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Technical Note

Current Status and Implications of Korean ODA for Vietnam: The Case of Mekong Delta from the View of Climate Change

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ABSTRACT

The Socialist Republic of Vietnam, one of the countries along the Mekong River, is an emerging driver of economic growth in Asia, but is facing major threats due to climate change. Especially, the Mekong Delta in Vietnam is one of the areas most vulnerable to direct inundation and salt water intrusion induced by climate change, which threatens the lives of the people who live there and harms the national and regional economies. This paper examines Korea's Official Development Assistance (ODA) program in the Mekong Delta with a focus on climate change. We argue that Korea's ODA has brought about and continues to provide mutual benefits for both countries, while additionally creating further opportunities to address the adverse effects of climate change in the Mekong Delta. The results show that while the Republic of Korea has been increasingly cooperative with Vietnam regarding economic and social development through ODA, there are limitations to dealing with the issues of climate change in the Mekong Delta. Therefore, we suggest more heavily focusing on climate change in the implementation of Korea's ODA, thus promoting sustainability and climate resilience in the Mekong Delta.

Key words: *Climate Change, Official Development Assistance, Mekong Delta, Vietnam*

1. Introduction

Over the past years, Republic of Korea (hereinafter referred to as Korea) has maintained faithful relations with Southeast Asian countries through establishment of stronger economic and political ties in all areas including Official Development Assistance (ODA). Korea has been strengthening its cooperative partnership with Southeast Asian countries by developing a political consultative body with established dialog partners since 1991, and the Joint Declaration of the Korea-Association of South-East Asian Nations (ASEAN) strategic partnership since 2010 (Kang, 2014). Under the New Southern Policy in 2017, Korea adopted 10 nations[1)] and India as New Southern countries, and among them, 6 nations[2)] were appointed as target cooperation countries for New Southern Official Development Assistance (ODA). According to the Committee of International Development Cooperation of Korea, it is expected that the size of Korea ODA for New Southern countries will be doubled in 2022 and achieve effectiveness through adherence to Sustainable Development Goals (SDGs), recipient countries' demands,

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1) Cambodia, Laos, Myanmar, Vietnam, Indonesia, Philippines, Singapore, Brunei, Malaysia, Singapore
2) Cambodia, Laos, Myanmar, Vietnam, Indonesia, Philippines

and the comparative advantage of Korea (The government of Republic of Korea, 2017).

As the New Southern countries, especially Mekong River countries[3] are becoming a new economic growth booster as the Mekong River economic block through trade, investment, and human resource exchange, Korea has been making an effort to build extensive cooperation with the Mekong countries (The government of Republic of Korea, 2017). In 2019, Korea adopted the Korea-Mekong River Declaration for the strategic partnerships with the Mekong nations by holding the first Mekong-Republic of Korea Summit in 2019 (Jung et al., 2019). On the Summit, Mekong countries and Korea expressed strong willingness to share experience on economic development and ICT-based cooperation, jointly responding to transnational challenges surrounding the Mekong River (MOFA, 2019). Especially Korea has been actively implementing cooperative projects for the CLMV countries (the Kingdom of Cambodia, Lao PDR, the Republic of the Union of Myanmar and the Socialist Republic of Vietnam), all of whom are major development partners in ASEAN (The government of Republic of Korea, 2017). The cooperation between Korea and the CLMV countries grows and extends focusing on the areas of ICT, rural development, public health and infrastructure, as Korea had provided $3.3 billion of ODA to the four countries as of 2017, which accounts for about 21% of Korea's total bilateral ODA (ASEAN-Republic of Korea Commemorative Summit, 2019).

The Socialist Republic of Vietnam (hereinafter referred to as Vietnam) and Korea have developed strong cooperation over the vast reaches of time in the political, economic, cultural, and human resources sectors based on diplomatic ties in 1992, the Korea-ASEAN Free Trade Agreement in 2007, and the Bilateral Trade Agreement in 2016 (Lee, 2013). Nowadays, Vietnam has become a major ODA partner of Korea due to its favorable conditions including geographic accessibility, cultural similarity, and abundant labor forces, potential domestic market size, and ample natural resources (Koo, 2017). While Korea's ODA toward Vietnam has been increasing, there is limited aid to respond climate change in the Mekong Delta to meet the demand of sustainable development of Vietnam. According to the National Strategy on climate change of Vietnam, climate change is likely to bring more opportunities for global, multilateral and bilateral cooperation in the way that developing countries like Vietnam can induce financial assistance and technology transfer from developed countries in a win-win mode (Vietnam Government, 2011). In this regard, ODA enables to work as a lever to promote mutual benefits of both donor and recipient country (Jung et al., 2019). Thus, the status of Korea's ODA in Vietnam and its consequence needs to be reconsidered to ensure that whether it seeks to achieve mutual benefits of Vietnam and Korea, especially in the context of climate change.

In the countries of the Mekong region, Vietnam, is increasingly aware of climate crisis affected by climate hazards. It is likely projected that in 2030, there is an increasing possibility of impacts of climate change in the Mekong region, accompanied by increased temperature and precipitation, decreased agricultural productivity, increased food scarcity, frequent floods in the region (Eastham et al., 2008). Especially the Mekong Delta in Vietnam is considered to be most affected by adverse effects of climate change such as inundation and salt-water intrusion (Stewart and Coclianis, 2011). It harms physical, chemical and biological properties, with predominantly the flooding of rice fields in the region, which damages the national and regional economy (Evers and Pathirana, 2018). In line with the situation, the Vietnam government has been trying to improve its adaptation and resilience to climate change by establishing the national strategies and measures to improve water availability and food security (Vietnam Government, 2011).

Therefore, this paper firstly analyzed the political, economic, and environmental situation of Vietnam focusing on adverse impact of climate change on the Mekong Delta in Vietnam. Then we examined Korea's

3) China, Myanmar, Cambodia, Laos, Thailand, Vietnam

ODA projects implemented in the Mekong Delta to identify its major characteristics. Finally, based on the findings from the challenges and limitations, we suggested several implications for the further implementation of Korea ODA, seeking mutual benefits of both countries, especially promoting regional industries and enhancing climate resilience in the Mekong Delta.

2. Overview of Vietnam and the Mekong Delta

2.1 Current Status of Vietnam and the Mekong Delta

After the Vietnam War ended in 1975, Vietnam was one of the poorest countries and in the mid of 1980's, the Vietnam government introduced economic and political reforms called Doi Moi to promote a socialist-oriented market economy, which generated the high performance in every sector of industry (Kraas 2012; Seo, 2012). Due to its rapid economic growth during the late 1980s to 2000s, Vietnam has quickly graduated from a low-income country and is grouped into Lower-Middle-Income Countries (LMICs) in the OECD list (Dinh HT, 2014). One of the factors behind this economic achievement is to boost the first industry but also secondary and tertiary industry, which is distinguished from other developing countries that mainly depend on low value-added primary products (Vietnam Government, 2011). Over the period, the economy of Vietnam has rapidly expanded backed by domestic demands and export-oriented manufacturing and processing industries in agriculture, apparel, textiles, and electronic devices due to its abundant and low-wage labor forces (Kim et al., 2017). However, due to its excessive development and rapid industrial structural reform, Vietnam has been suffering from deteriorated environment problems resulting from urbanization (Fan, 2018; Vietnam Government, 2011) and facing emerging threats posed by climate change (Adger et al., 2012).

The Mekong Delta region located in southwestern part of Vietnam has led enormous growth in agriculture, while being lagged behind the national average development in the socio-economic context (Garschagen, 2012; Kraas, 2012). In the region, the fifth of the Vietnamese population, about 17.6 million people resides (Ha et al., 2017 (GSVO, 2015) and the biological and natural resources are rich, which vitalizes the economies of agriculture, aquaculture, and tourism (Dang, 2018; Ha et al, 2017). The Mekong Delta's contribution to the national economy is significant as it contributes 18% of Vietnam's total GDP, generating around 90% of the rice exports and 73% of the country's aquatic production (Garschagen, 2012; GSO, 2011). The large and fertile plain, which is 65% (2,600,000 hectares) of the total Mekong Delta area (4,000,000 hectares), is mainly utilized for the agriculture (Ha et al., 2018; Cosslett and Cosslett, 2013), producing the half of national rice production at around 16 million tons as the second biggest rice exporting region worldwide (Song, 2012; Eom, 2016; Kakonen, 2008; Minh, 2002). The geographically favorable condition for the crop cultivation has created the residents' high dependency on the agriculture for their livelihoods. (Song, 2012; Ha et al., 2018; Cosslett and Cosslett, 2013).

On the other hand, there are some limitations to fully activate industrial development in other sectors but primary sector of the economy (Kraas, 2012). Therefore, the Vietnam government had tried to introduce various investment instruments to attract an inflow of Foreign Direct Investment and the region has been emerging as a preferred investment destination for many international investors (Dezan Shira & Assciates, 2020). According to the Provincial Competitiveness Index Report (2019) published by the Vietnam Chamber of Commerce and Industry and the United States Agency for International Development, four cities[4] in the Mekong Delta region were ranked the top ten cities as business-friendly cities among 63 provinces and cities (Dezan Shira & Associates, 2020). It is likely that the Mekong Delta offers a favorable environment to business due to abundant labor forces, low entry costs, simple administrative procedures,

4) Dong Thap, Vinh Long, Ben Tre, Long An, and Can Tho

and a reasonable labor policy compared to other major cities in Vietnam (GSOV, 2018). Nowadays, the Mekong Delta region has much possibility for further development, although the area's social and economic level is relatively low compared to other major cities in Vietnam.

2.2 The Mekong Delta and Climate Change

The main characteristics of the Mekong Delta are the geographic environment and climatic conditions along with the Mekong River. The Mekong River escapes to the South China Sea, it forms a large alluvial plain with delta topography in southern Vietnam. The region has a moderate altitude and a slow flow rate, which accumulates deposited river nutrients making it suitable for agricultural cultivation (Cosslett and Cosslett, 2013). However, rising sea levels and inundation due to climate change and ground subsidence caused by urban development are increasing the risk of flooding in the Mekong Delta. In the event of unforeseen flooding, about 75 percent of the rural population of the Mekong Delta is at risk of suffering tremendous damage (Tri, 2012). In the worse, at the end of the rainy season from October to November, there are high river flows, heavy rains, and seasonal floods, placing human beings in danger and risking physical damage to about 3,400,000 hectares of the Mekong Delta region (Cosslett and Cosslett, 2013). The most vulnerable cities in Mekong Delta are Dong Thap, Long An, Kien Giang, and Soc Trang, which are low-lying with insufficient drainage facilities and easily exposed to heavy flooding and salt intrusion (Tuan et al., 2009; Kakonen, 2008).

In particular, the flooding and inundation occur frequently in the river directly affect the agriculture in the Delta region (Minderhoud, 2019; Eom, 2016). As the river overflows during dry seasons when the flow rate is low, a variety of nutrients along with saltwater in the river are supplied to surrounding farmland resulting in fertile soil conditions (Eom, 2016; Cosslett and Cosslett, 2013). In this context, flooding has a positive effect on agricultural land in the river basin. However, as the flooding continues and soil salinity increases, it is difficult to grow crops that cannot grow in soil with more than a certain amount of salt, such as rice (Tuan et al., 2009). As a result, the local residents who are unable to maintain their production are forced to relocate their agricultural land and shelters as well (Eom, 2016). Likewise, the economic damage caused by flooding will give rise to a serious impact on the lives of the residents accompanying additional challenges in food security and stable housing (Smajgl et al., 2015; Chu et al., 2014).

In several studies conducted on the subject, researchers at the University of Wittrecht in the Netherlands predicted that as the Mekong Delta is only 0.8 meters above sea level, ground subsidence will occur within 57 years, damaging more than 12 million inhabitants in the region (Minderhoud et al., 2019; Cosslett and Cosslett, 2013). According to the study of the Asian Development Bank, sea levels in the Mekong Delta will be around about 65 cm−1 m higher in 2050, and 13−39% of the region will be submerged (ADB, 2011). It is also observed in a systematic review on 60 documents including peer-reviewed scientific articles, book chapters, reports, and planning and policy documents between published by 2000 and 2017, which highlighted flood management challenges in the lower Mekong delta (Hoang et al, 2018). As such, it is likely that climate change increases the risk of flooding, having significant impact on socio-economic status of livelihood by increasing poverty, agricultural damage, and disaster damage (Ko et al., 2019).

To tackle the climate change issue, the Vietnam government made various efforts in the following national policies, strategies and advocacies: the Socio-Economic Development Strategy and the Socio-Economic Development Plans, National Climate Change Strategy and various national strategies related to water management and climate change adaptation (Tan, 2012). According to Vietnam's Voluntary National Review on the Implentaiton of the Sustainable Development Goals published in 2018, the government has arranged and coodinated organizational systems by establishing the National Committee on Climate Change and setting the ministries, agencies and provinces more oriented in climate change responses (MP1, 2018). Also the Vietnam government has establihsed international partnerships with other countries, resulting in various bilateral and multilateral cooperation

such as Mekong River Commission (MRC), Asean Working Group on Water Resource Management (AWGWRM), Strategic Partnership Arrangement on Climate Change Adaptation and Water Management between Vietnam and Netherlands (Hoang et al., 2018). They are aimed to strengthen cooperation to address the adverse impact of climate change and increase resilience by establishing strategies, plans, commitment, and action plans on water management. In the partnerships, they explored key challenges and solutions to enhance the argument for improving the environment to flood management (Hoang et al., 2018).

3. ODA toward Vietnam and Mekong Delta

3.1 History of Korea ODA

After the Korean War ended in 1953, ODA grants from other countries were provided to Korea to assist the reconstruction of its devastated economy (Chun, 2010). In the 1960's, relying on the foreign assistance and investment, Korea's economy was gradually recovered and from the 1970's, it had accomplished dramatic economic development depending on heavy and chemical industries such as steel, shipbuilding and automobile manufacturing (Choi, 2010). From the 1960s to the 1980s, Korea had accomplished remarkable record of economic growth, which created its roles and responsibilities as a donor country to aid developing countries.

The first office assistance implemented by Korea as a donor country was to train the governmental officials from developing countries with funds supported by USAID in 1963 (Yim, 2014). Until the mid of 1970's, Korea implemented ODA supported from UN organizations, and the scale and types of assistance gradually had expanded by the incrementing demands of international community (Kim 2013; KOICA, 2008).

In 1987, the Ministry of Economy and Finance established the Economic Development Cooperation Fund (EDCF) and entrusted its operation of the fund to the Korea Export-Import Bank (KEXIM Bank). In 1991, Korea International Cooperation Agency (KOICA) was established under the Ministry of Foreign Affairs as a dedicated grant agency to provide grants and technical assistance to developing countries (Yim, 2014). Overall, the Committee for International Development Cooperation chaired by the Prime Minister is in charge of general coordination of ODA policy and programs (Kim, 2013). Officially, the prior status of Korea as a recipient country until the early 1990s was transformed to a donor country (Yim, 2014). It means that Korea was eliminated in the lending list of World Bank and became a member of the Organization for Economic Cooperation and Development (OECD) in 1996 (Go, 2011).

Table 1. Korea ODA proportion by type

	Type of Cooperation			Operating Agency	Ministries
ODA Classification	Bilateral (81%)	Grants (57.3%)	Grant Assistance	KOICA (Established in 1991)	Ministry of Foreign Affairs
			Technical Cooperation	Ministries	
		Loans (42%)	EDCF (Established in 1987)	Korea EXIM Bank	Ministry of Economy and Finance
	Multilateral (19%)	Contributions of International Organization	-	Ministry of Foreign Affairs	Ministry of Foreign Affairs
		Investments of International Organization	-	Korea EXIM Bank	Ministry of Economy and Finance

(Source: 2020 Development Comprehensive Implementation Plan)

Due to the Asian financial crisis in 1997, Korea accepted a bailout package from the International Monetary Fund and overcame the national crisis during the very short of time (Yim, 2014). The Korean economy recovered from the deep recession and achieved rapid economic development, providing ODA to other developing countries as a member of the OECD Development Assistance Committee (DAC) in 2009 (The government of Republic of Korea, 2017). Korea's accession to the OECD was the 2nd in Asia after Japan and the 24th worldwide, being the first case of being a donor country from recipient country (Go, 2011). From 2010 to 2018, the size of Korean ODA projects have increased by 106.2% to 2.4 billion dollars from 1.1 billion dollars (The government of Republic of Korea, 2017). The annual ODA growth rate of Korea has been much higher than that of other OECD countries given that Korea's donations grew by 11.9% while the average ODA growth rate of OECD DAC was 2.4%. It is likely that as the size of Korea's ODA has been growing, it is playing a crucial role in promoting development of developing countries as an intermediary power in international community.

3.2 Korea ODA for Vietnam

Vietnam is one of major partner countries and ODA recipient countries to Korea. The proportion of ODA for Vietnam comprises 20% of the total ODA for New Southern countries (The government of Republic of Korea, 2017; Kang, 2014). According to OECD statistics (2018) on aid disbursement, the size of Korea's ODA for Vietnam is the 3rd biggest following Japan and Germany. Among 13 areas[5], four sectors (Transport, governance, water management and healthcare, and education) were adopted as priority cooperation areas for Korean ODA in Vietnam. These priorities followed the consideration of Vietnam's demands, Vietnamese context, Korea's capacities and relative advantages, resources availability, harmonization with other donors, and the alignment between sectors (CPS, 2017).

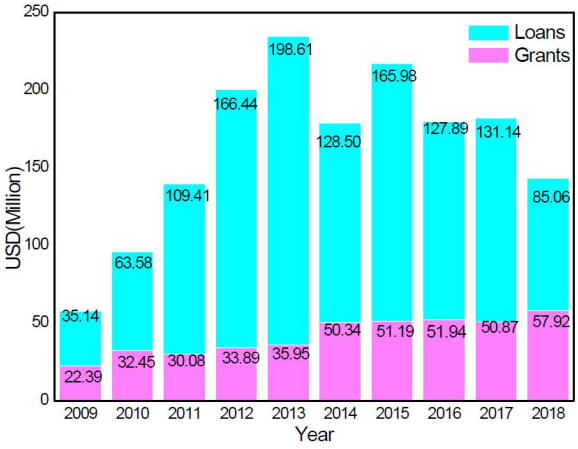

Fig. 1. Size of Korean ODA for Vietnam

(Source: OECD Statistics, 2020)

The majority of Korea's ODA projects in Vietnam comprise loan assistance rather than grants (Fig. 1). It is found that the rate of Korea's tied aid is significantly higher than the average rate of the OECD DAC countries, 15% as of 2016 (Kang and Kang, 2018) Since Vietnam obtained sufficient economic status due to its rapid economic development and it became a lower-middle-income country with the economic stability required to accept the loan and incur the burden of repayment. It is likely that Vietnam is utilizing ODA according to the domestic situation and the effectiveness of ODA, to reduce its dependency on the foreign assistance unlike other developing countries which tend to prioritize grants (Yoon, 2019).

At the same time, that the proportion of loans outweighs grants embodies different characteristics in that Korean loans are tied aid, which limits the nationality of goods or services to be procumbent supplier (Eom, 2014; Ha, 2009). While there have been constant debates over tied aid, Korea maintains the ODA procurement condition that enables Korean companies to provide the supplies needed by loan projects. Especially, large-scale loan projects such as those involved in infrastructure

5) Education, Health and Sanitation, Public-administration, Communication, Peace-building, Industry, Regional development, Aquaculture, Water resource, Energy, Transportation, Environment Protection, Natural Disasters

Table 2. Priority cooperation areas and directions for Korea's ODA in Vietnam

Priority Cooperation Areas	Directionality
1. Transport	- Support development of transport sectoral policy and infrastructure including railway, seaport, and inland waterways based on a comprehensive land development approach - Support expansion of expressway networks through public-private partnership(PPP)
2. Governance	- Support capacity building of various public administrative capacities related to economic, social, and environmental development and governance geared towards realization of the SEDP 2016-2020
3. Water management and Healthcare	- Support capacity building of water management and disease control as a response to climate change - Support water resources management, waste management, and establishment of special care hospitals to strengthen public health services and improve quality of life
4. Education	- Support training of advanced human resources in the areas of science andtechnology for sustainable national development - Support education of vulnerable social groups for the promotion of social integration

(Source: Government Ministries, 2016).)

development facilitate entrance of Korean companies into developing countries (The government of Republic of Korea, 2017; Ha, 2009). This trend implies that Korea's ODA has been introduced for the exports of domestic companies as well as humanitarian support (Ha, 2009). In the context, it is likely that Korea's ODA in Vietnam stretches the meaning of assistance beyond supporting the recipient country but also it is motivated by entailing economic benefits of Korea.

3.3 ODA for the Mekong Delta

3.3.1 International Trends

As international attention and recognition to the Mekong Delta has been increasing, a number of international organizations have made strides toward improving its climate resilience by highlighting the Mekong Delta as one of the most vulnerable areas (Cosslett and Cosslett, 2013; Stewart and Coclanis, 2011). Especially Multilateral Development Banks have implemented various initiatives and projects to respond to the adverse effects of climate change in the following; Climate Change Impact and Adaptation Study in the Mekong Delta (Asian Development Bank), Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project (World Bank), and Natural Disaster Risk Management Project (World Bank).

Japan, one of the major donor countries in Asia has supported the Mekong Delta region through considerable ODA funding to pursue mutual political and economic benefits in the region (Stallings and Kim, 2017; Bahri, 2010). The projects have focused on environmental issues including the installation of irrigation facilities, the prevention of drought and floods, and the expansion of the agricultural and fisheries industries. In addition, European countries have been pushing ahead with Mekong Delta climate change adaptation projects and sustainable development in the region. The Netherlands' cooperation on climate change adaptation in the water management sector has been outstanding at the governmental level. It has contributed to the governance of water management and water disaster response including the establishment of water disaster plan and the strengthening of water resource management plan. The Australian Agency for International Development has conducted the Water and Sanitation for the Rural Poor in the Mekong Delta project and the Mekong Delta Poverty Analysis project (OECD, 2005). The German government has also promoted bilateral cooperation projects in Integrated Coastal Management and the Climate Change and Coastal Ecosystems Program in the Mekong Delta.

However, the existing projects have a imitated capacity to directly deal with the effects of climate change. There are few projects linked to secure sustainable and climate-resilient environment in terms of ensuring their basic needs of livelihoods - food, housing, sanitation and health.

Most projects tend to focus on transportation to strengthen connectivity between cities. One of the major projects implemented by the Asian Development Bank is the Greater Mekong Subregion (GMS) Program, which involves infrastructure development in the transportation and energy sector (Stallings and Kim, 2017). Likewise, infrastructure projects funded by Japan in Vietnam account for 77.8% of the total ODA of Japan in Vietnam. In this context, it is probable that many ODA projects in the form of infrastructure construction tend to be prioritized by many donor countries and organizations in the region. Given that the Mekong Delta is highly vulnerable to adverse environmental events due to climate change, Korea's ODA needs to be refined to enhance its sustainability and resilience to climate change as well as economic development (Szabo et al., 2016; Stewart and Coclanis; 2011).

3.3.2 Domestic Trends

To identify the overall trend of Korea ODA projects in the Mekong Delta, we collected projects information from the web databases of KOICA, KEXIM Bank and ministries. Also we used other web-based reports, journals, articles, official publications and documents for analysis. As mentioned earlier, KOICA and KEXIM Bank play a key role as major ODA implementing and delivery agencies, having accumulated and released reliable data. We included the ODA projects officially listed in the open databases and reports of KOICA, KEXIM and CIDC.

Based on the findings, we identified 25 ODA projects implemented from 2006 to 2020 in the region (Table 3). The projects are segmented in the five different sectors: transport, public administration, education, water management, health and sanitation, and agriculture. The noticeable trend of the transportation sector is that most of the projects are construction of road infrastructure connecting cities between the Mekong Delta and major cities in Vietnam. In the public administration sector, projects are to offer small-scale financial support and establish industrial complexes. The projects in the education sector tend to focus on improving the environment of educational facilities such as school. In the water management and health and sanitation, projects is centered on building infrastructure and facilities of water supply, sewage and hospitals.

Based on the overall trends of current ODA project in the Mekong Delta, three characteristics of the projects are identified. First, in project modality or types, Korea ODA has been concentrated on infrastructure construction in the following: road construction in transportation; industrial complexes in the public administration; school facilities in education; sewage facilities in the water management; medical facilities in health and sanitation sector; and agricultural complexes in the regional agricultural development sector. The projects are directed at a relatively large proportion of economic and social infrastructure. In particular, as trade and the market economy needs to be vitalized, hardware projects such as road and railroad construction play a major role in promoting economic growth. It is because infrastructure projects tend to be large in size and in a long-term so it has a great impact on economic revitalization by boosting employment and increasing income and consumption (Won, 2013). In low- and middle-income countries such as Vietnam, infrastructure ODA may drive economic growth, leading to capital accumulation (Lee et al., 2018). Given that the economic development level of the Mekong Delta is relatively lower than that of other cities in Vietnam, the high demand on infrastructure projects is increasing (Garschagen, 2012).

In addition, in the context of global chain, infrastructure ODA is beneficial to donor countries as well. In case of Vietnam, it is a production base and bypasses export permits to Korea in the automotive and electronics industries. When building infrastructure is operated through ODA projects, it also induces to strengthen the competitiveness of recipient countries as a production base (Lee et al., 2018). Consequently, infrastructure ODA projects in the Mekong Delta region directly promote the local economic development, at the same time as having the indirect effect of expanding its global value chain to the Korean manufacturing sector. However, the concentration on infrastructure projects limits development of other sectors in ODA such as technology transfer and other value-added industries

Secondly, in terms of project sector, 12 projects out of

25 projects are allocated in the water management, health and sanitation, which is the largest portion in all the sectors. Of those, seven projects are targeting on improvement of sanitation facilities such as hospitals and toilets, which is in line with the Vietnam government's development goal of improving health and medical systems (Vietnam Government, 2011). Five projects are targeting to build water-related infrastructure, such as water supply and sewage facilities. However, in the context of climate change, they are not directly dealing

Table 3. Korea's ODA projects in the Mekong Delta by sector

	Project Title	Sector	Implementing Agency
Major Cooperation Sectors			
1	GMS Southern Coastal Corridor Project (Phase I)	Transport	Korea EXIM Bank
2	GMS Southern Coastal Corridor Project (Phase II)		Korea EXIM Bank
3	Construction of Rach Gia Bypass Project		Korea EXIM Bank
4	Vam Cong Bridge Construction Project		Korea EXIM Bank
5	Vam Cong Bridge Connecting Road Construction Project		Korea EXIM Bank
6	Lo Te ~ Rach Soi Highway Construction Project		Korea EXIM Bank
7	Income Generation for the Poor Households and Local Government's Capacity Enhancement Project in Vinh Long, Vietnam	Public Administration	KOICA
8	Construction of Korea-Vietnam Incubator Park (KVIP) in Can Tho City, Vietnam		Ministry of Trade, Industry, and Energy
9	Elementary School Environment Improvement Project in Ben Tre Province, Vietnam	Education	KOICA
10	Hai Duong, Phu to District Enhancing the Kindergarten Education in Hai Duong and Phu to district in Vietnam		
11	HoaKhanh Tay Water Supply Project	Water management and public health	Korea EXIM Bank
12	Long Xuyen Sewerage, Drainage, and Wastewater Treatment System Project		Korea EXIM Bank
13	Tra Vinh Water Supply Project		Korea EXIM Bank
14	Tieu Can General District Hospital Medical Equipment Provision Project		Korea EXIM Bank
15	Project of Medical Equipment Supply for Tan Chau Regional General Hospital, An Giang Province		Korea EXIM Bank
16	Construction Project of Ben Tre General Hospital		Korea EXIM Bank
17	Project for Groundwater Development in KienGiang Province		KOICA
18	Housing and toilet improvement project in My tho in Vietnam		KOICA
19	Enhancing basic health sanitation facility and awareness project in Hai Duong in Vietnam		KOICA
20	Public health care and housing improvement project in Vinh Long province, Vietnam		KOICA
21	Feasibility study of water quality measurement network construction in Tien Giang province, Vietnam		Ministry of Environment
22	Project of Medical Equipment Supply for Tan Chau Regional General Hospital, An Giang Province		Korea EXIM Bank
Others			
23	Integrated regional development project for the eradication of poverty in Vietnam's Mekong Delta, Ben Tre province	Agriculture and regional development	KOICA
24	Cash crop project for farm household income generation in Ben Tre, Vietnam		KOICA
25	Constructing a demonstration of a contract-based vegetable cultivation project in Hai Duong province, Vietnam		Ministry of Agriculture, Food and Rural Affairs

(Source: Official Website of KOICA, Korea EXIM Bank)

with climate change challenges, such as rising sea levels, inundation and floods. It is unlikely that Korea's ODA projects are not fully linked to Vietnam's priority of improving climate change response and water management in the Mekong Delta, while it emphasizes the other part of the goals.

Third, Korea ODA projects have been actively carried out in the agriculture and regional development, even though the sector is not included in the priority areas of cooperation. The trend with a special focus on the agriculture could be taken in the industrial characteristics of the Mekong Delta in that the area is one of Asia's major granaries, and rice and crop cultivation is playing a vital role in the national and regional economy (Minh and Kawaguchi, 2002). In addition, the processing and shipping of agricultural product is adopted as strategic industry in the Mekong Delta region (Kim et al., 2017). While Vietnam is industrialized and market-economized, traditional primary industry retains the largest share of the economy (Koo, 2017). As such, there is a great local demand to promote agriculture, and the potential for cooperation through ODA projects must be very high.

4. Suggestions for Korea's ODA in the Mekong Delta

In the previous sections, major characteristics of Korea ODA projects in the Mekong Delta were identified. The distinctive feature in modality is that Korea ODA has a large share of infrastructure projects regardless of sectors. All of the projects are allocated in the five sectors: transportation, water management, health, and sanitation, public administration and agriculture. They are the key areas to assist to foster economic and social development in general, but it has a limitation in the way that existing projects do not fully reflect the urgent agenda of climate change in the Mekong Delta.

According to Korea's International Development Cooperation Plan 2020, the government is expanding the ODA grants more than double by 2022 compared to 2017 to ensure the sustainable growth of the New Southern countries. In the third Five-Year Green Growth Plan 2019-2023, the need of expanding the green cooperation with the New Southern and New Northern countries and support in climate technology transfer is remarkably highlighted (Committee on Green Growth, 2019). Under the Korea's Country Partnership Strategy for Vietnam 2016-2020, the Korean government aims to carry out various measures in a prioritized way to support the Vietnam government's effort to respond to climate change in the Mekong River (Government Ministries, 2016). In the following, we suggest to mainstream the climate change into future implementation of Korea ODA projects considering the local needs as well as Korea's comparative advantage in technology and experience on climate change adaptation and risk prevention through the three types of ODA: problem-solving, industrial-development and governance-building ODA.

4.1 Problem-solving ODA

In the light of the Mekong Delta's vulnerability to climate change, it is necessary to reconsider the priorities of Korea ODA in terms of climate disasters and water management, which is a pressing problem to the local population. International trend of development in the water sector has shifted from water quality in the 1970s, and sustainable environment in the 1980s, to the global water crisis and water security in the 1990s-2000s (Ryu et al., 2014). As the water crisis and climate change-induced water disasters are becoming more serious in the Delta, integrated water management has a greater importance at the local level. However, as it is studied earlier, Korea's ODA projects in the water sector focused on water treatment and water resource management, by deploying water supply and sewerage facilities, even though there is an insufficient infrastructure and services for water disaster management in the Mekong Delta (Tran, 2019). As the concomitant result from the absence and lack of integrated water management system, it led to growing demand for assistance to expand infrastructure and improve capacity building on water management (Government Ministries, 2016).

Therefore, Korea's ODA projects needs to be revised in the way to respond to climate change in the water sector by deploying irrigation facilities and water control measures for the risk reduction of disasters. There is an increasing trend of large-scale floods that deviate from the planned frequency, and various flood measures such as flood forecasting systems and evacuation simulation scheme need to be considered in the synthetic approach (Han, 2019). Especially, Korea has a comparative advantage in integrated water management system that includes water quality, water ecology, and water disaster management (Ryu, 2014). Therefore, Korea's best practices in water management with advanced technology and accumulated experience can be incorporated into the situation of Mekong Delta. In this regard, Korea needs to allocate ODA projects to integrated water management, especially in response to climate change in the Mekong Delta. The shared solution will not only improve the quality of life of residents but also improve the sustainability of the local economy and ecological environment in the region.

4.2 Industrial Development ODA

Korea's ODA with the utilization of advanced ICT would be a good practice that contributes to the rapidly growing Mekong Delta region. Along with the demands of development of regional industries - agriculture, fisheries and tourism in the Mekong Delta, the Vietnam government has emphasized attracting innovative infrastructure and technology, especially through the construction of digital infrastructure to boost economic growth and the revival of major industries (SEDS, 2011). The Vietnam's Voluntary National Review outlines the importance of sharing experience on science and technology and technology transfer from advanced countries (MPI, 2018). In the case of Mekong Delta, the local demand for technology is so high and one of the main national goals is industrial development and economic growth through science and technology.

Since the end of the 1980s, Korea has made intensive investments in ICT infrastructure and technology under the national development strategy for informatization, and became an advanced ICT country based on its rapid economic environment, strong government policies and cultural characteristics. (Lee, 2013; Ko et al., 2010). Especially, Korea has competitiveness in ICT development through public-private cooperation, the establishment of the state of the art ICT network, and stable e-government systems (Ko and Kang, 2014). Korea has accumulated experience with economic transformation and ICT diffusion as an advanced country in in science and technology (Lee, 2013). Across many dimensions, ICT enables to induce societal benefits and stimulate economic growth as a key driver of improving efficiency and convenience in every sector of industry (Kim, 2009). In a long-term aspect, as a lever for development, Korea's comparative advantages can be utilized to improve social inclusion and sustainability in ODA projects.

Based on Korea's competitiveness on ICT, it is recommended to implement Korea's ODA in an innovative approach by incorporating ICT into the economy of the Mekong Delta. For example, electronic trade commonly called e-commerce could be utilized into the agriculture market in the Mekong Delta, which is an innovative platform in the agricultural sector with ICT. By expanding the reach and connectivity of ICT, it will be possible to promote the growth of the local economy by eliminating spatio-temporal limitations to export agricultural products. It is also possible to utilize ICT technology to monitor farmlands so that it enables to manage irrigation facilities or pests and diseases in real-time through mobile phones. There are many cases of high-tech complexes with the increasing demand for agricultural management and production using advanced technology (Renaud and Kuenzer, 2012). In this way, industrial development in cities as well as rural areas could be achieved using ICT and it could strengthen farmers' ability to respond to climate change as well (Thong Anh Tran, 2019).

4.3 Governance-building ODA

To promote climate-resilient and industrial development

through ODA, it is also crucial to establish sustainable governance structure to underpin it. Over the past few decades, Korea has been highly vulnerable to floods due to frequent typhoons and heavy rains. With the increasing demand on addressing water-related disasters, concerted effort between government ministries and agencies was being made to improve the water disaster management system. In addition, the flood response has been strengthened by establishing an integrated flood management system in cooperation with related water management organizations and local governments (Cho et al., 2016). As a shared solution, Korea's successful experience on water disaster management system is expected to contribute to strengthening the Mekong Delta's capability to cope with floods and minimize damage (Kim et al., 2018).

In that water resources are of great importance to all the people, water governance needs to include a wide range of stakeholders and be involve active participation by the civil society and local community for the wider water use (OECD, 2001). In some cases, ODA projects had been implemented without having sufficient consultation with the local residents and it deprived them of their right to live and caused the involuntary migration of residents (Lee, 2018). In the Mekong Delta as well, voices of villagers and farmers have not been fully reflected at the planning on water management and disaster prevention (Tuan, 2009). Thus, when carrying out water-related ODA projects, governance should be reconsidered by various stakeholders in a holistic approach from the national to community level.

In addition, to ensure ODA projects sustainable, capacity building should be provided in parallel. When science and technology infrastructure is introduced, skilled personnel with adequate and sufficient knowledge of technology and system are required to operate and manage the infrastructure after the project finished. For the sustainability of a project, technical education and training programs could be implemented so that local people can manage and use the infrastructure autonomously. Regarding to capacity building, customized training programs and materials can be planned and utilized according to targets groups, levels, and subjects (Minderhoud et al., 2019). Likewise, when implementing ODA projects, governance improvement should be systemically considered at the scale of national government, intermediate units and individuals as well.

5. Conclusion

Korea, as a bridge between developed and developing countries, has been expanding ODA projects in East Asian countries including Vietnam. As the adverse effects of climate change become substantial at the global level, the importance of ODA that addresses climate change is increasing. In this paper, we studied Korea’s ODA projects in the Mekong Delta with a special focus on climate change. It was found that they are active in the five sectors - transportation, public administration, education, water management, health and sanitation, and agriculture - in line with the Country Partnership Strategy Vietnam. The distinctive feature of Korea’s ODA is that the projects are likely to have a disparity in infrastructure across sectors. Also it revealed that Korea’s ODA is contributing economic and social development of the Mekong Delta, but it has a limitation in responding to climate change in the context of local situation. While existing projects are related to water management and agriculture, they are not directly dealing with the climate-induced challenges, such as rising sea levels and floods. Based on the findings from the study on the environment and industrial structure of the Mekong Delta, its vulnerability to climate change, the local needs on response to climate change, and the technological superiority of Korea, we suggested recommended direction of Korea ODA in three types of approaches: problem-solving, industrial development, governance-building.

This study identified challenges and limitations of current Korea’s ODA projects, but also proposed future directions in the context of sustainable development of Mekong Delta by shedding light on the importance of incorporating climate change into planning and implementing Korea ODA projects. However, this study has a limitation in that it focused on ODA projects

implemented by Korea, so it is necessary to delve into international ODA projects at a global scale and derive more implications by comparing and contrasting the projects for the further study.

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