정성 보장에 유리할 것임.
국제협력 방안에 대한 제언	o 기후변화와 관련한 국제협력은 기후변화 대응을 위한 국내정책의 난제를 해외에서 해결하는 방안으로 보려는 관점에서 벗어나야 할 필요가 있음. 기후문제는 국제 문제이므로 문제가 있는 곳에서 문제를 발생시킨 이유를 해결하려는 관점이 필요함.

기후변화 국제협력에 관한 전문가 의견서 (Expert I: 기후변화 감축정책 관련 국제협상, 배출권거래제 운용 등 국내 감축 이행에 지속 참여)

국제협력 방안에 관한 질 문	의 견
의사결정 기준에 대한 그룹별 입장	o 협상가 또는 전문가의 출신이 선진국인지 개도국인지에 따라서 전자는 감축 분야, 후자는 적응 분야, 경제발전에 대한 국제협력의 필요성을 강조해왔음. 국제협력에 소요되는 재원의 조달 주체(선진국 중심)에 따라서 그간의 기후변화협상에서는 위와 같이 전반적으로 입장이 다르게 전개되어 왔으며, 설문 조사 결과에서도 이런 측면이 반영된 것으로 보임. 즉, 선진국에서는 국제협력을 위한 재원의 흐름이 민간부문에서 주도적으로 흘러갈 수 있는 여건이 갖추어지는 것(감축 중심, 사업 확실성 등)을 선호하였으며, 과거 협상에서 다수 개도국이 요청해왔던 선진국의 정부재원(예산)으로 개도국을 지원하라는 주장에 다수 선진국이 반대해왔던 논의와 동일하다고 보임. o 이와 같은 사실을 종합적으로 고려할 때, 현재 우리나라에 중요한 기후변화 부문의 국제협력은 실제 탄소배출권이 발생될 수 있는 사업, 실제 사업의 불확실성이 적은 사업에 국내 기업의 자본이 투자되고 이것이 국내 배출권거래제에 활용될 수 있는 사업에 대해 그 수요가 높다는 측면을 반영한다고 볼 수 있음. o 또한, 우리나라는 그 동안 유무상 공여를 통해 국제협력을 진행해온 경험이 다수 축적되어 있는 바, 그간의 경험으로 개도국에서 시행하는 사업의

	불확실성에 대해 우려가 높다는 것도 반영되었다고 보임.
한국 협상가 그룹의 중간적 입장	o 한국 협상가 그룹은 국제협상 과정에서 많은 경우 선진국과 개도국의 중간자적인 입장을 중시하고, bridge 역할에 중요성을 강조해왔던 경험이 있음. 이런 측면에서 실제 기후변화협상이 원활하게 성과를 내기 위해서는 선진국의 관심이 감축 활동 확대와 개도국의 관심인 적응 및 경제발전 확대 사이에 균형을 잡아야 한다는 판단이 있기 때문인 것으로 보임. 또한, 그간 기후변화 협상 중 감축에 대한 논의에 우리나라가 적극적으로 입장을 표명하거나 깊게 개입하는 것을 꺼리고 반대로 국가 차원의 부담이 적은 적응, 투명성, 인력양성 부분에 대해 보다 적극적으로 역할을 하려는 태도에 기인한 것으로도 판단됨.
3개 국제협력 옵션에 대한 평가	o 국제협력 측면에서 CA 는 확실한 감축 잠재량 확보, 다양한 유형의 사업 발굴 가능성, MRV 측면의 융통성, 양자 또는 지역간 협력 가능성 등의 측면에서 다른 유형보다 수월할 것으로 판단하기 때문으로 보임. o 또한, SDM 이 CDM 과 유사하게 중앙집권적 운영체계를 가질 가능성이 높아 보이는 상황에서 교토의정서체계에서 CDM 에 대해 누적된 부정적 요소, 양자 또는 지역간 협력 사업 발굴에 부정적 측면 등이 SDM 보다는 CA 에 대한 선호도를 높인 것으로 판단됨. NMA 는 CA 와 비교시 감축 잠재량 확보, 사업 유형 등의 측면에서 아직 명확히 정의되지 못하여 매우 불확실한 문제가 있다고 판단됨. o 다만, 배출권거래제에 직접 참여하는 주체(국가, 기업 등)에게는 CA 가 SDM 보다는 Environmental Integrity 측면에서 문제가 발생할 가능성이 높아 보일 수 있어, 실제 사업 개발 과정에서는 SDM 이 더 신뢰성을 가질 수 있을 것으로도 예측할 수 있음.

북한의 적합도에 대한 입장	o 협상가 그룹은 북한과의 국제협력이 불확실성이 매우 높아서 다른 측면 (감축잠재량, 경제개발 항목 등)에서 의미가 있더라도 실제 국제협력의 가능성, 실효성이 낮다고 해석하는 것으로 판단됨. o 반면, 전문가 그룹은 우리나라 정부가 북한과 협력을 잘 하면 좋겠다는 당위적 전제(최근의 남북 화해 모드)에서 감축 잠재력과 경제발전 항목의 중요성에 높게 점수를 부여한 것으로 보임. o 다만, 동 설문의 목적이 배출권거래제에 사용될 해외 탄소배출권 확보를 위한 국제협력에 대한 것임을 고려할 때 협력 재원의 성격(정부, 민간), 사업 주체(한국 기업, 제 3 국가 기업 등), 국내 정부의 변동과 안보 이슈 발생 여부 등 매우 복잡한 요소에 의해 사업 적합성이 결정될 것으로 판단됨.
북한과 협력 시 사업 확실성 제고방안	o (위의 4 번 질문에서 답을 한 것과 같이) 한국 그룹은 그간의 역사적 경험으로 사업 확실성에 신뢰성을 줄 수 없는 것으로 판단됨. 사업 확실성을 제고할 수 있는 방안은 앞서 언급한 것처럼 재원의 성격, 사업의 주체, CA/SDM 측면의 장단점을 종합적으로 판단하여 추진할 필요가 있다고 판단됨. 개인적으로 재원은 민간, 사업 주체는 제 3 국가 기업과 공동 진행, SDM 형태로 진행하는 것이 사업확실성을 상대적으로 높일 수 있다고 판단됨.
국제협력 방안에 대한 제언	o 배출권거래제 측면의 국제협력에 대해서 우선은 우리나라가 믿을 만한 협력 파트너를 찾는 것에서 시작되어야 할 것임. 믿을 만한 협력 파트너는 그간의 온실가스 감축 노력 정도(다자기구와의 협력 정도, 국내 carbon pricing 제도 도입 여부 등)를 근거로 판단하는 것이 가장 효과적일 것으로 판단됨. 또한, CA, SDM 중에서 어떤 유형이 배출권 거래 시

	장기적으로 신뢰성이 높을 수 있는지를 주요 판단근거로 할 필요도 있음. o 이와 더불어, 보다 중요하게는 국제협력에 의해 다량의 배출권을 장기적으로 확보하겠다는 전략보다는 기후변화에 공동으로 대응한다는 외교적 관점을 가지고 접근하는 국제협력이 더 장기적인 협력이 가능할 것으로 판단됨.

기후변화 국제협력에 관한 전문가 의견서 (Expert J: 기후변화협상 및 국제협력에 지속 참여)

국제협력 방안에 관한 질 문	의 견
의사결정 기준에 대한 그룹별 입장	o 각 협상가 그룹의 중점 관심사안에 비추어 항목별로 중요도를 평가한 것으로 생각됨.
한국 협상가 그룹의 중간적 입장	o 한국 협상가 그룹의 기후변화 협상 내 역할과 유사하게 중요도를 평가한 것으로 판단됨.
3개 국제협력 옵션에 대한 평가	o 협상가 그룹의 우선순위를 반영한 평가라고 보임. 탄소시장의 거래와 발행에 있어서 선진국과 개도국이 구매자와 판매자로서 이해관계가 비교적 일치되는 분야임.
북한의 적합도에 대한 입장	o 한국의 협상가 그룹은 현실적인 접근법을 취한 반면, 전문가 그룹은 이상적인 접근법을 취하면서 북한과의 협력 의지를 강력히 표명한 것으로 보임.
북한과 협력 시 사업 확실성 제고방안	o 협력사업의 의사결정기준에서 사업확실성이 가장 중요하다는 인식이 공감되고 있는데 북한과의 사업은 확실성이 아직까지는 부족하다는 측면에서 향후 북한과의 협력사업에 있어서 신뢰성 회복이 가장 커다란 과제라고 할 수 있겠음. 소규모 사업이라도 수행하여 사업의 추진 실적을 쌓아 나가는 것이 중요하다고 봄.
국제협력 방안에 대한 제언	o 기후변화관련 국제협력은 양국 정부간 협력, 민관협력(PPP) 그리고 국제기구를 통한 협력의 방식이 있을 수 있음. 협력의 실효성을 높이기 위해서는 PPP 방식이 바람직할 것으로 보임. 우리나라의 경우 기후변화 대응에 있어 적응과 기술협력 분야에 보다 중점을 두고 대 개도국 협력사업을 실시하는 것이 좋을 것으로 생각됨.

기후변화 국제협력에 관한 전문가 의견서 (Expert K: 기후변화협상 및 국제협력에 지속 참여)

	의 견
의사결정 기준에 대한 그룹별 입장	o 전반적으로 수긍이 가나, 한국 협상가 그룹의 경우 세계 평화보다는 enlightened self-interest 에 방점을 둔 것으로 보임. 협상 대책 회의에서의 발언이나 제시된 입장이 고려된 것으로 보임.
한국 협상가 그룹의 중간적 입장	o 한국 협상가 그룹의 입장은 각 부처별로는 우선 순위가 다르지만, 한국의 기본 입장과 부합한다고 봄.
3개 국제협력 옵션에 대한 평가	o 정확한 평가라고 생각함.
북한의 적합도에 대한 입장	o 북한에 대한 자료와 정보가 거의 부재한 상태에서의 평가이기에 불확실성이 높다고 봄.
북한과 협력 시 사업 확실성 제고방안	o 북한에 대한 사업 확실성은 북한체제의 개방도에 비례한다고 봄. 사업 확실성을 높이는 방안은 북한이 국제 사회의 일원으로 국제합의를 존중하도록 하는 것이 최선이라고 봄. o
국제협력 방안에 대한 제언	o 기후변화 분야 국제협력은 양자 및 다자 차원에서 다양하게 진행될 수 있음. 가장 중요한 출발점은 협력 기반을 조성하는 것임. 한국의 경우 다자 차원의 협력 플랫폼은 다수 있으나, 양자 차원의 협력 플랫폼은 부처별 입장 차이로 기형적인 형태를 보이고 있음. 범정부 차원의 접근과 조정이 필요하다고 봄.

기후변화 국제협력에 관한 전문가 의견서 (Expert L: 기후변화협상 및 국제협력에 지속 참여)

국제협력 방안에 관한 질 문	의 견
의사결정 기준에 대한 그룹별 입장	o 그간의 기후변화 협상장에서 보여왔던 선진국과 개도국의 우선 순위와 관심사, 그리고 통상적으로 기대했던 선진국과 개도국의 입장과 태도에서 크게 벗어나지 않는 것 같음. 다만 한국 협상가 그룹은 선진국과 개도국 논리에서 한 발짝 떨어져 실질적인 차원에서 접근하고 있고, 전문가 그룹은 보다 가치적인 측면에 중점을 두고 있는 것으로 평가함.
한국 협상가 그룹의 중간적 입장	o 한국의 입장은 아직 선진국도 개도국도 아닌 중간자적 입장을 취하고 있고, 어찌 보면 어정쩡한 단계에 있다고 볼 수 있음. 어느 한 그룹의 입장을 명시적으로 지지하거나 택할 수 있는 준비나 조건이 안 된 상태에서 개도국 마인드를 갖고 수세적인 입장에서 적극적인 입장으로 선회하는 전환점에 있음. 따라서 가장 안전하다고 볼 수 있는 중간자적 평균에서 스탠스를 정하고 있는 것으로 생각됨.
3개 국제협력 옵션에 대한 평가	o 일반적으로 시장기제 도입에 있어서 대부분 찬성하고 있어서 비시장 접근법에 대한 평가도가 낮은 것은 당연하다고 할 수 있음. 이는 비시장 접근법의 내용이 모호하고 막연하기 때문이기도 함. o 시장기제 접근법에 있어서 중앙집권적인 SDM 보다는 협력적 접근법이 일정한 지침만 준수하면 재량도 더

	있고 보다 자유롭게 감축사업을 할 수 있어 여러 국가와 전문가들이 선호하고 있은 것으로 평가함.
북한의 적합도에 대한 입장	o 한국 전문가 그룹이 세계평화에 대해 가치를 더 많이 부여하고 있어 대북 사업에 대한 평가도가 높다는 것에 동의함. 정책을 담당하는 협상가들은 아직 비핵화 협상과 북미관계에 대해 보수적으로 접근하고 있는데 반해, 전문가들은 현실적인 여건과 한계 보다는 협력에 대한 기대를 더 많이 갖고 접근하는 데 큰 이유가 있지 않나 생각함.
북한과 협력 시 사업 확실성 제고방안	o 국제적인 지정학이 첨예하게 돌출하는 지점인 북한에 대한 사업확실성이 가장 낮은 것은 이해할 수 있음. 정치적인 불확실성과 신뢰도 저하가 결국 언제든 사업의 발목을 잡을 수 있다고 판단하기 때문임. 대북사업에 대한 확실성이 제고되기 이전까지는 여타 개도국에 대한 사업을 통해 경험과 노하우를 축적하여 북한에 적용할 수 있는 가능성을 높여가는 것이 바람직하다고 생각함.
국제협력 방안에 대한 제언	o 기후변화 협상에 있어서 선진국과 개도국의 대립이 지속되고는 있지만 각 그룹 내부에서는 입장차이가 점점 드러나고 분화되는 양상을 보이고 있음. 이런 상황하에서 글로벌 리더십도 다양화되고 분산될 가능성이 있음. o 우리의 경우 다양한 아이디어와 제안으로 의제를 형성하고 이끌어 나가는 노력이 더욱 필요하다고 생각함. 그러기 위해서는 우리의 국내 기후대응 정책도 전향적이고 혁신적으로 변화해야 함.

기후변화 국제협력에 관한 전문가 의견서 (Expert M: 기후변화협상, 국내 이행정책 수립 및 시행 등에 지속 참여)

국제협력 방안에 관한 질 문	의 견
의사결정 기준에 대한 그룹별 입장	o 그룹별 반응은 예상과 크게 다르지 않은 것 같음. 선진국의 경우 감축잠재력을 중심으로 본 접근은 대상국가의 감축잠재력이 큰 국가를 대상으로 투자하고 동시에 자국의 감축의무 중 일부를 개도국에서 실현하겠다는 의지를 보이는 것으로 판단됨. o 또한, 한국은 투자국의 입장에서 투자의 확실성을 중요시하는 것도 일반적인 답변으로 생각됨. 하지만 선진국 협상가들에게 이 부분이 가장 중요한 것으로 나타나지 않은 것은 그들의 입장에서 확실성은 협상을 통하여 확보할 수 있다는 전제가 있는 듯 함. o 한국의 전문가들이 세계평화에 상대적인 비중을 높게 부여한 것은 기후변화도 국제사회의 갈등을 일으킬 수 있는 원인으로 보고 기후변화문제의 해결이 세계평화에 기여할 수 있다는 관념적 답변이 아닌가 생각함.
한국 협상가 그룹의 중간적 입장	o 한국 전문가들의 입장은 선진국과 개도국의 중간자적인 입장을 취하고 있는 듯함. 감축, 적응의 중요성을 동시에 인식하고 또한 기후변화를 통한 개도국의 경제발전도 강조한 것으로 이해할 수 있음.
3개 국제협력 옵션에 대한 평가	o 당사국간 양자형태의 접근에 우선 순위를 두고 있어서 다자간 형태의 접근을 선호하는 듯함. o 다만, CA 와 SDM 의 선호에 있어서 통계적으로 차이가 있는 지 검증을 할 필요가 있으며, 통계적으로 차이가 유의미하지 않다면 결국 시장메커니즘을 모두 선호하는 것으로 받아들여야 할 듯함.

북한의 적합도에 대한 입장	o 협상가 그룹보다는 전문가 그룹이 북한을 대화, 투자의 상대로 보다 긍정적으로 보는 결과라고 생각됨. o 북한에 대한 인식의 차이, 그리고 한국 협상가 그룹이 사업의 확실성을 중요시하는 것과 관련이 있는 듯함.
북한과 협력 시 사업확실성 제고방안	o 다른 개도국, 특히 저개발국에 대한 일반적인 이해와는 달리 북한에 대한 이해가 높고 최근 북한과의 관계 진행사항에 대한 상대적으로 많은 정보를 반영한 결과라 판단됨. 이는 결국 정보와 관심의 과다에 따른 일종의 bias 된 의견일 수 있음. o 북한에 대한 사업확실성 제고는 결국 양자협력보다는 다자간 협력, 특히 기후변화협약과 파리협정 체제에서 합의된 rule 에 의한 접근이 불확실성을 최소화할 수 있다고 생각함. 또한 북한에 대한 투자 시 한국 단독보다는 북한과 상대적으로 친밀한 관계를 유지하고 있는 국가와 함께 투자하는 것도 고려할 필요가 있을 듯함. o 다만, 북한에 대한 투자의 불확실성이 다른 저개발국에 대한 투자의 불확실성보다 큰 것인지 살펴볼 필요가 있음.
국제협력 방안에 대한 제언	o 기후변화 관련 국제협력을 배출권 확보 중심의 접근보다는 에너지, 온실가스 감축사업 등에 대한 일반적인 투자 행위의 관점에서 접근해야 한다고 생각함. 투자를 통한 배출권 확보는 추가적인 편익으로 이해하는 것이 국제협력의 관점에서 바람직한 접근 방법이 아닌가 생각함.

국문초록

파리협정 하에서의 한국의 기후변화에 관한 국제협력

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기후변화협동과정
박홍경

우리나라는 국제적인 기후변화 대응노력에 맞추어 2030년까지 BAU (851백만 탄소톤) 대비 37%를 감축하기로 발표하였고, 이중 32.5% (276.5 백만톤)는 국내적인 감축을 통해 해결하며 나머지 4.5% (약 38.3백만톤)는 산림흡수원 활용과 국제협력으로 감축할 계획이다. 이 기후변화 관련 국제협력의 옵션은 2015년말 개최된 제 21차 기후변화협약 당사국 총회에서 채택된 파리협정의 제 6조에 명시되어 있고, 그 세부이행 규칙에 관한 협상은 2019년말 칠레에서 개최되는 제25차 기후변화협약 당사국총회에서야 최종 마무리될 것으로 보인다. 파리협정 제 6조에는 개별국가간의 자발적인 협력적 조치 (6.2~6.3조)와 비시장적 조치(6.8~6.9조), 그리고 기후변화협약 당사국 총회의 관할 하에 국제적인 온실가스 감축활동을 관리하는 지속가능발전 메커니즘 (6.4~6.7조)이 규정되어 있다.

이와 관련하여 국제적인 온실가스 감축사업과 기후변화 적응사업은 사업 유치국인 개도국의 적응필요성이나 경제발전 목표에 맞게 지역적으로

분산되어 진행되기 보다는 온실가스 감축잠재력이 높거나 사업운영의 용이성 또는 사업확실성이 높은 국가에 편중되어 실시되고 있는 것이 현실이다. 이러한 점에 착안하여 이 연구에서는 기후변화에 관한 국제협력의 정책결정에 있어서 4개 그룹을 선정하여 설문조사를 실시하였다. 즉, (1) 선진국의 기후변화 협상가그룹, (2) 개도국의 협상가그룹, (3) 우리나라의 협상가그룹, 그리고 (4) 우리나라의 학계, 연구계 및 기업에서 기후변화 관련 활동에 관여하고 있는 전문가그룹으로 나누어 총 109명이 설문에 참여토록 하였고, 계층분석법(AHP)의 일관성 기준을 통과한 76명 (선진국 협상가 12명, 개도국 협상가 8명, 한국 협상가 22명, 한국 전문가 34명)의 설문응답 결과를 통계처리하였다.

첫번째 설문내용으로서 기후변화 국제협력사업에서 개도국이 주목하는 (가) 적응필요성 (adaptation needs)과 (나) 경제발전 (economic development), 선진국이 관심을 두는 (다) 감축잠재력 (mitigation potential)과 (라) 사업확실성 (project certainty), 그리고 기후변화 국제협력 과정에서 부수적으로 수반되는 (마) 세계평화 (global peace) 등 5개 의사결정기준을 정하여 각각의 중요도에 대해 계층분석법 (AHP)에 따라 쌍대비교 하도록 질문하였다.

두번째 설문내용으로서 파리협정 상의 국제협력 옵션인 (거) 협력적 조치 (cooperative approaches), (너) 지속가능발전 메커니즘 (sustainable development mechanism)과 (더) 비시장적 접근 (non-market approaches)의 적합도에 대해 5개 의사결정기준에 따라 5에서 1까지 정수로 응답하도록 질문하였다.

세번째 설문내용으로서 우리나라와 긴밀한 관계를 맺고 있는 아시아 7개국과 북한 등 총 8개국의 국제협력적합도에 대해 우리나라의 협상가와 전문가들에게만 5개 의사결정기준에 따라 5에서 1까지 정수로 응답하도록

질문하였다. 8개국은 우리나라의 ODA 중점협력 25개국 중 우리나라와 경제관계가 긴밀하거나, 기후변화 취약성이 높은 아시아 국가로서 베트남, 인도네시아, 필리핀, 방글라데시, 몽골, 파키스탄, 미얀마와 북한이다.

설문응답 결과 5개 의사결정기준에 대한 중요도 평가에 있어서 선진국 협상가그룹은 감축잠재력에, 개도국 협상가그룹은 적응필요성과 경제발전에, 한국 협상가그룹은 사업확실성에, 한국 전문가그룹은 세계평화에 상대적인 비중을 둔 것이 특징적이었다. 한편, 한국 협상가그룹은 적응필요성, 감축잠재력, 경제발전 등 3개 의사결정기준의 중요도 평가에 있어서 선진국 협상가그룹과 개도국 협상가그룹의 평균값과 비교하여 그 중간 정도의 평균값을 부여하였다. 3개 국제협력 옵션에 대한 적합도 평가값은 평가그룹이 5개 의사결정기준에 따라 부여한 값에 해당 평가그룹의 의사결정기준별 평균값 (5개 기준 평균값의 합은 1)을 곱하여 구하였다. 설문응답자 들은 3개 국제협력 옵션 중에서 협력적 접근, 지속가능발전 메카니즘, 비시장적 접근 순서로 적합도가 높다고 평가하였다.

북한과 관련하여 한국 협상가그룹은 북한의 국제협력 적합도 평가에서 7위를 부여한 반면, 한국 전문가그룹은 북한에 3위를 부여하였다. 이는 한국 전문가그룹이 세계평화 항목에서 북한에 최대값을 부여하였고 감축잠재력과 경제발전 항목에서도 대체로 큰 값을 부여한 반면, 한국 협상가그룹은 적응필요성, 감축잠재력, 경제발전 등에서 한국 전문가그룹보다 높은 값을 부여하였음에도 불구하고 세계평화 항목에서 매우 낮은 값을 부여하였기 때문이었다. 한편, 전체 응답자 들이 5개 의사결정 기준에 따른 평가에서 사업확실성에 최대값을 부여하여 그 중요성을 부각시킨 가운데, 한국 협상가그룹과 한국 전문가그룹 모두 북한의 사업확실성에 대해 8개국중 최소값을 부여하였다.

설문결과의 해석에 있어서 객관성을 확보하고 시사점을 발굴하기 위해

기후변화협상 또는 국내 온실가스 감축정책 수립 및 이행에 10년 이상 참여한 경험이 있는 정책 전문가(executive expert) 13명에게 구조화된 인터뷰 응답을 별도로 받았다. 이 결과 인터뷰 응답자들은 한국 협상가들이 선진국과 같이 해외감축을 중시하면서도 개도국의 적응필요성 및 경제발전 목표에 공감하는 입장이어서 선진국과 개도국 간의 중재적인 역할 수행에 적합하다고 평가하였다. 그리고 국제협력 옵션 중 협력적 조치는 신속한 이행가능성, 융통성과 실효성 측면에서 선호되고 있는데 우리나라가 비시장적 접근에 있어서 우수사례를 제시할 수 있다면 선진국과 개도국간의 중간자 역할이 가능할 것이라고 의견도 제시하였다.

비시장적 접근과 관련하여, 서울시는 개별 가정과 기관의 온실가스 감축노력을 장려하는 '에코-마일리지 제도'를 운영하고 있으며, 아프리카 개발은행은 선진국 정부, 기업, 자선단체 등의 적응 관련 기술 투자를 유도하는 "적응혜택 메커니즘 (ABM)"을 설계하였는데 이러한 방향으로 국제협력의 장애를 극복해나갈 수 있을 것이다.

인터뷰 응답자들은 북한의 국제협력 적합도가 낮은 이유에 대해 과거의 부정적인 경험에 근거하고 있으므로 중국, 러시아, 미국 등과 다자적 협력방식 또는 기후변화협약 기구가 주관하는 메커니즘을 활용함으로써 사업의 확실성을 높이거나, 북한의 국제적 합의존중 및 북미관계개선 등 여건변화가 필요하다는 의견도 제시하였다. 지난 11월 정부 발표에 따르면, 유엔 안전보장이사회 (UNSC)가 수주일 동안 교착상태에 빠졌던 남북한 철도사업의 조사에 대해서 제재대상에서 제외하는 조치를 취하였는데, 이 돌파구는 한국과 미국 간의 긴밀한 협의와 유엔 안전보장이사회 이사국들의 지지를 통해 이루어졌다. 이러한 사례는 북한과의 기후변화 관련 국제협력에 있어서 향후 가능한 추진방향을 보여 주었다.

일부 인터뷰 응답자들은 국제협력을 통한 온실가스 배출권 확보가 당장

용이하지 않으므로 정부 차원에서는 우수한 기술을 보여주면서 민간차원의 협력사업을 지원하는 병행방식을 제시하였고, 북한과의 협력에 있어서는 상업적인 이익을 우선시하기 보다는 세계평화, 인도주의 등 다른 관점에서 접근할 때 북한과 기후변화에 관한 협력사업의 성사 가능성이 커질 수 있다는 의견을 제시하였다.

결국 기후변화에 관한 국제협력은 온실가스 배출권 확보라는 단일한 목표를 추구하기 보다는 개도국의 적응필요성과 경제발전 지원 또는 세계평화 등 다차원적인 접근이 필요하며, 우수한 기술을 기반한 협력사업 추진이 장기적으로 효과적일 것이다.

주요어: 기후변화, 계층분석법(AHP), 정책결정기준, 파리협정, 기후변화에 관한 국제협력, 감축과 적응

감사의 글

이 논문은 몇 가지 행운과 많은 분들의 도움이 함께 주어진 가운데 작성될 수 있었습니다.

첫째 행운으로 전의찬 교수님이 주도하시는 세종대학교 기후변화특성화 대학원은 2003년부터 운영되어 오면서 축적된 지식과 경험을 공유하는 훌륭한 장을 제공하였을 뿐만 아니라, 각자 본업을 충실히 수행하면서 학업을 병행할 수 있도록 세심하게 배려하여 주었습니다.

둘째 행운으로 외교부에서 2001년 이후 기후변화협상, 환경협력, 에너지협력 업무를 해왔고 최근에는 북극협력대표 임무를 부여 받아 북극과 연관된 기후변화 이슈를 새롭게 살펴볼 수 있는 소중한 기회를 가질 수 있어서 논문을 작성할 수 있었습니다.

셋째 행운으로 제가 2018년 5월 삼 년 간의 카타르 주재 대사 소임을 마치고 본부에 복귀한 후 수개월간의 보직 대기 기간이 주어졌기에 논문 기본 틀을 구성하고 설문조사 설계를 할 수 있었습니다.

제가 살아오면서 여러분들의 관심과 배려에 감사하는 마음을 늘 가져왔지만, 논문 작성 과정에서 단기간 내에 훨씬 많은 분 들로부터 직접적인 도움과 조언을 받았습니다. 먼저 전의찬 지도교수님과 김정인 교수님, 차재형 교수님, 김하나 교수님, 김은정 박사님은 논문 심사위원으로서 유익한 지도 뿐만 아니라, 저에게 필요한 많은 도움을 주셨습니다.

이동규 심의관님과 박순철 박사님은 한국 협상단과 외국 협상단으로부터 설문 응답을 각각 받아 주셔서 논문의 핵심부분을 구성할 수 있었습니다. 전의찬 교수님께서는 대학교 교수님, 연구기관 전문가님, 세종대 대학원 원우님 들에게 직접 메일을 발송하여 설문 응답을 받아 주셨습니다.

유연철 기후변화대사님, 김찬우 대사님, 최재철 대사님, 신부남 대사님, 권세중 국장님, 최원기 교수님, 오대균 실장님, 오일영 과장님, 김용건 박사님, 유승직 교수님, 이명균 박사님, 노동운 박사님, 오진규 박사님, 정태용 교수님, 심상민 교수님, 유인식 박사님 등은 전문가 인터뷰에 응하여 주시거나 여러 가지 좋은 의견을 주셨습니다.

세종대 기후변화특성화 대학원의 조성흠 박사님, 강성민 박사님, 신명진 연구원님, 유재호 연구원님, 김성동 연구원님과 많은 원우님 들께서도 다양한 학술적, 행정적 지원을 해주셨습니다.

그리고 정희, 근홍, 근석 등 가족들의 도움과 격려가 없었다면 이 논문을 완성하지 못하였을 것입니다. 위에 언급한 분들 이외에도 제가 일일이 거명하지 못한 더 많은 분들이 도움을 주셨고, 이 기회를 빌어 깊이 감사드립니다.

이 논문을 쓰면서 가장 큰 수확은 제 자신의 부족함을 다시 한번 절감한 점이었고, 이와 관련하여 많은 분들의 도움에도 불구하고 논문에 결함이 있다면 모두 제 자신의 책임임을 밝히며 앞으로 배우는 자세로 계속 노력하겠습니다.

2018년 12월 21일

박 홍 경