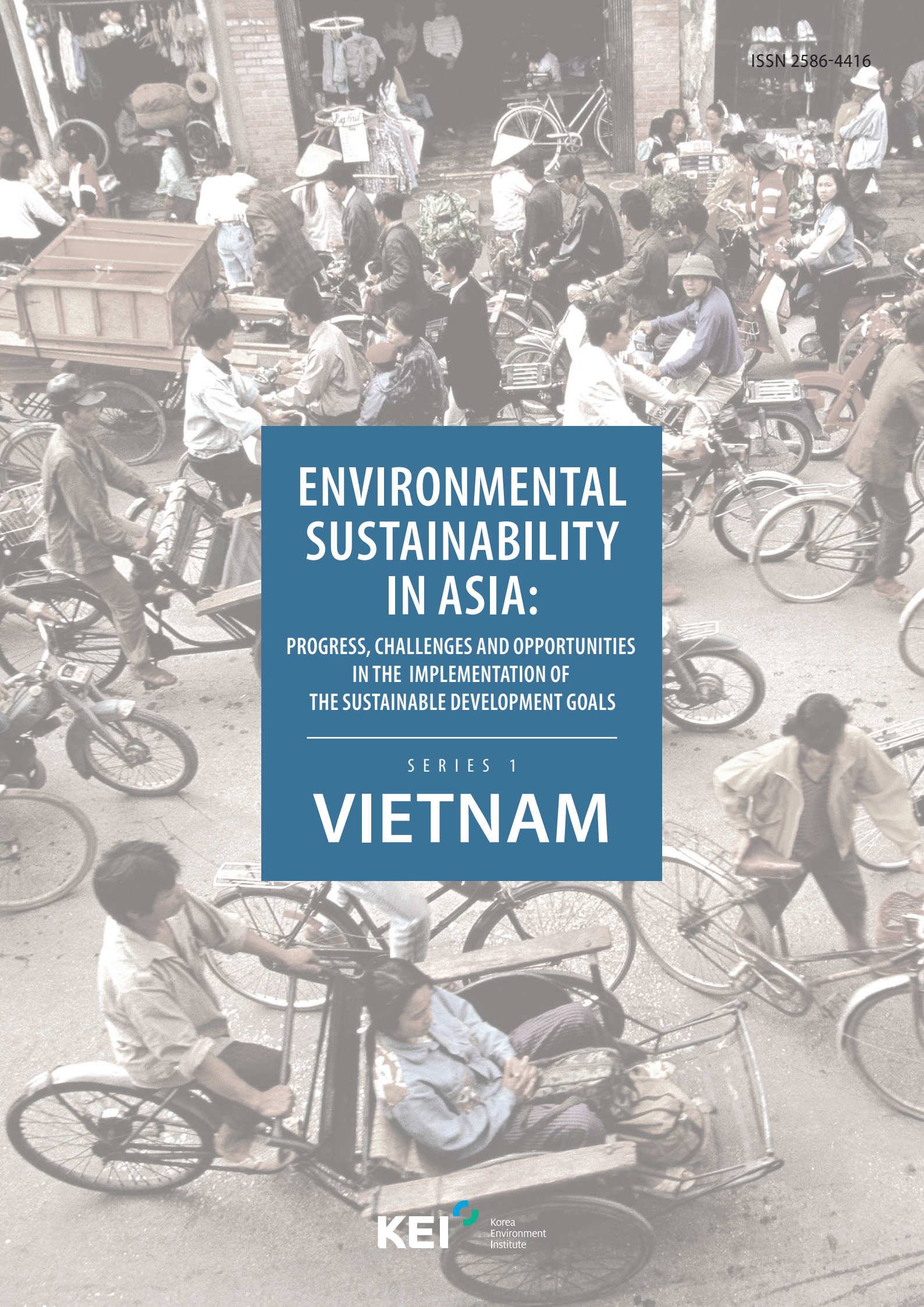
ISSN 2586-4416



ENVIRONMENTAL SUSTAINABILITY IN ASIA:

PROGRESS, CHALLENGES AND OPPORTUNITIES IN THE IMPLEMENTATION OF THE SUSTAINABLE DEVELOPMENT GOALS

SERIES 1

VIETNAM

KEI Korea Environment Institute

Environmental Sustainability in Asia :
Progress, Challenges and Opportunities in the Implementation of the Sustainable Development Goals
Series 1 - Vietnam

ISSN 2586-4416

This publication was financially supported by the Network of Institutions for Sustainable Development (NISD) Project Fund of the Korea Environment Institute (KEI).

Suggested citation:

KEI 2017. Environmental Sustainability in Asia: Progress, Challenges and Opportunities in the Implementation of the Sustainable Development Goals, Series 1 - Vietnam. Korea Environment Institute, Sejong, Korea.

Published in December 31, 2017

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ENVIRONMENTAL SUSTAINABILITY IN ASIA:

PROGRESS, CHALLENGES AND OPPORTUNITIES IN THE IMPLEMENTATION OF THE SUSTAINABLE DEVELOPMENT GOALS

SERIES 1

VIETNAM

Foreword

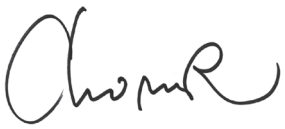
The Environmental Sustainability in Asia publication series, published by the Korea Environment Institute (KEI), demonstrates a comprehensive picture of the progress, challenges and opportunities of the Sustainable Development Goals (SDGs) implementation in the Asian countries. Each of the chapters provide extensive scientific evidence, consultations and intergovernmental process and policy recommendations on the seven principal themes of the SGDS: 1) clean water and sanitation (SDG 6), 2) affordable and clean energy (SDG 7), 3) sustainable cities and communities (SDG 11), 4) responsible consumption and production (SDG 12), 5) climate action (SDG 13), 6) life below water (SDG 14), and 7) life on land (SDG 15). It also highlights the complexity of the interlinked challenges confronting decision makers at various levels.

The launch of the Environmental Sustainability in Asia publication series comes at a critical time as the 2030 Agenda for Sustainable Development provides a clear pathway of action for people, planet and prosperity. In particular, we are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations (as stated in the Resolution adopted by the UN General Assembly –Transforming our world: the 2030 Agenda for Sustainable Development, 21 October 2015).

The first of the Publication Series focuses on the country of Vietnam. Vietnam is considered a development success country as it has transformed from being one of the poorest nations in the world to a middle-income country after two decades of rapid economic growth. Amid such rapid economic growth, Vietnam is facing significant challenges which can severely compromise the country's sustainable development (UNDP Vietnam). In response, Vietnam has made significant commitments providing potentials to bypass to smarter solutions for resilient development.

KEI recognizes experience sharing can be an effective development cooperation tool for its neighboring developing countries to fulfill their commitments to the international community and contributing responsibly to global efforts for sustainable development. By focusing on the experiences of the Vietnamese government, international organizations, international development agencies, and think tanks, the Environmental Sustainability in Asia Publication Series aim to project the benefits of experience into future actions and institutional commitments to better understanding effective actions in achieving the SDGs in the developing countries in Asia. I extend an invitation to all countries and relevant stakeholders in the region to engage with this publication.

This Publication Series is an output of the project entitled “Network of Institutions for Sustainable Development (NISD)” supported by the Korea Environment Institute. I would like to extend my gratitude to all the advisory members and authors who have contributed to the publication. Special thanks to Nguyen QuangThuan (President of the Vietnam Academy of Social Sciences), Nguyen Thanh Ha (Director General of the International Cooperation Department, Vietnam Academy of Social Sciences) and colleagues in the Vietnam Academy of Social Sciences for the planning, coordination and support of activities related to the preparation of the Environmental Sustainability in Asia – Vietnam.



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Key Message

It is a pleasure for me to introduce this collaborative publication on Environmental Sustainability in Asia: progress, challenges and opportunities in the implementation of the Sustainable Development Goals in Vietnam. With rapid economic growth over the past 25 years or so, Vietnam has successfully lifted itself from among the poorest nations in the world to middle-income status.

Yet, the continued and aggravated challenges of unsustainable growth, resource inefficiency and scarcity, climate change, air and water pollution as well as concerns for transboundary use of water resources and sustainable use of the Mekong River all signal the need for a further transformation in Vietnam as well as the broader Asia-Pacific region towards a more sustainable and resilient development path. With the 2030 Agenda for Sustainable Development, we have an ambitious and universally agreed framework for action for people, prosperity and the planet.

Recognising that the environment underpins all the 17 Sustainable Development Goals, with direct focus on goals 6 on clean water and sanitation; 7 on affordable and clean energy; 11 on sustainable cities and communities; 12 on sustainable consumption and production; 13 on climate action; 14 on life below water; and 15 on life on land, this publication aims to provide decision- and policy-makers a wealth of good practices from international development organizations, governments, academia, non-governmental organizations and communities working in this region to inform an integrated approach to policy making and implementation in Vietnam.

Such an integrated approach in pursuing social, environmental, and economic objectives for transformation supports growth that is in harmony with nature and where no one is left behind. Based on the experience in the preparation of this publication and its use to inform policy making and advocacy in Vietnam moving forward, UN Environment looks forward to undertaking similar work with the Korea Environment Institute in countries across the region.

The year 2030 is not that far away.

DechenTsering
Regional Director and Representative for Asia and the Pacific
UN Environment

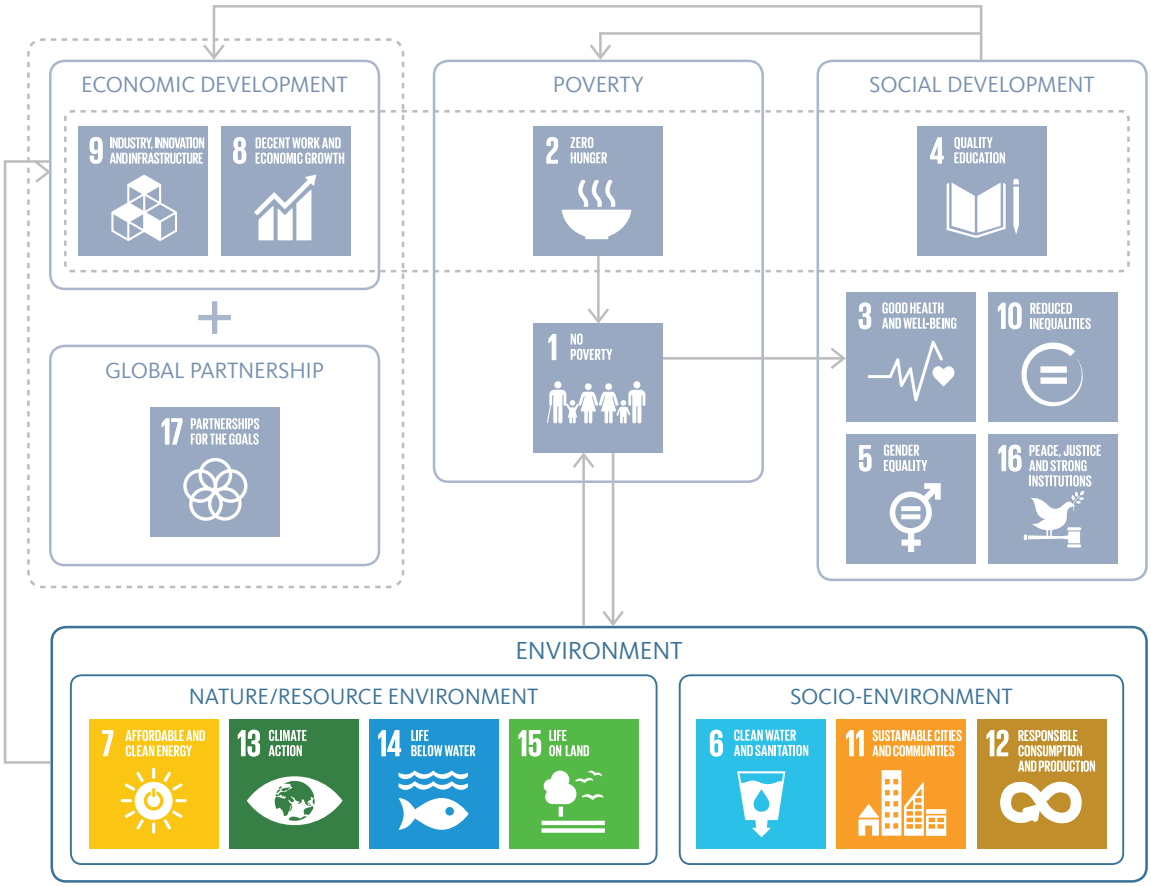
Introduction of Publication Series

Asia-Pacific Regional Perspectives and National Integration of SDGs

Introduction of Publication Series

On September 25th 2015, the United Nations General Assembly adopted the 2030 Agenda for Sustainable Development. The adoption of the Sustainable Development Agenda with 17 global goals set to end poverty, protect the planet, and ensure prosperity for all. Each of the 17 Sustainable Development Goals (SDGs) has specific targets to be achieved over the next 15 years[1]. Among the 17 goals of the SDGs, seven goals directly related to the environmental aspects have been clustered and were selected as the seven principal themes of the Environmental Sustainability in Asia Publication Series. The seven principal themes include1) clean water and sanitation (SDG 6), 2) affordable and clean energy (SDG 7), 3) sustainable cities and communities (SDG 11), 4) responsible consumption and production (SDG 12), 5) climate action (SDG 13), 6) life below water (SDG 14), and 7) life on land (SDG 15).

↘ Clustering and Interlinkages in the SDGs



Source : KEI Focus 2015 (Vol.3 No.1), Implementation of UN Sustainable Development Gooals[2]

1. United Nations General Assembly (2015), Resolution adopted by the General Assembly on 25 September 2015, Transforming our world: the 2030 Agenda for Sustainable Development, 21 October 2015.
2. KEI Focus 2015 (Vol 3, No 1), Implementation of UN Sustainable Development Goals.

Based on the seven principal themes of the Environmental Sustainability in Asia Publication Series, diverse institutions including the government, international organizations, development agencies, and think tanks, were invited to relate their work in active efforts to promote the SDGs and to advance their shared commitment to the importance of fostering sustainable development. Article commentaries of the diverse institutions draw upon experiences highlighting good practices and reflect the process and challenges on the seven principal themes.

This edition of the Environmental Sustainability in Asia Publication Series reflects the progress, challenges and opportunities of the seven principal themes in Vietnam, highlighting good practices in a wide variety of societies and disciplines. Vietnam is considered a development success country as it has transformed from being one of the poorest nations in the world to a middle-income country after two decades of rapid economic growth. Amid such rapid economic growth, Vietnam is facing significant challenges which can severely compromise the country's sustainable development[3]. To respond, the Vietnamese Government has integrated the implementation of 2030 Agenda in the National Assembly's resolutions and the Government's guidance documents. With the Ministry of Planning and Investment (MPI) assigned by the Government to lead coordination of all stakeholders for the Agenda 2030 implementation in Vietnam, MPI is currently finalizing the National Action Plan providing guidance framework, defining activities and responsibilities among different stakeholders for Vietnam's Sustainable Development Goals (VSDGs)[4].

Drawing from Vietnam's development of National Action Plan and VSDGs, KEI recognizes experience sharing can be an effective development cooperation tool for its neighboring developing countries to fulfill their commitments to the international community and contributing responsibly to global efforts for sustainable development. By focusing on the experiences of the Vietnamese government, international organizations, international development agencies, and think tanks, the Environmental Sustainability in Asia Publication Series aim to project the benefits of experience into future actions and institutional commitments to better understanding effective actions in achieving the SDGs in the developing countries in Asia.

3. UNDP in Viet Nam Website, "About Viet Nam".Retrieved from http://www.vn.undp.org/content/vietnam/en/home/countryinfo.html.
4. UNDP in Viet Nam Website (2016, Nov 10), "Viet Nam integrates Sustainable Development Goals in national policy"Retrieved from http://www.vn.undp.org/content/vietnam/en/home/presscenter/pressreleases/2016/11/10/viet-nam-integrates-sustainable-development-goals-in-national-policy.html.

Asia-Pacific Regional Perspectives and National Integration of SDGs

UN Environment

The 2030 Agenda with its 17 Sustainable Development Goals (SDGs) and 169 targets[1] is an ambitious global plan of action for people, planet, peace, prosperity and partnership, which has been adopted by the world leaders at the United Nations Summit in New York in September 2015. Building upon the achievement of the Millennium Development Goals, this universal Agenda pledges to leave no one behind, pays special attention to the poorest and most vulnerable, and promotes enjoyment of a wide range of human rights by all. It takes into account different national realities, capacities and levels of development, respects national policies and priorities and works with a broad range of actors from civil society, the private sector, academia and non-governmental organizations.

The 2030 Agenda highlights critical links between development, the environment and wellbeing. It integrates the economic, social and environmental dimensions into a framework for transformational change to put the world on a sustainable and resilient development path. Central to the Agenda is the understanding that a healthy, well-functioning environment is crucial for humankind to prosper - lifting people out of poverty, ending hunger, growing economies, building peaceful, just and inclusive societies, and promoting the health of people and this planet. Environmental considerations are therefore integral to all the 17 SDGs and 7 of the SDGs have an environmental focus: water and sanitation (Goal 6), energy (Goal 7), human settlements (Goal 11), sustainable consumption and production (Goal 12), climate change (Goal 13), oceans and terrestrial ecosystems (Goals 14 and 15).

The impact of environmental degradation is indeed felt daily by millions of people around the world, especially in the Asia-Pacific region which is the engine of global growth and home to 60% of the global population[2]. The 6th Global Environment Outlook for Asia-Pacific (GEO-6 Asia-Pacific)[3], published by UN Environment in June 2016, identified the following 5 critical environmental trends in the region which have since been repeatedly discussed in regional policy processes, most recently in the Asia-Pacific Ministerial Summit on the Environment held on 5-8 September 2017 in Bangkok:

1. Increasing demand of resources from rapid urbanization and affluent life styles;
2. Increasing inefficiency in the use of resources;
3. Increasing vulnerability to the impacts of natural hazards and extreme events;
4. Increasing environmentally-related health risks; and
5. Widening gaps across the landscape of policies and legislation and their implementation.

1. United Nations (2017), "General Assembly resolution 71/313, Work of the Statistical Commission pertaining to the 2030 Agenda for Sustainable Development", retrieved from: https://undocs.org/A/RES/71/313
2. ESCAP (November 2013), "Population trends in Asia and the Pacific", Retrieved from: http://www.unescapsdd.org/files/documents/SPPS-Factsheet-Population-Trends-v3.pdf
3. For the report, please see: https://uneplive.unep.org/media/docs/assessments/GEO_ASSESSMENT_REPORT_ASIA_Wam.pdf

1. Increasing demand of resources from rapid urbanization and affluent life styles

Increasing concentration of population in urban areas and expanding middle class with affluent lifestyles in Asia-Pacific have caused higher demand for resources, exerting growing pressure on ecosystem resources. The region has seen an unprecedented speed and scope of urbanization. It has 17 megacities (cities exceeding 10 million inhabitants) and will have no less than 22 by 2030.[4] These Asia-Pacific cities, as the pre-dominant hubs of economic growth and wealth creation[5], are home to 46% of the world's middle class in 2015, which will rise to 65%[6] by 2030.

2. Increasing inefficiency in the use of resources

The Asia-Pacific region is currently responsible for 53% of the global material consumption, with lower efficiency than the rest of the world[7]. To produce one US dollar of gross domestic production (GDP), this region on average uses 3 kilograms of materials while the rest of the world uses only 1 kilogram[8]. Such inefficiency in material use is largely responsible for widespread environmental degradation, loss of ecosystem services, generation of excessive waste and additional financial burdens.

3. Increasing vulnerability to the impacts of natural hazards and extreme events

The Asia-Pacific region is the world's most disaster-prone region, exposed to many types of natural disasters such as earthquakes, floods, droughts and typhoons[9]. Over the period of 2005 – 2014, 1,625 reported disaster events from this region claimed 500,000 lives, affected 1.4 billion people and caused $523 billion worth of economic damage[10]. Their frequency, intensity and fatality will continue to be aggravated by climate change impacts, putting more people, economy and environment at higher risk.

4. Increasing environmentally-related health risks

The Asia-Pacific region faces growing environmentally-related health threats from widespread air pollution, harmful chemicals and heavy metals, and emergence and spread of vector-borne diseases. Air pollution is the most pressing environmental health crisis in the world. It is responsible for more than 6.5 million deaths annually, and nearly 2 out of 3 occur in low- and middle-income countries of South-East Asia and Western Pacific regions[11]. Water is related to various infectious and parasite diseases such as diarrheal diseases, intestinal nematode infections, malaria, dengue, trachoma and many others as well as to negative neonatal conditions such as stunting and even death[12]. The

4. ESCAP, UN Habitat (2015), "The State of Asia and Pacific Cities in 2015: Urban transformations shifting from quantity to quality", retrieved from: http://www.unescap.org/sites/default/files/The%20State%20of%20Asian%20and%20Pacific%20Cities%202015.pdf
5. HomiKharas (February 2017), "The Unprecedented Expansion of the Global Middle Class", Global Economy and Development Working paper 100, Bookings Institution, retrieved from: https://www.brookings.edu/wp-content/uploads/2017/02/global_20170228_global-middle-class.pdf
6. Ibid.
7. UN Environment (2015), "Resource use in the Asia-Pacific: A booklet of infographics", United Nations Environment Program, Bangkok, retrieved from: http://www.switch-asia.eu/fileadmin/user_upload/RPSC/Publications/09Infographic_Low-resolution_.pdf
8. Ibid.
9. ESCAP (2015), "Asia-Pacific Disaster Report 2015 – Disasters Without Borders: Regional Resilience for Sustainable Development", retrieved from: http://www.unescap.org/sites/default/files/Full%20Report%20%20%5BLow-Res%5D.pdf
10. Ibid.
11. Air Quality, UN Environment Program Asia and the Pacific Office, retrieved from: http://www.who.int/mediacentre/news/releases/2016/air-pollution-estimates/en/
12. WHO (2016), "Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks", retrieved from: http://www.who.int/quantifying_ehimpacts/publications/preventingdisease.pdf

burden of water-related disease is extremely high in this region, considering the fact that 30 percent of the population of South and Southeast Asia are estimated to use drinking water contaminated by human faeces[13]. Climate change is expected to cause approximately 250,000 additional deaths annually between 2030 and 2050 by adversely affecting social and environmental determinants of health such as clean air and water, sufficient food and secure shelter[14].

5. Widening gaps across policies and legislation and their implementation

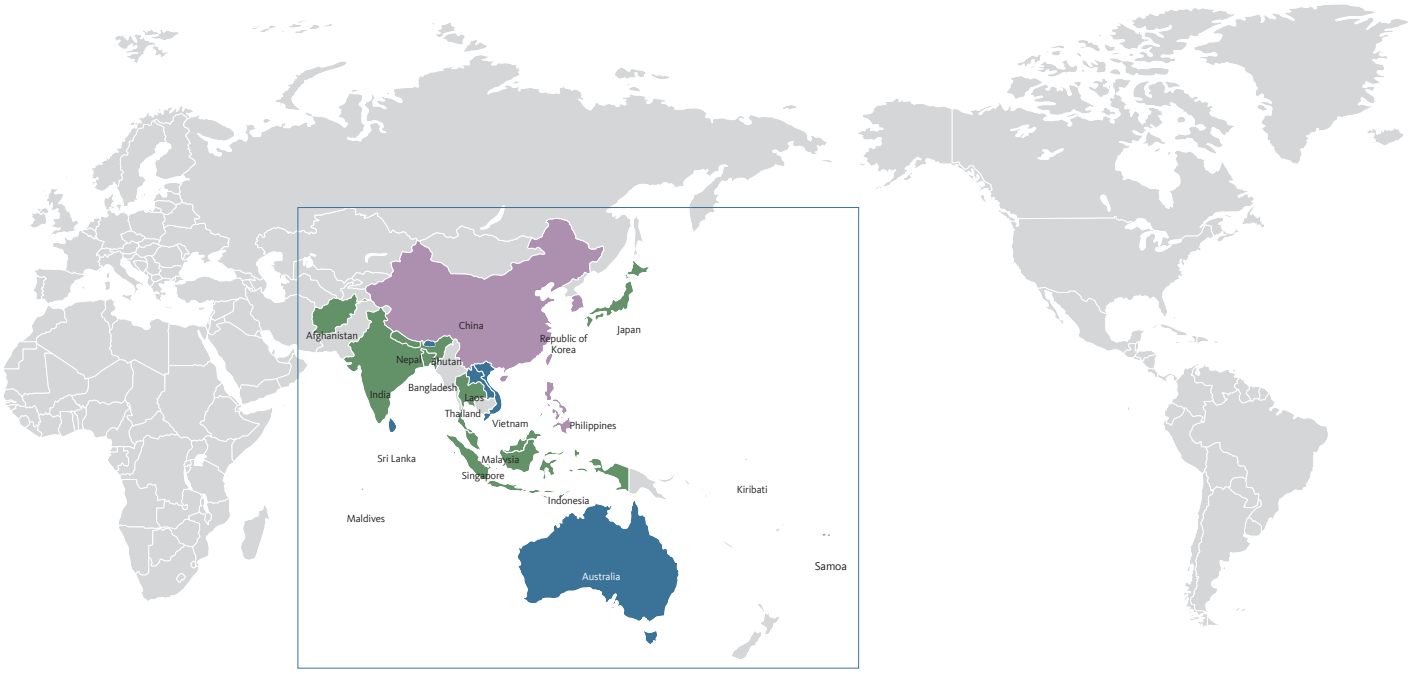
Despite increasing policy interventions to cope with existing environmental issues, the policy gap is widening due to ineffective policy implementation, poor scientific base for policy formulation and newly emerging environmental issues. The Asia-Pacific region still lacks the comprehensive governance and policy mechanisms to effectively address sustainability challenges due to a broad spectrum of reasons, such as lack of funding and human skill, weak governance systems and challenges in prioritization of efforts[15].

As countries in the region deliberates on these challenges and reflects on the lessons from the past, there is increased realization among them that their future potential is being undermined by pursuing the traditional model of development and that the 2030 Agenda, in particular the environment-related SDGs 6, 7, 11, 12, 13, 14 and 15, provide a robust framework for sustainable development that "meets the needs of the present without compromising the ability of future generations to meet their own needs[16]". Consequently, countries have resolved to take urgent action with stronger commitment to the SDGs both collectively and individually.

Collectively as a region, Asia-Pacific countries gathered at the Asia Pacific Forum on Sustainable Development in March 2017 and adopted a road map[17] for regional cooperation on implementing the 2030 Agenda for Sustainable Development. The road map lays out priority areas, implementation arrangements and a process for tracking progress on the SDGs to facilitate regional level cooperation in promoting the balanced integration of the three dimensions of the SDGs, with a focus in the thematic areas of social development, disaster risk reduction, climate change, management of natural resources, connectivity and energy. The road map particularly highlights the importance of supporting the implementation of SDGs by developing countries, least developed countries, landlocked developing countries, Small Island Developing States (SIDS) and other countries with special needs[18].

At the national level, Asia-Pacific countries are making considerable efforts to mainstream the SDGs into national policies, plans and strategies and to set nationally-relevant targets, taking into account national circumstances and realities. In 2016 and 2017, 13 countries[19] from Asia-Pacific region submitted their Voluntary National Reviews (VNR) on the SDGs to the High-level Political Forum on the Sustainable Development. 7 additional Asia-Pacific countries have volunteered to submit the reviews to the Forum in 2018. The review is a state-led voluntary action involving multiple stakeholders to follow-up on the SDGs implementation at the national level[20] to feed into the global follow-up and review mechanisms of the 2030 Agenda for Sustainable Development. The fact that many Asia-Pacific countries are continuously submitting reviews is a demonstration of their strong engagement and ownership at the national level to achieve the SDGs.

13. Bain, R. et al. (2014). "Global assessment of exposure to faecal contamination through drinking water based on a systematic review". Tropical Medicine & International Health 19(8), 917-927. doi: 10.1111/tmi.12334, retrieved from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4255778/
14. WHO (July 2017), "Climate change and health", retrieved from: http://www.who.int/mediacentre/factsheets/fs266/en/
15. UN ESCAP, UNEP, UNU, IGES (2016), "Transformations for Sustainable Development: Promoting Environmental Sustainability in Asia and the Pacific", retrieved from: http://www.unescap.org/sites/default/files/publications/Transformation%20for%20Sustainable%20Development.pdf
16. http://www.un-documents.net/our-common-future.pdf
17. ESCAP (2017), "Regional Road Map for Implementing the 2030 Agenda for Sustainable Development in Asia and the Pacific", retrieved from: http://www.unescap.org/sites/default/files/publications/Final%20SDG%20Roadmap_Updated%20Logo.pdf
18. Ibid.
19. This table only includes countries of the Asia-Pacific region as defined by UN Environment for its operation.
20. For further information, please visit: https://sustainabledevelopment.un.org/vnrs/



2016
China
Philippines
Republic of Korea
Samoa

2017
Afghanistan
Bangladesh
India
Indonesia
Japan
Malaysia
Maldives
Nepal
Thailand

2018
Australia
Bhutan
Kiribati
Laos
Singapore
Sri Lanka
Vietnam

As the leading global environmental authority, the United Nations Environment Program (UN Environment) plays a key role in supporting the coherent implementation of the environmental dimension of the 2030 Agenda. Its key mandates include contribution to the Global Sustainable Development Report and the annual Sustainable Development Goals Report through provision of policy relevant information including through assessment processes such as the Global Environment Outlook; and supporting the monitoring of the 80 environment-related indicators, taking the lead as custodian agency for 26 indicators for SDGs 6, 8, 12, 14, 15 and 17[21] and contributing to others.

Through its work in 7 priority areas of: climate change; resilience to disasters and conflicts; healthy and productive ecosystems; environmental governance; chemicals, waste and air quality; resource efficiency; and environment under review, UN Environment aims to address including but not limited to SDG 6 on clean water and sanitation (target 6.3, 6.5 – 6), SDG 7 on affordable and clean energy (target 7.2 – 3, 7.a), SDG 11 on sustainable cities and communities (target 11.4 – 7, 11.a – b), SDG 12 on responsible consumption and production (target 12.1– 8, 12.a), SDG 13 on climate action (target 13.1, 13.3), SDG 14 on life below water (target 14.1 – 6, 14.c), and SDG 15 on life on land (target 15.1 – 9, 15.a, 15.c)[22].

Achieving the 2030 Agenda and the SDGs require continuous and increased cooperation, joint responsibility, new partnerships and strong engagement of all actors – the UN family, nations, businesses, civil society and many others – that need to look at how they can transform the way we live and conduct our affairs.

21. "SDG Indicators: UN Environment as Custodian Agency", retrieved from: https://uneplive.unep.org/media/ docs/projects/SDG_Indicators_ UNEP_as_custodian_agency.pdf

22. UN Environment (2016), Medium Term Strategy 2018-2021, retrieved from: https://wedocs.unep.org/rest/bitstreams/11369/retrieve

I

SDGs in Vietnam

1.

Integration of 2030 Agenda and SDGs in Vietnam: Overall Planning and Coordination of VSDGs for Environmental Sustainability

1

Vu Xuan Nguyet Hong [1)]
Nguyen Le Thuy [2)]

Integration of 2030 Agenda and SDGs in Vietnam: Overall Planning and Coordination of VSDGs for Environmental Sustainability

1. From Vietnam's Agenda 21 and Development Goals (VDGs) to Vietnam's Sustainable Development Goals (VSDGs)

Vietnam's Agenda 21 and its Implementation

The Vietnamese government already expressed its interest in environmental sustainability in the early 1990s. This has been shown by the Government's issuance of the National Action Plan on the environment and sustainable development in 1991. This is considered as the Government's first legal document[3)], which formally addressed environmental issues and directed policy approaches for sustainable development in Vietnam for the period 1991-2000. Over the past fifteen years, Vietnam has emerged as an active and responsive member of the United Nations (UN) by exerting significant efforts in implementing its commitments made in UN summits, including those related to sustainable development.

For example, in response to the UN Conference on Environment and Development in 1992[4)] and the World Summit on Sustainable Development in 2002[5)], the Government of Vietnam adopted its national Agenda 21 by issuing Strategic Orientations on Sustainable Development in Vietnam[6)]. This document was formulated based on the UN Agenda 21 and taking into consideration the national context and making adjustments. It also elaborated the development priorities of Vietnam in the early 21st century and provided a framework for national strategic sustainable development orientation in the 21st century. Furthermore, the National Strategy for Sustainable Development for the period 2011-2020 was issued in 2012[7)]. This legal document can be seen as Vietnam's follow-up step in implementing its Agenda 21 which provided detailed sustainable development approaches, objectives, targets, policy priorities and measures to be undertaken by Vietnam in the period 2011-2020. More importantly, the Decision introduced a list of 30 indicators to be used for monitoring and evaluating sustainable development performance in Vietnam. They consist of three general, ten economic, ten social and seven environment-related indicators[8)].

In 2013, in order to implement the National Strategy for Sustainable Development, the Government of Vietnam adopted the National Action Plan for Sustainable Development for the period 2013-2015,[9)] followed by

1. Former Vice President, Central Institute for Economic Management (CIEM).
2. Deputy Director, Department for Science, Education, Natural Resources and Environment, Ministry of Planning and Investment (MPI).
3. A legal document is the legislative document which is issued by an authorised government agency according to their by-law mandates. The document is institutionalized by law and is compulsory implemented. The forms of legal documents include Constitution, Laws, National Assembly's Resolutions, the Government's Decree, Prime Minister's Decision, line ministries' Circulars, Local Peope's Council's Resolusions, Local Peope's Committee's Decisions. In the hierarchy of legal documents, the highest legislative document is Constitution, then followed by Laws. The Government's Decree, Prime Minister's Decisions are under-law legal documents (see Law on Legal Document Promulgation 2015 at https://thuvienphapluat.vn/van-ban/Bo-may-hanh-chinh/Luat-ban-hanh-van-ban-quy-pham-phap-luat-2015-282382.aspx)
4. Known as the 1992 Earth Summit which was held in Rio de Janeiro, Brazil in 1992. The Summit announced the so-called Rio Statement (globally well-known as Agenda 21) which was considered as a non-binding, voluntarily implemented action plan of the United Nations with regard to sustainable development. See more details at http://research.un.org/en/docs/environment/conferences

the introduction of a set of indicators to be used for monitoring and evaluating sustainable development performance at the local level[10]. Based on these legal documents, the line ministries and provincial governments prepared and approved either their own Local Agenda 21 or action plan for implementing the strategy for sustainable development in the period 2011-2020 (MPI, 2015).

Institutionally, after the adoption of Vietnam Agenda 21, the National Council for Sustainable Development was established[11] and authorized by the Government to act as a counselor in directing, regulating, supervising and evaluating the implementation of Vietnam's Agenda 21. The National Sustainable Development Office was established and attached to the Ministry of Planning and Investment (MPI) to support the Council in their daily work. At ministerial and local (provincial) level, the Committee for Sustainable Development was also established to help the line ministries and provinces implement their strategies and action plans for sustainable development. In addition, a Business Council for Sustainable Development was formed and attached to Vietnam Chamber of Commerce and Industry (VCCI) with the mission to promote the implementation of Vietnam's sustainable development strategy and effective use of natural resources by encouraging domestic firms to apply environmental-friendly technology and contributing to the development of renewable energy industry (Vu and Dang, 2015).

It is obvious that Vietnam has formulated a legal and institutional system for realizing Vietnam's Agenda 21 both at national and local levels. It is important to note that a part of the legal documents directly addressed and captured three aspects of sustainable development as mentioned above, the Government also issued several other legal documents which are indirectly or partly related to sustainable development aspects and they contributed to the formulation of a comprehensive legal system for sustainable development in Vietnam. For example, the key legal documents related to environmental sustainability and green growth listed below also clearly addressed the approaches, objectives and policy priorities and measures for Vietnam toward sustainable development and a green growth path in the context of climate change:

- Prime Minister's Decision No 2139/QĐ-TTg dated 05/12/2011 on Approval of National Strategy on Climate Change;
- Prime Minister's Decision No 1393/QĐ-TTg dated 25/9/2012 on Approval of National Strategy on Green Growth for the period 2011 – 2020 and the vision to 2050;
- Prime Minister's Decision No 1216/QĐ-TTg dated 05/09/2012 on Approval of National Strategy on Environmental Protection for the period 2011-2020 and the vision to 2030;
- Prime Minister's Decision 1570/QĐ-TTg dated 06/09/2013 on Approval of Strategy on sustainable extraction and use of marine natural resources and environmental protection until 2020 and the vision to 2030
- Prime Minister's Decision No 76/QĐ-TTg dated 11/1/2016 on Approval of National Action Plan on Sustainable Production and Consumption with a vision to 2030.

5. Known as the 2002 Earth Summit. At this Summit, the UN members re-affirmed their commitment to "full implementation" of Agenda 21, alongside achievement of the Millennium Development Goals and other international agreements. See more details at http://research.un.org/en/docs/environment/conferences
6. Prime Minister's Decision No 153/2004/QĐ-TTg dated 17/8/2004.
7. Prime Minister's Decision No 432/QĐ-TTg dated 12/4/2012.
8. Can be seen at https://thuvienphapluat.vn/van-ban/Linh-vuc-khac/Quyet-dinh-432-QD-TTg-phe-duyet-Chien-luoc-Phat-trien-ben-vung-Viet-Nam-138132.aspx
9. Prime Minister's Decision No 160/2013/QĐ-TTg dated 15/1/2013.
10. Prime Minister's Decision 2157/2013/QĐ-TTg dated 11/11/2013.
11. The Council was re-named as the National Council for Competitiveness Improvement and Sustainable Development in May 2012

After more than ten years of implementing Agenda 21, Vietnam has come a long way in moving the country's development process toward sustainable development both in terms of the nation's overall attitude and action. First, although there are still some shortcomings in achieving the sustainable development goals (SDGs), sustainable development approaches and principles have been gradually mainstreamed into national development strategies, plans and programs (Vu and Dang, 2015). Second, the national stakeholders' awareness of sustainable development, including the government, businesses, civil society and households has improved significantly both at national and local levels. Third, at the international level, Vietnam has always expressed its commitment to play an active role and join the world's dialogues and discussions on sustainable development. For example, Vietnam signed and became a member of several international protocols and agreements related to sustainable development such as the Montreal Protocol on Substances that Deplete the Ozone Layer, the Vienna Convention for the Protection of the Ozone Layer, the United Nations Convention on the Law of the Sea (UNCLOS), the United Nations Framework Convention on Climate Change (UNFCCC), and the Convention on Biological Diversity (CBD). The nation has also committed to implementing the Millennium Development Goals (MDGs) and the Paris Agreement on Climate Change (COP-21) among others.

However, there are several shortcomings in implementing Agenda 21 which were clearly revealed after ten years of implementation[12].

- First, the enforcement of policies on sustainable development is weak and uneven between central and local levels as well as among different government agencies; several problems have occured in the process of mainstreaming sustainable development in national, sectoral and local strategies, master plans and programs. In addition, coordination of sustainable development policies between line ministries, central and local governments is still limited.
- Second, during the implementation of Vietnam's Agenda 21, significant financial resources were mobilized, especially from the state budget and ODA. However, these funds were doled out without clear prioritization. In particular, funding resources coming from the business community and private sector were still limited.
- Third, the lack of an applicable M&E framework for assessing sustainable development performance is another issue. In fact, the sets of sustainable development indicators both at national and local were introduced but were not fully applied in practice because of the difficulties in collecting information and data. The information system supporting the M&E works in this aspect of sustainable development management was underdeveloped. Citizen and communities face difficulty in accessing information about environmental pollution and use of natural resources.

12. See more details in "Report on Ten-Year Progress of Implementing Agenda 21 in Vietnam". Vietnam Office for Sustainable Development, MPI. December 2015

Table 1-1 below demonstrates the key achievements and shortcomings of Vietnam's environmental sustainability performance in accordance with Agenda 21 during the last fifteen years, which constitutes one of the three pillars of sustainable development.

↘ Table 1-1

Key Achievements and Shortcomings of Vietnam's Environmental Sustainability

Achievements
- Legal system on natural resource management and environmental protection was formulated and improved over time. This system was also disseminated and informed to major stakeholders, particularly the business community and citizens.
- Public mobilization was carried out to encourage participation in environmental protection
- The budget funding for environmental protection was increased, which indicates the Government's growing commitment toward environmental sustainability.
- The measures for pollution prevention and control contributed to slowing down but not stopping environmental pollution and emissions.
Shortcomings
- Environmental pollution and emissions have worsened, both in urban and rural areas. Natural resource became more and more exhausted due to over-extraction. The ineffective use of energy, especially non-renewable energy, and natural resources for production and consumption by citizen became the crucial issue.
- Society's attitude and awareness about their responsibility to protect the environment and conserve natural resources are still limited and have not shown significant progress. In general, environmental protection has yet to become a part of Vietnamese citizens' daily lives.
- The enforcement of natural resources management and environmental protection regulations is still limited. The weak execution and monitoring of the implementation of environmental protection laws and regulations is considered as a big issue at the local level.
- Coordination among related stakeholders in dealing with cross-cutting issues of natural resources management and environmental protection has been very weak at both central and local levels.
- The mainstreaming of natural resource and environmental issues in development decisions was weak and has yet to meet sustainable development principles and requirements. These issues were not yet fully addressed in development strategies, master plans and policies of central and local authorities alike.

Summarized from "Report on Ten-Year Progress of Implementing Agenda 21 in Vietnam – Vietnam Office of Sustainable Development, MPI. December 2015

Vietnam's Development Goals and its Achievements of Environmental Sustainability

In 2000, the world witnessed a historical moment when the Millennium Summit of the United Nations announced the United Nations Millennium Declaration, expressing the members' commitments to a new global partnership framework for fighting hunger and extreme poverty, development and environmental protection. After one year, the eight Millennium Development Goals (MDGs) for the year 2015 with 18 targets and 48 indicators were established, which are seen as a global framework for measuring and monitoring development progress of the UN member nations to the year 2015.

After the Millennium Declaration was announced, Vietnam expressed its strong will to implement the commitments. The Government designed the Vietnam Development Goals (VDGs) with the aim of nationalizing MDGs in accordance with Vietnam's conditions. It also integrated these VDGs in the five-year social-economic plans and established the system of national statistical indicators which included all VDGs for assessing and monitoring the progress of implementing MDGs in Vietnam.

In the period 2001-2015, despite several challenges, Vietnam considered MDGs as one of its national development priorities. The efforts made by all stakeholders, including the government, overall society and development partners led to critical successes in poverty reduction and economic reforms, transforming Vietnam from one of the poorest countries in the world to a low- to middle-income country by 2010[13]. After fifteen years of implementing the MDGs, Vietnam has made progressive achievements. Among the eight MDGs, it successfully fulfilled three goals in advance of the MDGs deadline (i.e. 2015), including eradicating extreme hunger and poverty (Goal 1), achieving universal primary education (Goal 2) and promoting gender equality (Goal 3). In addition, three more goals are almost achieved, namely reducing child mortality (Goal 4), improving maternal health (Goal 5) and combating HIV/AIDS malaria and other diseases (Goal 6). One of the remaining two MDGs Vietnam is struggling to achieve is environmental sustainability (Goal 7) (Socialist Republic of Vietnam, 2015). In this respect, although Vietnam promised its active role in international agreements and conventions on environment and climate change, their actual implementation at both national and local levels was still limited. The shortcomings in this area have already been addressed in Table 1-1 above. In addition, the strong and increasing impacts of climate change in recent years have posed additional critical challenges to the country in the process of accelerating economic growth and at the same time ensuring environmental sustainability in the post-MDGs period.

Vietnam's National Action Plan for Implementing Agenda 2030 for Sustainable Development

On September 25, 2015, at its Summit, the United Nations launched the master plan with a set of seventeen ambitious goals to be achieved over the next fifteen years. The formal name of this new plan is Agenda 2030, which is comprised of 17 "Post-2015 Sustainable Development Goals" (SDGs) with 169 specific "targets" capturing all aspects of sustainable development. According to the UN's declaration about Agenda 2030, this is a plan of actions for "people, planet, partnership, prosperity and peace" in the coming years and it is a follow-up to the previous fifteen-year UN plan for the MDGs. It also dovetails nicely, although not explicitly, with the UN Agenda 21[14]. At this UN Summit, Vietnam's representative expressed strong support and commitments to implement all SDGs of the Agenda 2030 in Vietnam.

In 2016, Vietnam started integrating UN Agenda 2030 into its national agenda by formulating the National Action Plan for Implementing Agenda 2030 for Sustainable Development. The Action Plan formulation process was based on the involvement of a broad range of related stakeholders, including the national assembly, government agencies at national and local levels, civil society, associations, academic and business communities, and development partners. In addition, in order to get the consensus and comments from related parties, a series of consultative workshops and discussions were held on specific VSDGs during the two processes of action plan formulation, including: (i) the policy mapping of current national or sectoral strategies, plans, and programs to identify the gaps between current national goals and global SDGs; and (ii) commenting on the proposed VSDGs and the draft Action Plan.

13. In 2010, nominal GDP per capita of Vietnam reached USD 1,168 compared with USD 416 in 2001. In 2016, this figure was estimated to be USD 2,233. (Source: World Bank, at http://pubdocs.worldbank.org/en/977981492061085584/Vietnam-MPO-SM17-VN.pdf)
14. See further in details at https://sustainabledevelopment.un.org/post2015/transformingourworld

On May 10, 2017, the Prime Minister signed Decision No. 622 on approval of the National Action Plan for Implementing the Agenda 2030 for Sustainable Development. Similar to UN Agenda 2030, the National Action Plan can be seen as the follow-up plan of Vietnam's Agenda 21 as well as other related development strategies, plans and programs which have already been adopted and are currently being implemented in Vietnam.

The National Action Plan includes 17 general sustainable development goals which are almost identical to the SDGs (except for SDG 11 which added in the rural development aspect). More importantly, Vietnam's Agenda 2030 introduced 115 specific targets (detailed VSDGs), which are fewer than the 169 targets set in UN Agenda 2030. The detailed number of targets set for each VSDG is set out in Table 1-2, which indicates that the number of detailed VSDGs (or targets) in each general VSDG is fewer than the number of targets in each SDG. This, however, does not mean that Vietnam dropped some important targets in UN Agenda 2030. Some global targets in the global SDGs are considered to relate to development partners and developed countries' actions or international responsibilities, so they are not relevant for a developing country like Vietnam. In addition, some targets of the UN Agenda 2030 were merged in VSDGs; and other targets (particularly, those with the code SDG a,b,c etc.) of UN Agenda 2030 became the tasks assigned to related ministries to be implemented in order to achieve the related VSDGs[15]. In other words, the 115 targets included in Vietnam's Agenda 2030 captured all the UN's SDGs targets with several modifications and adjustments to meet the context of Vietnam.

15. For example, SDG 1.1 and 1.2 of UN Agenda 2030 became VSDG 1.1; SDGs 3.1 and 3.2 were combined and became VSDG 3.1; SDG 8.6 and 8.b were merged into VSDG 8.6 etc.

Comparison of Number of Targets in UN's and Vietnam's Agendas 2030

↘ Table 1-2

SDGs/VSDGs(*)		SDGs/ targets	VSDGs/ targets
Goal 1	End poverty in all its forms everywhere	7	4
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture	8	5
Goal 3	Ensure healthy life and promote well-being for all at all ages	13	9
Goal 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	10	8
Goal 5	Achieve gender equality and empower all women and girls	9	8
Goal 6	Ensure availability and sustainable management of water and sanitation for all	8	6
Goal 7	Ensure access to affordable, reliable, sustainable energy for all	5	4
Goal 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	12	10
Goal 9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	8	5
(Goal 10)	Reduce inequality within the society (originally, "Reduce inequality within and among countries")	11	6
(Goal 11)	Develop sustainable and resilient cities and rural areas; ensure safe and resilient working and living areas; maintain relevant regional allocation of population and labor (originally: "Make cities and human settlements inclusive, safe, resilient and sustainable").	10	10
Goal 12	Ensure sustainable consumption and production patterns	11	9
(Goal 13)	Take urgent action to combat climate change and natural disasters (originally: "Take urgent action to combat climate change and its impacts")	5	3
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	10	6
(Goal 15)	Protect and sustainably develop forests, conserve biodiversity, develop ecosystem services, combat desertification, and halt and reverse land degradation (originally: "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss")	12	9
(Goal 16)	Promote peaceful, democratic, equitable and inclusive society for sustainable development; provide access to justice for all and build effective, accountable and inclusive institutions at all levels (originally: "Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels")	12	9
Goal 17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	19	5
	Total	169	115

Note: (*) The goals in parentheses imply that there are some words or content changes or adjustments compared with the original UN SDGs.

Source: Summarized from UN SDGs and Decision No. 622.

2. National Action Plan for Implementing 2030 Agenda for Sustainable Development and VSDGs on Environmental Sustainability

The Prime Minister's Decision No. 622 mentioned above clearly stated the overall objective of Vietnam's development path in the next fifteen years, which is "to maintain sustainable growth coupled with implementing social progress, equity and ecological environmental protection; be proactive in climate change adaptation; ensure every individual fully develops his or her potentials, participates in and benefits from development achievements; build a prosperous, peaceful, inclusive, equitable and sustainable Vietnam"[16]. This objective clearly illustrates the main contents of the development objectives in Agenda 21 of Vietnam, the Socio-Economic Development Strategy (SEDS) for the period 2011-2020 as well as the key principles of UN Agenda 2030. In other words, Decision No. 622 implies that Vietnam has fully integrated UN Agenda 2030 and the SDGs into the national agenda[17].

As illustrated in Table 1-2, seven of the total 17 general VSDGs directly relate to environmental sustainability, namely goals 6, 7, 11, 12, 13, 14 and 15. Also, 47 out of 115 VSDGs/targets of the above seven general VSDGs (accounting for more than 40% of total detailed VSDGs) are those related to environmental sustainability. The following discussion of this section will elaborate which specific targets included in each general VSDG are related to environmental sustainability.

Goal 6: Ensure availability and sustainable management of water and sanitation for all. Compared with the eight targets of UN's SDG 6, VSDG 6 comprises only six targets asfollows:

- Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all;
- Target 6.2: By 2030, achieve access to equitable sanitation and hygiene for all, paying special attention to the needs of women and girls, people with disabilities and those in vulnerable situations, end open defecation, and install hygienic toilets in 100% of households;
- Target 6.3: By 2030, improve water quality, control the sources of pollution; end the use of hazardous chemicals in industry, agriculture and aquaculture which cause pollution ofwater resources and degradation of biodiversity; treat 100% of hazardous wastewater, halve the proportion of untreated wastewater in urban areas, and increase safe reuse of water;
- Target 6.4: By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable supply of freshwater to address water scarcity, and substantially reduce the number of people suffering from water scarcity. Ensure that water withdrawal does not exceed the withdrawal thresholds of riversor exceed the exploitable reserves of different water layers;
- Target 6.5: By 2030, implement integrated water resources management by river basin, including transboundary water resources through international cooperation;
- Target 6.6: By 2030, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

16. See for more details at: http://www.chinhphu.vn/portal/page/portal/chinhphu/hethongvanban?class_id=2&mode=detail&document_id=189713
17. In fact, the objective, 17 general VSDGs and 115 targets (detailed VSDGs) addressed in the National Action Plan for implementing UN Agenda 2030 and VSDGs in Vietnam under the Prime Minister's Decision No. 622 clearly demonstrate the five P's principles (i.e. People, Planet, Prosperity, Peace and Partnership), the "inclusiveness" and "multi-dimensions" factors of development approaches in UN Agenda 2030;

Goal 7: Ensure access to affordable, reliable and sustainable energy for all

- Target 7.1: By 2020, almost 100% of households will have access to power; by 2025 that proportion will reach 100%, and universal access to affordable, reliable, and modern energy services will be ensured by 2030;
- Target 7.2: By 2030, increase substantially the share of renewable energy in the preliminary energy consumption of the country, the proportion will reach 31% by 2020 and 32.3% by 2030;
- Target 7.3: By 2030, double the rate of improvement in energy efficiency. Reduce electricity consumption by 10% compared to the basic scenario; and
- Target 7.4: By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all, particularly for less developed areas, remote and mountainous areas or islands.

Goal 11: Develop sustainable and resilient cities and rural areas; ensure safe and resilient working and living areas; maintain relevant regional allocation of population and labor.

- Target 11.1: By 2030, ensure access to adequate, safe and affordable housing and basic services for all and upgrade slums;
- Target 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improve road safety, notably by expanding public transport, with special attention to the needs of women, children, persons with disabilities and older people;
- Target 11.3: By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management;
- Target 11.4: Strengthen efforts to protect and safeguard the world's cultural and natural heritage;
- Target 11.5: By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to gross domestic product caused by disasters, with a focus on protecting the poor and people in vulnerable situations;
- Target 11.6: Reduce the adversely environmental impacts on people in urban areas, enhance management of air quality, and municipal and other waste sources;
- Target 11.7: By 2030, provide universal access to safe, inclusive and accessible green and public spaces for all, in particular for women and children, persons with disabilities and older people;
- Target 11.8: Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning;
- Target 11.9: By 2030, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation of and adaptation to climate change and resilience to disasters; and
- Target 11.10: Sustainably develop rural areas, ensure the harmony among economic development, urbanization and inclusion; protect ecological environment; build technical infrastructure and improve the quality of life of rural people in the aspects of economy, culture, society, environment and democracy.

Goal 12: Ensure sustainable consumption and production patterns

- Target 12.1: Implement the Ten-Year Framework of Programs on Sustainable Consumption and Production Patterns according to international commitments;
- Target 12.2: By 2030, achieve the sustainable management and efficient use of natural resources; achieve rational exploitation and economical and sustainable use of mineral resources;
- Target 12.3: By 2030, halve per capita food waste and reduce food losses along production and supply chains, including post-harvest losses;
- Target 12.4: By 2020, achieve environmentally sound management of chemicals and wastes throughout their life cycle, in accordance with agreed international frameworks, with the aim to reduce air, water and soil pollution and adverse impacts on human health and the environment;
- Target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse;
- Target 12.6: Encourage companies to apply sustainable practices, including cleaner production technology, efficient use of natural resources and environmental protection; implement social responsibility for the poor and disadvantaged people and integrate sustainability information into their periodic reports;
- Target 12.7: Promote public procurement practices that are sustainable;
- Target 12.8: By 2030, ensure that people everywhere have the relevant information and awareness of sustainable development and lifestyles in harmony with nature; and
- Target 12.9: Rationalize taxes; reduce and eliminate fossil fuel subsidies; introduce relevant policies to reduce potentially negative impacts in a manner that protects the poor and vulnerable people and the affected communities.

Goal 13: Take timely and efficient action to combat climate change and natural disasters.

- Target 13.1: Strengthen resilience and adaptation to climate change-related hazards and response to other natural hazards and disasters;
- Target 12.2: Integrate climate change measures into policies, strategies, master plans, and development planning; and
- Target 12.3: Conduct education, awareness-raising, capacity building and institutional development in early warning of, and response to, climate change and mitigation of disaster risks.

Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

- Target 14.1: By 2030, prevent and significantly reduce and control marine pollution of all kinds, in particular from land-based activities, with special attention to solid waste, wastewater and organic pollution;
- Target 14.2: By 2030, enhance management and protection of marine and coastal and island ecosystems to avoid significant adverse impacts, strengthen the ocean's health and resilience;
- Target 14.3: Minimize and handle the impacts of ocean acidification, put priorities on enhancing scientific cooperation at all levels in the context of climate change;
- Target 14.4: By 2020, effectively regulate harvesting, and end overfishing, illegal, unreported and unregulated (IUU) fishing and destructive fishing practices and implement science-based management plans, to restore fish stocks in the shortest time feasible at least to levels that can produce maximum sustainable yield as determined by their biological characteristics;
- Target 14.5: By 2030, conserve at least three to five percent of coastal and marine areas, based on science and consistently with national and international laws; and
- Target 14.6: By 2030, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, and eliminate subsidies that contribute to IUU fishing, support the WTO fisheries subsidies negotiation.

Goal 15: Protect and sustainably develop forests, conserve biodiversity, develop ecosystem services, combat desertification, and halt and reverse land degradation.

- Target 15.1: By 2030, ensure conservation, restoration and sustainable use of important terrestrial and wetland freshwater ecosystems and their services, in particular forests, dry land ecosystems in line with international obligations;
- Target 15.2: By 2020, end the conversion of forestry land use to other land use purposes; By 2030, strengthen sustainable management of different types of forest, stop deforestation, recover degraded forests, foster plantation and regenerate forests, and increase the forest coverage area to about 50% nationwide;
- Target 15.3: By 2020, combat desertification, and restore degraded land and soil, including land affected by desertification, drought and floods, and other causes;

- Target 15.4: By 2030 ensure the conservation of forest ecosystems which are important at national or international level, including their biodiversity and ecosystem services which are essential for sustainable development;
- Target 15.5: By 2030, take urgent and significant action to reduce and ultimately end degradation of natural habitat of ecosystems, protect and prevent the extinction of endangered species;
- Target 15.6: Ensure fair and equitable sharing of the benefits arising from the utilization of genetic resources, and promote appropriate access to genetic resources;
- Target 15.7: Stop and address poaching, trafficking and illegal consumption of species of flora and fauna at the edge of extinction, and their products; and
- Target 15.8: By 2020, undertake effective measures to prevent and control invasive species that disrupt land and water ecosystems.

3. Stakeholders in Implementing VSDGs on Environmental Sustainability

The National Action Plan for Implementing UN's Agenda 2030 and VSDGs in Vietnam under the Prime Minister's Decision No. 622 as mentioned above requires a broad range of stakeholders for implementation, because the action plan is very comprehensive and captures the broadest aspects of sustainable development. This section will address first, the main parties responsible for overall implementation of the National Action Plan; and second, the leading and coordinating parties responsible for implementing specific targets/ VSDGs related to environmental sustainability.

Stakeholders for Overall Implementation of the National Action Plan and VSDGs

According to Decision No. 622, one of the most critical approaches to ensuring the implementation of the National Action Plan is the responsibilities of the people and organizations of the society. Particularly, key stakeholders responsible for overall implementation of Decision No. 622 include the National Council for Sustainable Development and Competitiveness, the Ministry of Planning and Investment, the Ministry of Finance, the Provincial People Committees, the media and social organizations. The parties and their responsibilities in overall implementation of the National Action Plan are highlighted in Table 1-3.

The Main Parties Responsible for Overall Implementation of the National Action Plan and VSDGs in Vietnam

↘ Table 1-3

ORGANIZATIONS	TASKS
Government/ Prime Minister – National Council for Sustainable Development and Competitiveness Enhancement	- Recommend and consult the Government and the Prime Minister in overseeing and executing the National Action Plan's implementation.
Ministry of Planning and Investment (MPI)	- Mainstream VSDGs in the national social economic development strategy (SEDS), five-year and annual national social economic development plans. - Formulate and submit to the Prime Minister for approval Vietnam's sustainable development indicators and roadmap for achieving VSDGs. - Formulate a statistical system of sustainable development indicators and create a database. - Conduct monitoring and evaluation (M&E) work at national level; prepare reports and review the VSDGs progress and funding. - Formulate a plan for mobilizing domestic and foreign funding for implementing VSDGs. - Study the establishment of the Fund for sustainable development support.
Ministry of Finance	- Ensure adequate state budget for implementing the Action Plan. - Formulate policies to promote the economic and private sector's participation in action plan implementation.
Ministry of Information and Communication (MOIC); Ministry of Education and Training (MOET) Vietnam's Television Stations Voice of Vietnam	- Conduct necessary propaganda to raise awareness of sustainable development as well as participate in M&E on VSDGs performance.
Line Ministries Local governments	- Prepare and approve sectoral or local action plans; be proactive in their implementation and coordinate with other stakeholders in accordance with the tasks assigned to them. - Mainstream VSDGs in the sectoral and local government strategies, plans and policies. - Coordinate with MPI in formulating a set of statistical indicators for assessing sustainable development. - Organize awareness raising activities for government officers and staff on sustainable development and the Action Plan. - Organize M&E work in implementing the assigned VSDGs as the lead or collaborating agencies
Vietnam Fatherland Social-political and socio-professional organizations/ associations NGOs Business community	- Be proactive in participating in the implementation of the Action Plan and VSDGs within their own responsibilities and mandates. - Participate in preparing reports on VSDGs performance.

Source: Extracted from Decision No. 622.

Apart from the stakeholders mentioned in Table 1-3, the specific parties responsible as the lead organization in implementing each detailed target (VSDG) and measures related to environmental sustainability are also indicated in the National Action Plan which is summarized in Table 1-4.

Lead Stakeholders for Implementing VSDGs Related to Environmental Sustainability

↘ Table 1-4

Responsible organization	Lead the Implementation of Specific VSDGs (Targets) such as:
Ministry of Construction (MOC)	6.1.a, 6.2, 6.3.a, 11.1, 11.3, 11.6, 11.7, 11.9, 12.5.b, 13.1.b, 13.2.c;
Ministry of Agriculture and Rural Development (MARD)	6.1.b, 11.5, 11.10, 12.3.a, 13.3.c, 14.2, 14.4, 14.5, 14.6, 15.2, 15.3, 15.4, 15.7
Ministry of Natural Resource and Environment (MONRE)	6.1.d, 6.3.b, 6.5, 6.6, 12.2.a, 12.4.b, 12.5.a, 13.1.a, 13.3.a, 14.1, 14.3, 15.1, 15.5, 15.6, 15.8;
Ministry of Industry and Trade (MOIT)	7.1, 7.2, 7.3, 7.4, 12.1, 12.2.b, 12.3.b, 12.4.a
Ministry of Planning and Investment (MPI)	11.8, 12.7.b, 13.2.a
Ministry of Finance (MOF)	6.1.c, 6.3.c, 12.7.a, 12.9
Ministry of Transport (MOT)	11.2, 13.2.b
Ministry of Education and Training (MOET)	13.3.b
Ministry of Information and Communication (MOIC)	12.8
Ministry of Culture, Sports and Tourism (MCS&T)	11.4
Vietnam Chamber of Commerce and Industry (VCCI)	12.6

Source: Extracted from Decision No. 622.

It is clear from table 1-4 that among the eleven agencies being assigned as the lead organizations in implementing VSDGs related to environmental sustainability, the most important ones are MONRE, MARD, MOC and MOIT. It is important to note that they are not only assigned as lead organizations in implementing VSDGs as demonstrated in table 1-4, they are also the collaborative organizations in implementing other VSDGs related to environmental sustainability. In other words, one ministry can be the lead in implementing one VSDG, but they can also be a collaborative party in other VSDGs according to Decision No. 622.In addition, this Decision also indicates a broad range of other related parties such as other ministries, provincial People's Committees, business sector, media, social organizations,associationsandthe Fatherland who are assigned to be the collaborative agencies in implementing almost all VSDGs related to environmental sustainability[18].

18. See more details in the Annex of the Decision No. 622 at: https://thuvienphapluat.vn/van-ban/Thuong-mai/Quyet-dinh-622-QD-TTg-2017-Ke-hoach-hanh-dong-quoc-gia-thuc-hien-Chuong-trinh-nghi-su-2030-348831.aspx

4. Challenges in Implementing VSDGs for Environmental Sustainability

Discussion in sections 2 and 3 above indicates that Vietnam's National Action Plan for implementing Agenda 2030 and VSDGs of Vietnam is a comprehensive program capturing a broad range of sustainable development aspects. It provides the development and policy directions for the country for the next fifteen years and beyond. The Action Plan has expressed the strong Vietnamese government's political will and commitment in implementing Agenda 2030 and transforming it into national actions. It is important to make clear that VSDGs related to environmental sustainability in this Action Plan as discussed in section 2 are not entirely new. They are the continuation of the current ongoing strategies, plans, programs and policies on environmental protection, climate change and natural resources management. In addition, the VSDGs related to environmental sustainability also provided the updates of the related policy directions and goals up to the year 2030. The promulgation of the Action Plan under the Prime Minister's Decision No. 622 is seen as the crucial initial step and it will serve as a legal foundation to call for the actions from all stakeholders in the society as well as for the support from the international community along its implementation process in the coming years.

However, the journey to implementing the Action Plan will not be easy. A lot of challenges are expected ahead, including:

First, mainstreaming VSDGs in the national and local socio-economic development strategies, plans and programs is crucial. Although the national Action Plan already indicated the responsibilities of specific government agencies at both central and local levels in implementing the VSDGs related to environmental sustainability (as mentioned in section 3), it is important to ensure that these VSDGs are reflected in their operational agendas and annual work plans. Recognizing this importance, the Action Plan requires "the related parties to mainstream the targets and goals under their responsibilities into their development strategies, plans, programs and policies". It is expected that the related VSDGs indicators will be integrated into the national, local and sectoral strategies, plans, programs and policies in the coming years, especially for the period 2021-2030.

Second, it is important to ensure the enforcement of the Action Plan and participation of all related parties in the society throughout the implementation process. This is not easy since each VSDG related to environmental sustainability relates to several parties and organizations which require effective coordination and collaboration among them. While the Action Plan clearly indicates the lead and collaborative organizations in implementing each VSDG, all parties should be proactive in participating. In this regard, the related parties should be encouraged to initiate new ideas in working together and actively getting involved in the activities related to their assigned responsibilities.

Third, as indicated in a study by Friedrich Ebert Stiftung published in 2016[19], weak financial flows and weak financing capacity were the major constraints for many countries in achieving the MDGs in the past and similarly these will hinder successful achievement of the SDGs in the coming years. In the case of Vietnam, insufficient financial resources would

19. See in details in "Moving forwards with SDGs: Implementation challenges for developing countries", by FES in July 2016 at http://library.fes.de/pdf-files/iez/12673.pdf

also be an important challenge for successful implementation of the VSDGs. Vietnam successfully mobilized significant amounts of official development aid (ODA) for implementing the MDGs, but the ODA flow to Vietnam for VSDGs implementation will not be the same as before, since the country has become a low- to middle-income economy. To procure the financial resources for implementing the VSDGs, Vietnam will have to rely on domestic and other sources, including government budget, business community (both domestic and foreign) and social contributions. In addition, the Action Plan indicates a government initiative in creating a Sustainable Development Support Fund. However, from past experiences, we should not expect too much from this financial mechanism since such a fund will not serve as a significant means of funding VSDGs.

Fourth is about data-related issues and capacity of national statistical agencies. Data availability and accessibility are critical for ensuring transparency and accountability for monitoring and tracking the progress of VSDGs implementation in the coming years. In Vietnam, available information and data related to VSDGs in general is very limited. According to a recent study by the General Statistical Office of Vietnam (GSO, 2016)[20], the information of only 124 out of 230 SDGs indicators can be found or collected[21]. Among those, data of only 89 indicators are available, of which only 13 are publicly accessible in GSO's Annual Statistical Year Book. Data of the remaining 76 indicators, particularly those that require data disaggregation can only be obtained through further calculation or extraction from several national survey data sets which are not publicly accessible. More importantly, data available for VSDGs related to environmental sustainability are even more limited. Table 1-5 illustrates that data of only 14 out of 67 global SDGs indicators related to environmental sustainability (accounting for 20.8%) are available and can be found in Vietnam's national statistical system.

20. See more details in the report "Mapping the relevance of global SDGs indicators for Vietnam". General Statistical Office. July 2016.
21. Note that the number of SDGs indicators was reported to be 230 as of April 2016. The latest list of global SDGs indicators comprises of 232 indicators instead of 230 as mentioned in the text.

Data and Information on SDGs Indicators Availability Related to Environmental Sustainability

↘ Table 1-5

General SDGs/VSDGs related to environmental sustainability		Number of global SDGs indicators suggested	Number of global SDGs indicators which have data in Vietnam
Goal 6	Ensure availability and sustainable management of water and sanitation for all	11	2
Goal 7	Ensure access to affordable, reliable, sustainable energy for all	6	2
Goal 11	Develop sustainable, resilient cities and rural areas; ensure safe, resilient working and living areas; maintain relevant regional allocation of population and labor	13	1
Goal 12	Ensure sustainable consumption and production patterns	11	1
Goal 13	Take urgent action to combat climate change and natural disasters	4	0
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	10	3
Goal 15	Protect and sustainably develop forests, conserve biodiversity, develop ecosystem services, combat desertification, and halt and reverse land degradation	12	5
	Total	67	14

Source: Calculated from the Review Table on Relevance of Global SDGs Indicators for Vietnam, GSO, 2016

Currently, GSO is preparing the drafted list of sustainable development indicators which would be used to monitor and report the VSDGs implementation. The proposed list was based on the list of 232 SDG indicators made by the Inter-agency and Expert Group on SDG Indicators (IAEG-SDG). A total of 176 indicators were proposed by GSO, among those only 79 indicators are considered to be applicable in the context of current data availability. It is expected that a list of VSDGs indicators and the road map for VSDGs implementation will be formed and approved by the Government in 2018.

References

Friedrich Ebert Stiftung, FES. (2016). Moving forwards with SDGs: Implementation challenges for developing countries.

Government of Vietnam (2015). National Report on Fifteen Years of Achievements in Implementing MDGs in Vietnam. MPI

General Statistical Office (2016). Mapping the Relevance of Global SDGs Indicators for Vietnam. Un-official publication. July 2016.

Ministry of Planning and Investment, MPI (2015). Report on Progress of 10 years implementing Agenda 21 in Vietnam. Vietnam Office for Sustainable Development

Vu Xuan Nguyet Hong, Dang Thi Thu Hoai (2015). Scoping Study on Integration of Poverty and Sustainability into National Development Planning: Vietnam Country Report. UNDP Hanoi.

II

Climate Action

2.
Integration of Climate Change into Socio-economic Development Planning and Plans in Vietnam: Issues and Challenges

3.
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Integration of Climate Change into Socio-economic Development Planning and Plans in Vietnam: Issues and Challenges

1. Introduction

According to the World Bank (2007), Vietnam is one of the countries most seriously affected by climate change (CC) and sea level rise (SLR). If sea level rises by one meter, approximately 10% of the population will be directly affected, with the loss of about 10% in GDP. If sea level rises by five meters, the affected percentage of population and GDP loss would both reach 35%[4)]. CC has exacerbated disasters and extreme weather events, such as: floods, storms and droughts in either frequency or scale, or unpredictably repeated, and also caused huge damages to people, property, infrastructure, education, health and the living environment[5)]. The consequences of CC and disasters in Vietnam are serious and are viewed as additional challenges to the achievement of poverty reduction as well as the implementation of the MDGs and sustainable development goals (SDGs).

In recent years, the Vietnamese government has devised many policies in response to CC. One of the requirements is first to mainstream CC into development strategies, planning of industries, sectors and regions. The integration of CC policies and measurement into socio-economic development strategies and plans will ensure the stability of investment activities aiming to reduce the CC associated vulnerability of sectors. However, reflecting CC into strategies, planning and plans in Vietnam is at the initial phase.

2. Status of integrating CC associated solutions into socio-economic development planning and other plans in Vietnam

Government policies and guidelines

The regulation of mainstreaming CC into planning and plans is explicitly mentioned in Resolution No.24/NQ-TU dated 3 June, 2013 about how to actively respond to CC and strengthen the management of natural resources and environmental protection of the Central Committee of the Communist Party of Vietnam. The objective of the Resolution is to reflect CC and natural resources into socio-economic development planning by: (i) implementing functional zoning based on ecological characteristics, potential resources and adaptation to CC as a basis for development planning; (ii) marine space planning associated with land development

1. Institute of Human Geography, Vietnam Academy of Social Sciences
2. Institute of Human Geography, Vietnam Academy of Social Sciences
3. Institute of Human Geography, Vietnam Academy of Social Sciences
4. Dasgupta Susmita, Benoit Laplante, Craig Meisner, David Wheeler, and Jianping Yan, 2007. The Impact of Sea Level Rise on Developing Countries: A Comparative Analysis. World Bank Policy Research, Working Paper 4136, February 2007
5. IMHEN and UNDP (2015), Viet Nam special report on managing the risks of extreme events and disasters to advance climate change adaptation, Viet Nam Publishing House of Natural Resources, Environment and Cartography.

space; (iii) integrating CC adaptation goals, resources management and environmental protection into industries, sectors and socio-economic development planning, national defense and local security, and (iv) reviewing, supplementing and adjusting the strategies and planning of industries and sectors as well as local socio-economic development according to sea level rise scenarios.

In order to develop the action program for implementing Resolution No.24/NQ-TU, the Government of Vietnam promulgated Resolution No.08/NQ-CP dated 23 January, 2014 which emphasizes mainstreaming CC, resources management and environmental protection into strategies, socio-economic development planning, strategies, industrial and sectoral development planning.

* The Law on Natural Disaster Prevention (2014) has defined the basic principle of natural disaster prevention as "integrating natural disaster prevention in socio-economic development planning, plans of nation, sites and industrial development planning and plans". In order to implement that principle, Article 16 of the Law proposes specific processes of integrating natural disaster prevention into sectoral and socio-economic development planning as well as plans, including the following steps:

(i) National and local socio-economic development planning, plans and industrial planning as well as other plans must specify natural disaster prevention measures which are compatible with the natural disaster characteristics of each site and area to ensure sustainable development.

(ii) Based on the evaluation results and disaster risk assessment, the integrated contents must:

- Identify measures to prevent and mitigate the impacts of natural disaster in socio-economic development processes;
- Identify and implement measures to minimize the negative impacts on the environment and the growing risks of natural disasters;
- Identify measures to build the infrastructure system by taking natural disaster prevention into account; and
- Identify available resources to integrate disaster prevention.

(iii) The responsibility of integrating natural disaster prevention into sectoral and local socio-economic planning and plans is defined as follows:

- The People's Committees at all levels are responsible for integrating natural disaster prevention into local socio-economic development plans;
- The ministries as well as ministerial-level agencies are responsible for integrating natural disaster preparedness into sectoral development planning; and
- The Ministry of Planning and Investment is responsible for advising and assisting the government in integrating natural disaster preparedness into national socio-economic development planning and plans.

(iv) The Ministry of Planning and Investment presides over and coordinates with other ministries and ministerial-level agencies in guiding the integration of natural disaster prevention in industrial and socio-economic development planning and plans.

* The Law on Environmental Protection (2015) specifies integrating CC responses into socio-economic development strategies, planning and plans in Article 40, Chapter IV. In particular, it emphasizes that: (i) response to CC must be reflected in socio-economic strategies, planning and plans as well as sectoral development planning; and (ii) integration of CC response into socio-economic strategies, planning and plans must be based on the assessment of the interaction between human activities within strategies, planning, plans and environment as well as CC and the development of resolutions for environmental protection and response to CC.

* The National Target Program to respond to CC was approved by the Prime Minister on 2 December, 2008 in Decision No.158/2008/QD-TTg on integrating CC into development policies. It clearly states that the tasks of responding to CC must be reflected in development strategies, programs, planning and plans of all industries and localities. It must be institutionalized by legal normative documents and thoroughly implemented. On that basis, the specific tasks that were identified are: (i) consider the potential impacts and the solutions to respond to CC during the development as well as reviewing and revision of socio-economic development plans and development strategies of all sectors and regions or localities, in which criteria and indicators for each phase should be clearly stated; (ii) by 2010, the assessment on the impacts of CC and sea level rise on all development plans must be completed so that the summary and classification of responding solutions could be defined for each development strategy before the regulations and official guideline documents are developed and promulgated to guide the integration of CC into plans; (iii) implement the integration of CC into strategies and plans as regulated; and (iv) by 2015, complete the integration of CC issues into development plans for the period 2010-2020, assess the result of integrating CC into development plans for the period of 2010-2015, and integrate CC issues into development plans for the coming periods in a comprehensive and effective manner.

In order to provide financial support and institutional capacity building to implement the National Target Program to respond to CC, the Government signed a cooperative agreement in 2009 with the governments of Japan and France on the Supportive Program to Respond to CC. The Supportive Program is implemented according to identified phases with a focus on the enactment and implementation of the annual political matrix to respond to CC. The matrices embody commitment to (i) develop and regulate legal documents and policies by Vietnam's government on an annual basis; and (ii) design the detailed plans to integrate CC response measures into socio-economic plans as well as ministries, industries and local plans.

* The National Strategy on CC, approved by the Prime Minister on 5 December, 2011 in Decision No.2139/2011/QD-TTg, identified very specific tasks for each stakeholder. In particular, it stresses the key role of the State in responding to CC, particularly in integrating CC response into strategies, planning and plans of the government, ministries/sectors and sites as follows:

(i) Review and adjust socio-economic development strategies, planning and plans of ministries, sectors and localities based on scientific, cost-effective analysis as well as uncertainties and risks associated with CC and sea level rise. By 2015, promulgate socio-economic development strategies

and plans of ministries, industries, and localities after careful review and adjustment.

(ii) Integrate CC measures into socio-economic development planning and plans of regions and localities; review, revise and complete the designing of projects and technical standards and regulations applied to infrastructure based on CC scenarios. Implement step by step so as to develop all economic zones by taking sustainability and safety into account by 2030.

* The Support Program to Respond to CC was approved on 8 October, 2014 in Decision No.1824/QD-TTg on approving the revised documents of the Assistance Framework Program to Respond to CC, which emphasizes the integration of CC mitigating activities such as reducing greenhouse gas (GHG) emissions in accordance with national conditions. On the basis of the National Strategy on CC, the National Strategy on Green Growth and the annual development priorities at national, sectoral and local levels, each ministry and sector will propose a list of strategies, policies, planning and plans (referred to as political actions) related to CC response and submit it to the Ministry of Natural Resources and Environment so as to reflect it in the general political framework.

Meanwhile, after the Paris Agreement was discussed and approved at the 21st Conference of the Parties (COP21) in December 2014, Vietnam also joined the signing of the Paris Agreement with 170 countries on 22 April, 2016 at the United Nations headquarters. In order to fulfill the commitments identified in the Agreement, the Vietnamese government has issued several CC related policies which later on were integrated into other sector policies such as agriculture, forestry, water resources and energy.

Practical cases

Ministerial levels:

* Ministry of Natural Resources and Environment: The Ministry of Natural Resources and Environment issued Circular No. 29/2014/TT-BTNMT dated 6 June, 2014 on "Detailed regulations on formulating and adjusting land use planning and plans" (Article 10) which instructs the development of land use planning and plans at all levels through analysis and assessment of the impacts of CC on land use in two specific areas: (i) sea level rise and saltwater intrusion and (ii) desertification, erosion and landslides.

Next, the Ministry of Natural Resources and Environment issued Decision No. 1289/QD-BTNMT dated 14 August, 2016 on "Issuing the process of integrating CC into strategies, planning and plans of natural resources industry." The process consists of five steps with thirteen activities, which are implemented in parallel and integrated with the steps of designing strategies and plans.

- Step 1: Prepare for integration, which consists of three activities: (1) establishing an Integrated Implementation Team; (2) arranging necessary resources for the implementation process; and (3) analyzing and assessing strategies, planning and plans in the context of CC impacts.

- Step 2: Identify the relationship between CC and strategies, planning and plans, which includes the following activities: (4) identifying the impacts of CC on natural resources and environment; and (5) identifying the impacts of the strategies, planning and plans on CC adaptation capacity.
- Step 3: Select the responses to be implemented: (6) selecting adaptation measures; and (7) selecting mitigation measures.
- Step 4: Integrate the selected responses to CC including: (8) integrating CC into views and objectives; (9) integrating CC into contents and tasks; (10) integrating CC into the solutions and implementations of the strategies, planning and plans; and (11) stakeholder consultation. What must precede this step is reviewing and integrating the response (mitigation and adaptation) solutions into all parts of strategies, planning and plans (from the viewpoints, objectives, contents of the draft documents of the strategies, planning and plans to implementation phrases). This integration process is carried out with the broad participation and consultation of all stakeholders.
- Step 5: Monitor and assess the implementation of CC response solutions, including: (12) monitoring and evaluating the implementation of solutions which were integrated into the strategies, planning and plans; (13) proposing and recommending editing. It is also necessary to monitor and evaluate the implementation of solutions to respond to CC in the strategies, planning and plans and identify the achievements, constraints, weaknesses and causes so that the recommendations for adjusting the strategies, planning, plans or support to integrate CC into the next stages could be drawn effectively.

* Ministry of Planning and Investment: In order to contribute to laying the legal foundation for integrating CC into socio-economic development plans at all levels, the Ministry of Planning and Investment issued Decision No. 1485 / QD-BKHDT dated on 17 October, 2013 on "The Introduction Guiding Framework to Choose Priorities for CC Adaptation in Developing Socio-economic Development Plans." This is a supportive tool that strengthens the capacity of planning officers and policy makers on CC response in ministries, industries and local communities. The Guiding Framework stated clearly the prioritized process for investment in CC response, including four steps of: (1) defining priority targets, (2) screening the activities and projects according to emergency characteristics, (3) grading the screened activities and projects based on identified various criteria, and (4) arranging a prioritized list based on ranking to create a foundation for the decision-making process. At the same time, the guideline documents how to integrate the prioritization process into the current socio-economic development planning process including detailed guidance with illustrative examples of each step on how to apply the guiding process in choosing the top priority activities for climate change adaptation in investments and development projects. The guiding framework was designed based on international experience as well as the realities of Vietnam with a focus on the key sectors' activities and projects. Although this guiding framework aims to institutionalize the CC adaptation priorities at the strategic level by integrating them into the socio-economic development planning processes, it falls short of being the best practice guideline. For example, the guiding framework only prioritizes objectives individually without giving a priority

category across the tasks for a strategy or a multi-objective program. The decision on prioritized activities which are synthetic and cross-cutting of a multi-objective program should be coordinated with existing criteria. Therefore, the application of the guideline needs to be improved and activities that are in line with the reality must be added during the priority setting processes.

In order to integrate natural disaster preparedness and prevention into socio-economic and industrial development plans, the Ministry of Planning and Investment promulgated Circular No.05/2016TT-BKHDT dated 6 June, 2016, which went into effect on 20 July, 2016. The Circular specified that the implementation process consists of five steps: (1) review and evaluate how natural disaster prevention was carried out as part of the planning and plans of the previous period; (2) analyze the realities and status of vulnerable people based on their future economic, social and environmental conditions; (3) identify the causes, both objective and subjective, of damage in each sector (economic, social and environmental); (4) identify disaster prevention solutions based on prioritized frequent disasters; and (5) monitor and evaluate the implementation of integration.

* Ministry of Agriculture and Rural Development: To further promote activities to mitigate and adapt to CC, the Ministry of Agriculture and Rural Development issued Directive No. 809 / CT-BNN-KHCN dated 28 March, 2011 on "Integrating CC into Constructing and Implementing the Strategies, Plans, Programs and Projects for Agricultural and Rural Development in the Period of 2011-2015" which articulates integrating CC into the development, approval and organizational processes to implement the strategies, planning and plans for the agricultural sector under the guideline of actively participating in reducing GHG emissions and responding to CC. The integration must be based on the following principles: (1) ensure sustainable socio-economic development of systems, sectors and regions that contribute to CC adaptation and mitigation; (2) focus on meeting both long- and short-term tasks and requirements while concentrating on multi-objective activities; and (3) ensure maximum mobilization and effective use of all resources from individuals and organizations at home and abroad.

The integration of CC is carried out in the following steps:

- Evaluate the impacts of climate change and identify the vulnerability of domains, regions and areas;
- Update the information and data and identify what should be added to CC integration;
- Analyze and select the acceptable levels of risk for domains and regions;
- Select the mitigation and adaptation solutions;
- Implement and adjust the response solutions in a timely manner; and
- Summarize and evaluate the implementation results.

* Ministry of Industry and Trade: It is important to carry out activities to respond to CC in the energy sector because it is the largest economic sector contributing to GHG emissions (accounting for 66.8%)[6]. Therefore, to reduce GHG emissions, integrating CC issues has been incorporated into agreed policies, programs and plans with the task of reducing emissions, as follows:

Integrating reduction of greenhouse gas emissions in energy sector's strategies and planning

↘ Table 2-1

Documents	By 2020	By 2030	By 2050
National Green Growth Strategy	- Increase the rate of renewable electricity to 4.5%	- Increase the rate of renewable electricity to 6%	- Renewable energy 11%
National electricity planning in the period 2011-2020 with a vision to 2030	- Reduce electrical elasticity to 1.5 by 2015 and 1 by 2020; · Wind power: 0.7%; · Biomass power: 0.6%; · Hydropower: double by 2020; and · Nuclear: 1.5%	- Reduction of electric elasticity to <1; · Wind power: 2.4%; · Biomass power: 1.1%; and · Nuclear: 10-11%;	- 100% of industrial production units to apply cleaner production processes;
National energy development strategy	- Renewable energy: 5%; - 50% of industrial production units to apply cleaner production processes; and - 8-13% of raw materials, fuel and energy consumption are saved	- Reduce CO_2 emissions per unit of GDP by 35-45% compared to 2010; and - Reduce GHG emissions by 2-3% (2020-2030).	- Use market tools to improve energy efficiency.
National Program on Energy Efficiency Saving	- Save 5-8% of total energy consumption in the period of 2011-2015; - Reduce CO_2 emissions per unit of GDP by 10-15% compared to 2010; - Reduce CO_2 emissions in the energy sector by 10-20%; and - Use market tools to improve energy efficiency and to change market-based pricing mechanisms, waste fee, carbon taxes, support renewable energy and reduce fossil fuel subsidies.	- Change the energy market structure in transport and industry (by using renewable energy).	- Change the energy market structure in transport and industry (by using renewable energy).
Decision No.2068/ QD-TTg on approving Vietnam's Renewable Energy Development Strategy up to 2030, with a vision to 2050	- Develop and use renewable energy sources that contribute to the achievement of sustainable environmental objectives and the development of a green economy; and - Reduce GHG emissions in energy activities compared to business as usual by about 5% by 2020.	- Reduce about 40 million tons of coal and 3.7 million tons of oil products by 2030; and - Reduce GHG emissions by about 25% by 2030 and by about 45% by 2050.	- Reduce GHG emissions by about 45% by 2050; - Contribute to reducing fuel imported for energy purposes: and - Reduce about 150 million tons of coal and 10.5 million tons of oil products by 2050.

Source: Authors' compilation, 2017

6. Vietnam's Second National Communication (2010) under the United Nations's Framework Convention on Climate Change.

Local levels

To implement the National Target Program to respond to CC, provinces and cities have actively implemented several activities which are appropriate for the local context, such as: (1) promptly assessing the impact of CC on sensitive vulnerable areas and domains, from which action plans to respond to climate change for each province and city in the period of 2011-2015 and a vision 2020 are developed; and (2) establishing provincial and city level Steering Committees for responding to CC. As of June 2016, 63 out of 63 provinces and cities have issued their Action Plan to respond to CC in which specific tasks and projects for the period up to 2015 and the five years from 2016-2020 are identified. However, few local authorities have developed plans to integrate CC into their socio-economic development planning and plans.

* Status of CC integration into the socio-economic development policies of Son La

According to the evaluation of the Human and Nature Center, Son La Province has reflected CC into several policies such as: (i) The Overall Socio-Economic Development Planning from 2006-2020 and The Five-Year Socio-Economic Development Plan (2011-2015) approved by Resolution 339/2010/NQ-HDND; (ii) Resolution 51/2013/NQ-HDND on adjusting and supplementing the Five-Year Socio-Economic Development Plan (2011-2015); (iii) Response to Climate Change Plan in Son La Province to 2020 (approved by Decision 1001/2012/QD-UBND); (iv) Land Use Planning of Son La Province; Forest Protection and Development Planning for Son La Province by 2015 with a vision to 2020 (approved by Decision 2188/2008/QD-UBND); (v) Biodiversity Conservation Planning; Reviewing and Supplementing the Planning on Agricultural and Rural Development in Son La Province from 2009-2020 (approved by Decision 3338/2009/QD-UBND); and (vi) New Rural Development Project of Son La Province to 2020 (approved by Decision 2360/2012/QD-UBND).

In many cases, CC is either not reflected or poorly reflected in provincial policies. Planning and plans that are directly related to CC, such as forest protection and development or biodiversity protection, mention CC in their vision and objectives. The five-year overall socio-economic planning and plans, the five-year development plan (2011-2015) and the agricultural sector plans, however, do not refer to CC in their introduction. Industrial and commercial planning such as hydropower and minerals do not mention matters pertaining to CC.

Most of the CC response measures are only mentioned as solutions to implementing agricultural development plans, such as: (i) increasing forest coverage; (ii) protecting and developing forests; (iii) adjusting plans and planning to make them suited to production areas; (iv) using sensible animal breeds; and (v) using modern and appropriate technologies and techniques for cultivation and breeding in order to reduce GHG emissions. However, the objectives of each development plan are inconsistent and still have limitations as follows: (i) the development of CC policies does not take into account the balance of implementing resources; (ii) there is no policy designed for vulnerable

groups such as farmers and women; (iii) the CC action plan has not been updated according to the latest CC scenario of the Ministry of Natural Resources and Environment; and (iv) local policies do not specify the role of communities and community organizations in developing and implementing CC response solutions and setting up green, environmentally-friendly agriculture.

* Status of CC integration and disaster risk reduction into the socio-economic development planning in some districts of Tra Vinh province

The Tra Vinh Provincial People's Committee and the Department of Planning and Investment have always paid attention to, and directed the implementation of, socio-economic development planning processes to suggest various solutions in order to improve the efficiency of their planning processes. Over the years, socio-economic development planning processes have focused on market factors, poverty reduction and others but still fall short of estimating the impacts of CC and disaster risk reduction. Acknowledging the importance of integrating CC and disaster risk reduction into development plans, the Department of Planning and Investment worked together with the PRC Project (implemented by Oxfam) to develop and integrate CC and disaster risk reduction into socio-economic development plans in 2015 in 19 communes in Chau Thanh (14 communes and 14 towns) and Cau Ngang districts (5 communes) in Tra Vinh province.

The provincial authorities have revised, adjusted and supplemented the guidance book for developing socio-economic development plans at the commune level in 2015 with clear guidance on how to integrate CC and disaster risk reduction measurements. This guideline was developed based on the guidebook for developing the socio-economic development plan at the commune level in 2013 by incorporating climate change adaptation. The authorities also organized a training workshop on how to develop socio-economic development plans by reflecting CC and disaster risk reduction for the staff of People's Committees, the statistical office of 14 communes of Chau Thanh district and five communes of Cau Ngang district, and the officials of People's Committee and Finance-Planning Division of Chau Thanh and Cau Ngang districts as well as a number of relevant departments. Throughout the training, participants learned basic knowledge of: (i) CC and the risks associated natural disasters; (ii) how to fill in the planning forms; and (iii) practiced several skills such as organizing and running a consultation meeting with local residents, developing and presenting socio-economic development plans, etc.

In the process of developing the socio-economic development plans of communes or towns, local authorities also have to consult their residents as regulated (all hamlets organized consultation meetings (147 meetings), with more than 5,000 people attending, of which 35% were women). The Department of Planning and Investment monitored and supervised 28 meetings from 20 June, 2014 to 11 July, 2014 in 28 hamlets (where the consultation meetings were organized with a total of 989 participants, filled with all stakeholders according to the regulations, of which 342 women participated, accounting for 35%). The working groups of communes and towns developed their plans based on the comments of and contributions from citizens as well as secondary databases. As a result, all 19 out of 19 communes developed their plan in a timely manner and satisfied the

requirements. In general, all communes and towns went through the process of developing their socio-economic development plans in 2015 by reflecting CC and disaster risk reduction in accordance with the guideline. This is significant because socio-economic development plans were developed by including feasible activities that align with the reality as well as the residents' needs.

Through the pilot implementation of developing socio-economic development plans at the commune level by reflecting CC and disaster risk reduction in the 19 communes of Cau Ngang and Chau Thanh districts, the following lessons were learned:

- Advantages: All communes and districts went through the planning process in a timely manner by taking the bottom-up approach and minimizing the stereotyping, copying and voluntarism found in typical planning development processes, so that the plans of communes and towns are believed to have higher quality and satisfactory progress and contents. Their plans are compatible with the actual conditions of each site, partially meets the needs and aspirations of the people, and the people have positively responded to the process. The integration of CC and natural disasters risk reduction into the socio-economic development planning process helps raise citizens' awareness of CC, and enables them to propose appropriate CC adaptation and prevention resolutions and suggest their own list of climate change adaptation activities.
- Difficulties: There was insufficient time to organize the training course on integrating CC and disaster risk reduction into socio-economic development plan at the commune level in June because the district must report to the province on 15 July every year to meet the deadline of providing input for planning at the provincial level, and this has affected information collection at hamlet and commune levels, and put pressure on completing the report on time. Therefore, the suggestion is that future training sessions should be held either in March or April every year to help communes and hamlets take more initiative in collecting and synthesizing the information and the draft of planning reports. On the other hand, the responsible staff of the communes, districts and cities (including the source teachers) have changed frequently and had to be retrained. The awareness of officials of the value chain and CC is limited. In some minority ethnic areas, it is difficult to organize the meeting and get comments. Some communes developed plans far behind schedule. State resources were limited but people's needs also varied, making it difficult to meet the requirements. There was no clear direction for people on how to adapt to CC by technical factors instead of proposing other requirements. The central and local governments also provided inconsistent direction on how to respond to CC.

Based on the achievements, the Department of Planning and Investment in Tra Vinh Province continuously cooperated with the PRC project to implement the integration of CC and DRR all over the communes and towns in Chau Thanh and Cau Ngang districts in 2016. At the same time, they also developed the guideline for integrating CC and disaster risk reduction into socio-economic development plans at district level, piloting at these two districts.

* Status of CC integration into the commune socio-economic development plan in Hai Duong commune, Hai Lang district, Quang Tri province

Hai Duong Commune, Hai Lang District, Quang Tri Province is located in a coastal sandy area. Livelihoods of citizens are based on agriculture. However, in recent years, with unusual changes in the weather, drought months last longer and affect agricultural productivity as there are more uncropped areas in the dry season. Under the framework of a project of integrating disaster risk management/CC into the socio-economic development planning process of the communes supported by Vietnamese Oxfam, the agricultural sector of Hai Lang district has worked together with scientific research agencies to identify inhabitants' priority demands which are associated with their livelihoods. In the process, a series of simple and effective adaptation solutions have been identified and included in the commune's socio-economic development plan. In particular, the model of covered vegetable planting, combined with simple adaptation measures such as sprinkler irrigation, covering beds with straw, preparing beds to hold water, helped the commune women plant vegetables out of season, which ensured a stable income and prevented them from leaving bare land in the dry season. Moreover, this integration process has helped the commune authorities learn more about the needs of people in times of crisis, and what the Government could do to help them and also how to design the socio-economic development plan of the commune in the best way.[7)]

7. Oxfam (2012), Report put together by collecting the good models of natural disaster risk mitigation and climate change adaptation in sustainable livelihood programs

The integration of issues related to natural disaster risk mitigation and CC adaptation into local socio-economic development planning processes has been implemented based on the following principles:

- Integrate in all steps of establishing communes' socio-economic development plans;
- Integrate natural disaster risk mitigation and CC adaptation based on the principle of sustainable development: systematic, comprehensive, sectoral, interdisciplinary, and inter-regional; contribute to poverty mitigation and gender equality and prioritize vulnerable groups such as the poor and children;
- Mainstream and focus on integration according to the identified priorities, and strike a balance between natural disaster risk mitigation, and CC adaptations with immediate impacts and potential long-term impacts;
- Integrate based on the active participation of the governments at all levels, committees, sectors, unions, units in communes, villages, enterprises and communities; Mobilize community resources based on disaster risk assessment and CC, analyze the strengths and weaknesses of the communities, and encourage the community to take the initiative in designing and integration; and
- Do not impose bulky, complicated or additional work for local planning staff and local governments.

To effectively integrate the issues related to natural disaster risk mitigation and CC adaptation in local socio-economic development plans, the following activities were carried out:

(1) Establishing a planning team by engaging stakeholders and providing training on how to develop the socio-economic development plan which is integrated as well as makes use of participatory methods in the planning process.

(2) Collecting and analyzing information including the information on risks, damages, signs and impacts of CC, orientation information and related activities to natural disaster risk mitigation and CC adaptations at all levels and related domains and departments.

(3) Processing and synthesizing the information:

- Summarizing the information on damages, climate/weather changes and the situation of natural disaster risk mitigation and CC adaptation activities.
- Analyzing the current status, finding solutions and identifying the priorities related to natural disaster risk mitigation and CC adaptations which support the socio-economic development process. It is also important to consider the adverse effects of implementing these solutions in the socio-economic development process in general and natural disaster risk mitigation and CC adaptations in particular.
- Taking out the targets and criteria for natural disaster risk mitigation and CC adaptations.
- Preparing for the drafting process of integrating socio-economic development plan.

(4) Developing socio-economic development plans.

- Organizing public consultation, comprehensive consulting and revising of the drafting plan to ensure broad participation, people's contribution and support and related domains and departments by gathering communities' opinions and offering appropriate modifications.
- Completing and submitting the integrated socio-economic development plans for approval, submitting the plan to the supervisor for approval and also monitoring and updating the approval process and results.

The integration process has gradually been institutionalized for replication in other communes and districts in the pilot provinces. Formal testing of the Community Development Fund has been conducted to promote activities and initiatives of the new integrated plans. These funds will focus on CC adaptation and natural disaster mitigation solutions that have been identified and included in the strategies, focused on CC adaptation in agriculture and other natural disaster mitigation measures. Although the funding from these funds accounts for only a small part of the total budget needed for activities related to natural disaster risk mitigation and CC adaptation, it has played an important role in promoting communities' participation and making plans more efficient.

In addition, guidelines have been developed to integrate natural disaster risk mitigation and CC adaptation into local socio-economic development plans, including the active participation and consultation of government agencies and related NGOs. This has complemented the lack of guidance documents related to the integrating process in Vietnam and also helped

disseminate implementation experience. This guideline is currently being carried out in the pilot provinces and used for policy advocacy to institutionalize the process of integrating natural disaster risk mitigation and CC adaptation into the socio-economic development plans around the country.

The lessons learned from the process of integrating CC issues into the socio-economic development planning process of Hai Duong Commune are as follows:

- The commune socio-economic development plan should be developed by considering: (i) the vision of the district, including the visions related to CC adaptation and community-based natural disaster risk mitigation; (ii) citizens' opinions (gathered in typical villages) on the commune's development plan; and (iii) comments from the department and domain (through the working group) on the commune's development plan.
- The analysis of impacts, causes and solutions to CC adaptation and natural disaster risk mitigation should be incorporated in each step of the planning process.
- The participation of governments at all levels, especially related provincial departments, committees and domains plays a very important role in guiding and monitoring the work of planning at the grassroots level.[8)]

3. Challenges in the process of integrating CC into socio-economic development planning

The results of the status analysis have shown that the activities of integrating CC adaptation into socio-economic development planning in Vietnam have been defined in the Vietnamese Communist Party's laws and sub-laws as well as developing mechanisms and policies of ministries and departments. However, in reality, there are only a few localities that have fully integrated CC adaptation into their development plans. Some localities have integrated CC adaptation into their planning and plans only at either provincial or communal level. It is clear that integrating CC into planning in localities has not been given enough importance and has not been implemented comprehensively. At present, the process of integrating CC into socio-economic development planning and plans faces many difficulties and challenges.

First, almost all provinces have faced difficulties due to the lack of specific guidance on how to integrate CC, especially where the resources for implementing CC response activities should be found. At present, CC integration is considered as one of the priorities mentioned in the Action Plan for CC Response at the provincial level and is also one of many important policy solutions that promote the implementation of CC mitigation and adaptation activities. However, localities are still very confused during the integrating implementation process.

8. Oxfam (2012), Report Synthesised and collected of the good models in natural disaste risk mitigation and climate change adaptation in sustainable livelihood programs.

Second, most of the action plans for responding to CC and CC integration in localities are still unspecific, unreliable and not feasible. The reason is that the development of the action plans has not been implemented appropriately based on research, selection and assessment of impact and vulnerability to propose specific solutions. In addition, the monitoring data on CC, hydrology and hydraulics of urban and rural areas and river basins are limited, making vulnerability assessment unreliable.

Third, when integrating CC into local socio-economic development policies, three levels of intervention should be clearly determined in the specific policy framework or action plan at the provincial level.

- Level 1: Incorporate the implementation of development efforts to reduce vulnerability, at the same time define the priority of adaptive solutions. The basis for adaptation can be strengthened through the effective use of available resources, enhancement of resilience of people and economic activities in the province.
- Level 2: Ensure that the issues relating to CC response are reflected in the decision-making process of the relevant fields/sectors so that CC adaptation solutions are properly considered.
- Level 3: Development of specific policy solutions for CC adaptation towards resolving the issues that Level 1 and Level 2 interventions have not covered. Each level of intervention requires provincial departments/ domains' changes in planning, finance, implementation, monitoring and evaluation of the implementing process.

Fourth, integration activities tend to be implemented as a mere formality. In fact, the activities directly relating to natural disaster prevention such as developing monitoring system and hydro-meteorological forecasting technology; forecasting and early warning of extreme weather and natural disasters, constructing dykes for flood prevention and protection, building reservoirs and irrigation system for drought prevention are basically implemented synchronously in accordance with plans and budget schedules. However, the integration of CC into almost all socio-economic development industries such as agriculture, forestry, industry, transportation, collection and treatment of domestic waste including mitigation and adaptation activities are implemented as a mere formality. The reason is that the common socio-economic development activities are aimed at benefitting producers and enterprises first and foremost, instead of investing in CC response. The CC aspect is only considered when there are signs of remarkable damages due to CC or when the investments in responding to CC create specific benefits for enterprises. One of the main reasons why policies on integrating CC in Vietnam has failed to meet the expected requirements is because of the trade-off between objectives and requirement in the guarantee of profit, and economic growth achieved by development activities under the circumstances of limiting GHG emissions, environmental protection and enhancing the resilience to the impacts of CC in each development activity. In many cases where environmental factors and CC do not result in remarkable and direct consequences, many localities are still sacrificing the environment and sustainability in order to achieve profits or short-term economic growth.

Fifth, besides the "trade-off" tendency in economic development strategy, the subjective thinking and action of ministries, sectors, and localities are also considered to restrain CC integration activities. Most policies and documents relating to CC response integration call for "taking the initiative" and "exerting effort", but were not effectively implemented.

Sixth, the interdisciplinary nature of CC issues, as well as the conflict of interest of various stakeholders, has caused many difficulties in the process of harmonizing the interests of stakeholders. In Vietnam, the policies and responsibilities for responding to CC are often associated with environmental sectors, leading to the fact that CC has not been fully considered by other sectors. Ministries and sectors have developed their own action plans for responding to CC, while there is still a lack of coordination among sectors.

Seventh, although some CC responses have required the commitment and action at the regional level, currently there is a lack of coordination among provinces in managing and implementing regional planning. Current regional planning is developed by assigning specific responsibility for each province rather than encouraging close cooperation among stakeholders within the same process. Therefore, when integrating CC into regional planning, there is still no investment plan to mobilize the resources to prove the general efforts in sustainable development areas. In many cases, solutions for facilitating CC adaptation are applied in one administrative unit without considering the impact on the overall region, causing an increase in natural disaster risk for other sites in the area. Each province only focuses on impacts and solutions within its administrative boundaries; hence, ignores opportunities for economic development based on diversified resources, and this also prevents CC response initiatives from being carried out in cooperation with other provinces in the region. This shows that the institutional challenges need to be solved by revising the regional planning methodology and changing local governance structures.

4. Conclusion

Integrating CC response solutions into socio-economic development planning and plans is a compulsory requirement for ministries, sectors, and localities in Vietnam. It is reflected in the vision of the Vietnamese Communist Party, confirmed by Resolution No. 24/NQ-TU and Resolution No.08/NQ-CP. Ministries and industries also have implemented their own action programs to cope with CC, and the Ministry of Planning and Investment and the Ministry of Natural Resources and Environment in particular have issued the guidelines to integrate CC adaptation into the development planning and plans at different scales. On that basis, some localities have integrated CC response solutions into development plans at provincial, district and communal levels. However, actual integration has only been piloted in some provinces, districts and communes with the support of domestic and international NGO projects.

To integrate climate change into development planning and plans synchronously and effective manner, it is necessary to focus on the solutions such as:

- Enhance awareness of governmental officials. Especially, it is necessary to hold more training courses on methods and knowledge on integrating climate change into development plans and plannings for making plans and plannings officials at provincial, district and commune levels.
- It is necessary to set the regulations on the role of each stakeholder which participate in integrating process (government bodies and agencies in planning - investment, natural resource - environment, finance; enterprises, affected communities, etc). The planning process of integrating climate change needs to be designed, organized and guided specifically to ensure that all stakeholders have the opportunity to participate equally and effectively in a participative planning mechanism, especially the resident communities follow to the participative planning mechanism.
- It needs to strengthen their capacity for climate change and understand the vulnerability analysis and assessment undertaken by professional agencies as well as the adaptability of the community at the commune level according to the assigned areas. At the provincial level, the responsible officials should be equipped with skills in analyzing; proposing policies, programs, and projects; as well as prioritizing investment projects for appropriate and effective integration.
- There must be an evaluation and supervision of how CC is reflected in development planning and plans to assess the effectiveness and to gather lessons from the experiences for future development planning and plans.

References

Nguyen Duc Anh (2015), The Situation of integrating climate change in socio-economic development policies of Son La, Human and Nature Center, Hanoi, Vietnam

Dasgupta Susmita, Benoit Laplante, Craig Meisner, David Wheeler, and Jianping Yan, 2007. The Impact of Sea Level Rise on Developing Countries: A Comparative Analysis. World Bank Policy Research, Working Paper 4136, February 2007.

IMHEN and UNDP (2015), Viet Nam special report on managing the risks of extreme events and disasters to advance climate change adaptation, Viet Nam Publishing House of Natural Resources, Environment and Cartography.

IPSARD (2015). Report reviewed and evaluated the policies and strategies for responding to climate change in Vietnam funded by FAO, Hanoi, Vietnam

Ministry of Agriculture and Rural Development (2011), Integrating climate change into developing and implementing strategies, planning, plans, programs, projects for the period 2011-2015.

Ministry of Natural Resources and Environment (2012), Climate change and sea level rise scenarios for Vietnam, Vietnamese Natural Resources and Environment Publishing and Vietnamese Mapping, 2012.

Christine Wamsler (2009), Applying framework for integrating climate change and risk mitigation into urban development.

National Target Program to Respond to Climate Change (Decision No.158/2008/QD-TTg dated December 2nd, 2008 of the Prime Minister), December 2008.

Oxfam (2011), Integrating disaster risk reduction and climate change Adaptation into commune Socio-Economic Development Plans, Hanoi, Vietnam.

Oxfam (2012), Report synthesized and collected of the good models in natural disaster risk mitigation and climate change adaptation in sustainable livelihood programs, Hanoi, Vietnam

ADB (2009), Mainstreaming climate change in ADB operations. Climate change implementation plan for the Pacific region (2009 - 2015).

UK Environmental Agency (2007), Strategic environmental assessment and climate change: guidance for practitioners.

Hanh H. Dang, Axel Michaelowa, Dao D. Tuan (2003), Synergy of adaptation and mitigation strategies in the context of sustainable development: the case of Vietnam, Published in: Climate Policy, 3, Supplement 1, 2003, p. S81-S96.

UNEP-UNDP (2011). Mainstreaming Climate Change Adaptation into Development Planning: A guide for practitioners, www.unpei.org, p. 10.

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Lessons from Support of Green Growth in Vietnam

Abstract

Vietnam's impressive economic growth is marked by high energy intensity which is still rapidly growing compared to other Asian countries. Although the country's total greenhouse gas emissions are still relatively low, they are rising fast. The planned investments into coal-based power generation are predicted to trigger more than a threefold increase in the country's total greenhouse gas emissions during 2010-2030.

At the same time, Vietnam's national Green Growth Strategy suggests a growth model that offers a cost-effective opportunity for matching the greenhouse gas reduction ambitions with increased competitiveness of the economy. Implementation of this strategy is supported by green growth action plans that have been issued by key 7 central authorities and are also being developed in 29 provinces or cities. These plans identify numerous economically attractive actions that could be implemented if funding is secured, especially from private sources.

Incentives for private investments into green growth are already being established in the banking system which was in 2017 instructed to develop green credit lines and mainstream environmental and social risk management into crediting process. However, private investments are likely to be mobilized only if environmental externalities are duly factored into decision-making.

To this end, important incentives could be established through increased environmental fees and their more stringent collection and/or by reflection of carbon price in the use of energy. In order to avoid adverse economic knock-on effects, such economic incentives would need to be phased-in incrementally. Once conducive pre-conditions are put in place, pilot projects supported by national or international climate finance can develop innovative solutions and services that are viable in the changing economic context. All these tools combined would create favorable conditions for much needed mobilization of private capital.

1. Introduction

Vietnam has achieved remarkable development results over the past 30 years. Economic and political reforms launched through Doi Moi in 1986 have unlocked the country's economic potential and the Vietnamese population has enjoyed one of the fastest GDP per capita growth rates in the world, averaging 6.4 percent a year in the 2000s (World Bank, 2017).

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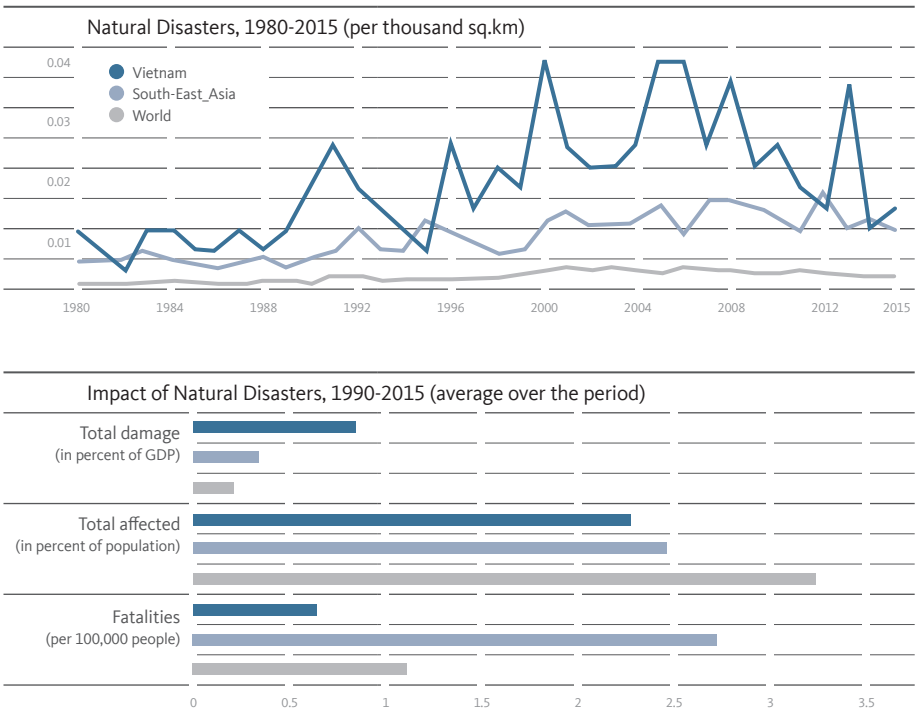
Vietnam's dynamic economy continues on a solid growth path, driven by robust domestic demand and export-oriented manufacturing (IMF, 2017a). At the same time, Vietnam ranks among the countries most vulnerable to climate change impacts (Kreft et.al., 2015). Climate risks start posing immense challenges that could threaten agricultural development and food security and other sectors, such as energy and transportation (IMF, 2017b).

According to the Vietnamese Ministry of Planning and Investment (MPI), UNDP and the World Bank (2015) the country already experiences increased temperatures, sea level rise, intensifying storms, and more frequent floods and droughts, which cause loss of life and damages to the economy. The Mekong River Delta and Red River Deltas already suffer from saltwater intrusion threatening agricultural productivity and the millions of people relying on these watersheds for their livelihoods. Urban populations living in informal settlements are also at risk; particularly to heat and humidity extremes, while residents living in coastal cities are adversely affected by floods and storms. IMF (2017b) warns that compared with the rest of the world or Southeast Asia, Vietnam has much higher percentage of total damage due to natural disasters, which during 1990-2016 resulted in loss of 0.8 percent of GDP annually (see Figure 3-1).

↘ Figure 3-1

Natural disasters and their impacts on Vietnam

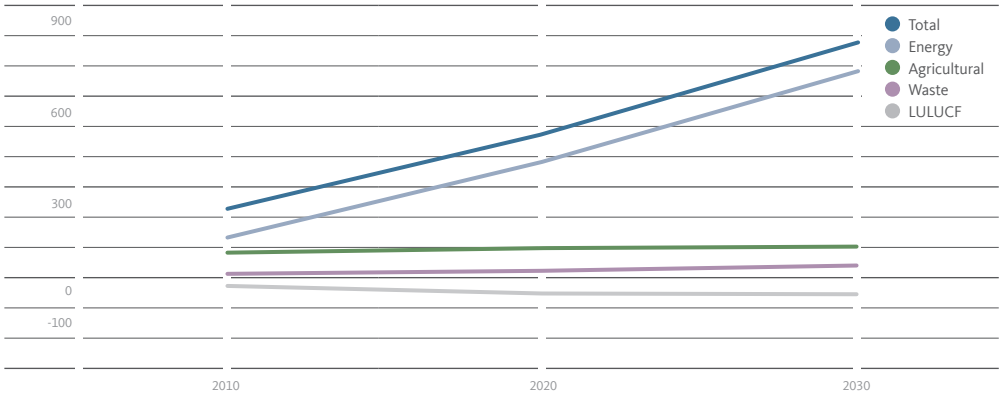


Source: International Monetary Fund (IMF, 2017b)

These risks arise while the country is projected to become a major greenhouse gas (GHG) emitter. Between 1991 and 2012, Vietnam's total GHG emissions grew by 937 percent, with gross domestic product (GDP) growing by 315 percent (USAID, 2016). Official projections prepared for the 2015 Paris Climate Conference (MONRE, 2016) suggest that the country's total net GHG emissions are expected to further increase more than threefold between 2010 and 2030 (see Figure 3-2). The forestry sector, if all reforms promoted under REDD+ program are fully implemented, is expected to become a carbon sink but it cannot offset major increases in emissions associated with the consumption of fossil fuels for power generation, industries, and transport. Emissions per capita are thereby expected to become comparable to today's level of European countries (Meessen et al., 2015).

↘ Figure 3-2

GHG emissions in 2010 and business-as-usual projections for 2020 and 2030 ($MtCO_{2e}$)

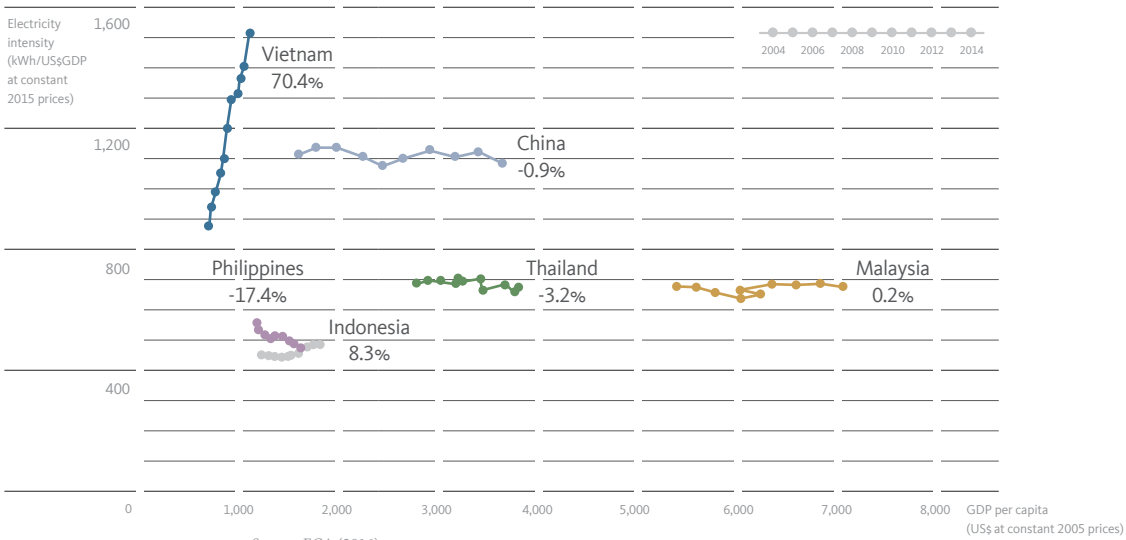


Source: MONRE, 2015

The rapid increase in GHG emissions is driven by Vietnam's very high energy intensity – and especially electricity intensity - which continues to grow rapidly compared to other Asian countries (see Figure 3-3). The industrial sector consists of many energy intensive industries (such as production of steel, fertilizers, cement, pulp and paper) which often rely on outdated production technologies. Also, while per capita electricity consumption remains relatively low, i.e. one-third of China, it is anticipated that electricity demand from the general population will continue to grow faster than the average national GDP for the next two decades (World Bank, 2017).

↘ Figure 3-3

Rapid growth in Vietnam's electricity intensity

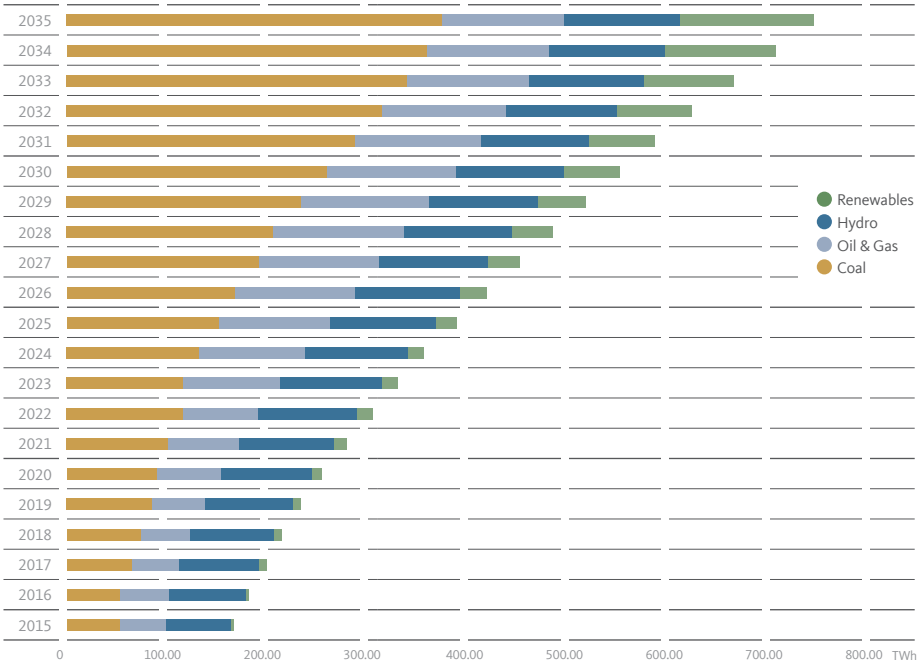


Source: ECA (2016)

The second driver of Vietnam's steeply growing GHG emission trajectory is a planned reorientation of power supply mix towards coal-based power plants (UNDP, 2016). With exhausted potential for development of new large hydropower projects and the postponement of nuclear power plants, the revised power supply strategy within the 7th Power Development Plan (PDP7rev, 2016) includes a major increase of coal-based power generation which is predicted to account for more than 50 percent of the power mix by 2030. If these plans materialize, by 2030 Vietnam would be using 15 times as much coal as it did in 2012 and would become the 8th largest user of coal for energy globally (ECA, 2016). Interestingly, since the country has limited domestic coal reserves, much of the coal would have to be imported. Furthermore, many of the proposed power plants are sited in densely populated Red River Delta and Mekong Delta areas and would significantly increase existing air pollution loads in these regions.[8)]

↘ Figure 3-4

Electricity output by fuel under base case scenario



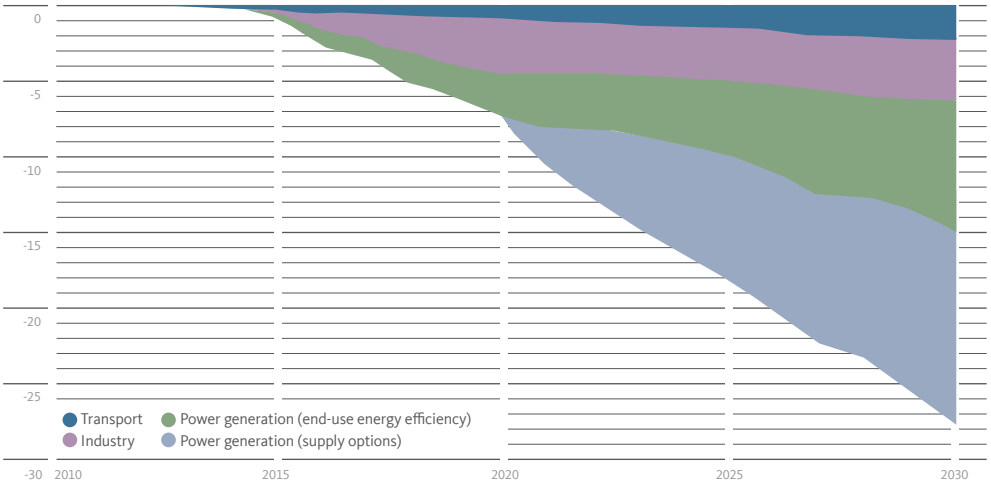
Source: MOIT (2017)

The World Bank (Audinet et al., 2016) also warns that proposed investments into coal-based power generation will lock Vietnam into emission intensive development pathway. The report suggests to instead mobilize significant initial investments into power sector that are expected to have positive spillover effects in terms of economic growth, productivity, and avoided health costs. The most significant reduction of GHG emissions lays in energy consumption and could be accomplished on the power supply side and in end-use energy efficiency (see Figure 3-5).

8. Eventual approval of the new coal-power plants in the proposed scale could be indicative of the effectiveness of the nation's environmental impact assessment system which has already come under criticism (Vietnam News 2016; VietNamNet, 2017). Review of the current system of environmental impact assessment and strategic environmental assessment in Vietnam would deserve detailed analysis which goes beyond the scope of this paper

↘ Figure 3-5

CO_2 Emissions reductions proposed, relative to business as usual



Source: Audinet et al. (2016)

In the meantime, Vietnam pursues a modest mitigation target by committing itself to unconditionally reduce its GHG emissions by 8% compared to a business-as-usual scenario by 2030 (INDC, 2015). This target may increase to 25% GHG emissions reduction against the steeply growing business-as-usual emission trajectory if international support is received through bilateral and multilateral cooperation.

While the majority of the decisions related to the future GHG emission trajectory will be taken in the power sector , this paper explores opportunities for reductions of GHGs through a wider economic transition to green growth model. The paper focuses primarily on economic factors and leaves aside environmental governance - environmental impact assessments and environmental enforcement, etc. - which naturally influences climate-related decisions as well.

2. Vietnam's national approach to reduction of greenhouse gas emissions

The Government's initial response to climate change in Vietnam focused mainly on adaptation, reflecting priorities formulated in its National Strategy for Natural Disaster Prevention, Response and Mitigation (2007) and National Target Program to Respond to Climate Change (2008). Opportunities for climate change mitigation in the country were seen mainly in the promotion of energy efficiency through the Vietnam Energy Efficiency Program and an active participation of Vietnam in the Clean Development Mechanism (see Section 3 for details). Nevertheless, the country's first Climate Change Strategy (VCCS, 2011) recognized the need 'to turn low-carbon economy and green growth into the main vision for sustainable development and to use lower emission and higher absorption of greenhouse gases as indicators of socio-economic development'.

A major work program on GHG mitigation was launched based on the Vietnam's national Green Growth Strategy (VGGS, 2012). This strategy identified green growth as the most cost-effective opportunity for matching GHG mitigation with national ambitions for enhancing competitiveness of the economy. To this end, VGGS established three primary strategic tasks, as well as quantified objectives towards 2020, and longer-term visions for 2030 and 2050 (see Table 3-1). Although the VGGS primarily focuses on GHG emissions reduction, it pursues an integrated development paradigm which corresponds well with Vietnam's Agenda 21[9].

↘ Table 3-1

Objectives of the 3 VGGS strategic tasks (VGGS, 2012).

Strategic tasks	2020	2030	2050
Reduce the intensity of GHG emissions and promote the use of clean and renewable energy	- Reduce intensity of GHG emissions by 8-10% as compared to 2010; - Reduce energy consumption per unit of GDP by 1-1.5% per year; and - Reduce GHG emissions in the energy sector by 10% relative to business-as-usual and by a further 10% with international support	- Reduce GHG emissions by 1.5-2% per year. - Reduce GHG emissions in the energy sector by 20% relative to business-as-usual and by a further 10% with international support	- Reduce GHG emissions by 1.5-2% per year
Greening production	- The value of high technology and green technology will make up a share of 42-45% of GDP; - The rate of commercial manufacturing facilities that meet environment standards will reach 80%; - Application of clean technologies will reach 50%; - Development investment for supporting sectors to protect the environment and enriching natural capital will reach at 3-4% of GDP.	-	-
Greening lifestyle and promoting sustainable consumption	Cities: - The rate of grade III cities with wastewater collection and treatment systems that meet regulatory standards: 60%; those of grade IV and grade V cities and craft villages: 40%. - The rate of large and medium cities satisfying green urban standards reaching 50%. - The green areas for vegetation reaching urban standards. Pollution: Improving the environment in 100% of severely polluted areas. Waste: Rate of waste that is collected and treated in accordance with applicable standards. Transport: Share of public transportation in large and medium cities reaching 35-45%.	-	-

9. VGGS was later coordinated with Vietnam's National Action Plan to implement the 2030 Agenda for Sustainable Development, which was approved in 2017.

Following the adoption of VGGS, the Prime Minister in 2014 issued the Vietnam Green Growth Action Plan (VGGAP, 2014) which defined 66 interventions that specified examination of institutional arrangements for green growth; revision of master plans; promotion of technology transfers; business promotion and private sector engagement; and developing supporting fiscal and financial arrangements.

The Vietnam Green Growth Action Plan also requested all ministries and provinces to formulate their own green growth action plans. The Ministry of Planning and Investment (MPI) supported provinces by providing a template for green growth action plans and mobilized support for pilot provinces from various donors including UNDP, USAID, Belgium Technical Cooperation (BTC), KOICA, GIZ, JICA and others. As a result of these efforts, by July 2017, Green Growth Action Plans were prepared in 7 key central authorities: Ministry of Industry and Trade, Ministry of Agriculture and Development, Ministry of Construction, Ministry of Transport, State Bank of Vietnam, Ministry of Finance and Ministry of Natural Resources and Environment. In addition, 30 provinces or cities have either adopted or are elaborating their own Provincial Green Growth Action Plans (GGAP) (see Table 3-2), after the approval of VGGAP. The following section presents some experiences gained from this process.

List of provinces and cities having or developing Provincial Green Growth Action Plans

↘ Table 3-2

Supporting Organization		Province	Status of implementation by July 2017
Bread for the World	1	Hoa Binh	Completed in 2016
KOICA	2	Bac Ninh	Completed in 2015
	3	Quang Nam	Completed in 2015
	4	Ben Tre	Completed in 2015
UNDP	5	Quang Ninh	Completed in 2015
	6	Dalat	Completed
	7	Ha Nam	Pending for approval
	8	Cao Bang	Started in 2016
	9	Bac Kan	Started in 2016
	10	HCM city	Started in 2016
Belgium Technical Cooperation	11	Ha Tinh	Completed in 2016
	12	Binh Thuan	Completed in 2016
	13	Ninh Thuan	Completed in 2016
	14	Khanh Hoa	Pending for approval
	15	Phu Yen	Pending for approval
	16	Binh Dinh	Pending for approval
GIZ	17	An Giang	Completed in 2017
	18	Hau Giang	Started in 2016
	19	Kien Giang	Started in 2016
	20	Ca Mau	Started in 2016
	21	Bac Lieu	Started in 2016
	22	Soc Trang	Started in 2016
USAID	23	Thanh Hoa	Completed in 2016
ADB	24	Vinh Yen city	Completed in 2015
	25	Ha Giang city	Completed
	26	Hue city	Completed in 2015
Domestic sources	27	Hai Phong city	Completed in 2016
	28	Tay Ninh	Pending for approval
	29	Ha Noi	About to start
	30	Lao Cai	Completed in 2014

Source: CIGG (2017a), USAID (2017)

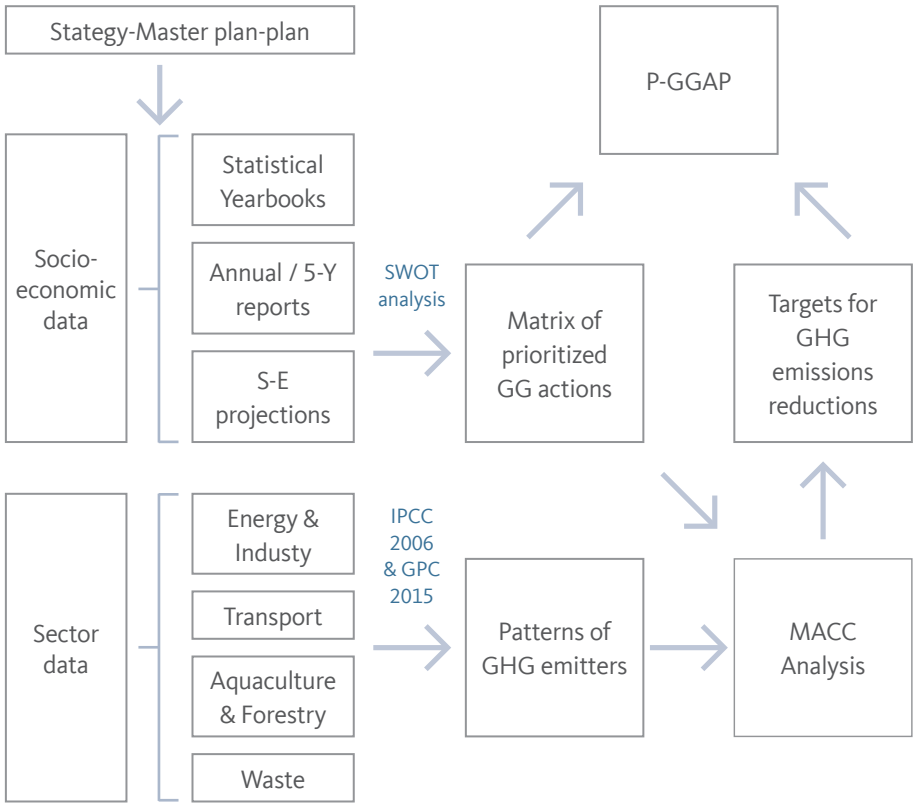
3. Lessons from implementing provincial Green Growth Action Plans

The methodology recommended by the MPI and followed by most provinces to elaborate the provincial Green Growth Action Plans consists of the following steps, all relying on intensive consultations of local experts:

1. Elaborate the provincial GHG emissions reference level under 'Business-As-Usual' until 2020, mainly based on the province's socio-economic development plan.
2. Quantify the local GHG emissions reduction opportunities and rank them according to their respective marginal abatement cost (e.g. leading to a provincial Marginal Abatement Cost Curve-MACC) and the VGGS SWOT matrix[10].
3. Elaborate two green growth scenarios that include (1) the measures in the provincial voluntary action plan and (2) those requiring additional financial support from either the national government or international sources. The capital investment need of each scenario is estimated here as well by summing up the capital investment needs of each individual emission reduction measure. The individual investment needs are taken from past national or sectoral studies.

↘ Figure 3-6

The methodology for elaborating PGGAP



Source: Trinh et al. (2016)

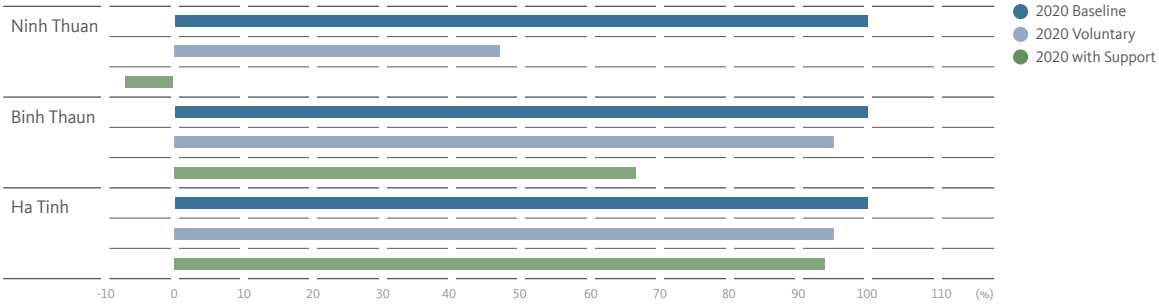
10. The VGGS SWOT (Strengths, Weaknesses, Opportunities, Threats) matrix was developed using three strategic tasks in VGGS as key green growth dimensions, and VGGS solutions as green growth performance indexes. For each province, using VGGS SWOT matrix can give indications on underperforming areas for further improvement through GGAP.

The scope of GHG emissions considered includes direct and indirect emissions from electricity consumption, broken down into five key emission sources following the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GHG Protocol, 2014). The direct emissions of the territory encompass both energy-related and non-energy[11] emissions but not the power supply sector. The indirect emissions from electricity consumption are estimated based on the average national grid emission factor. Regarding economic assumptions, the abatement cost of each mitigation action is a hard-coded value (i.e. it is identical for all provinces) and its capital investment need is estimated by previous mitigation studies at national level.

The resulting emissions reduction scenarios promoted through the GGAPs currently vary widely according to each province's specificity. For the six coastal provinces supported by the Belgian Technical Cooperation, the evolution of the forestry coverage plays a significant role in the mitigation ambition - even leading to negative emissions level for Ninh Thuan (see Figure 3-7).

↘ Figure 3-7

GHG emissions reduction scenarios relative to business-as-usual from the GGAP of Ha Tinh, Ninh Thuan and Binh Thuan (Including CO_2 capture by forests)

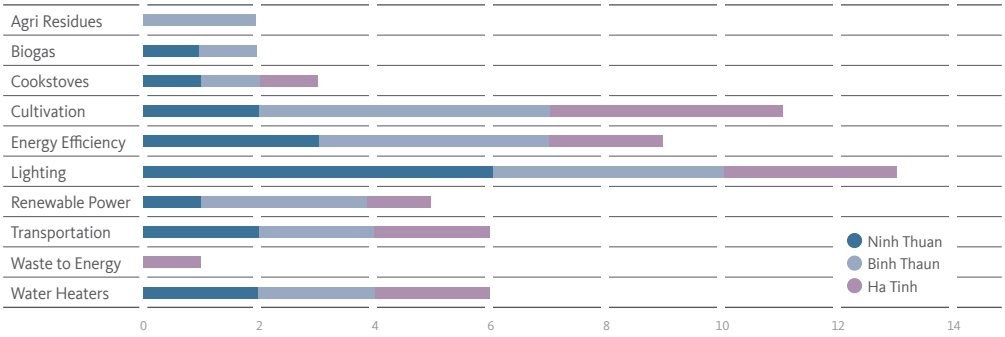


Source: GGAP's, BTC.

The economic attractiveness of various mitigation options is reflected by the marginal abatement cost which allows authorities and climate finance stakeholders to consider attractiveness of proposed green growth solutions. The provincial GGAPs contain numerous actions with a negative abatement cost (See Figure 3-8) and identify economically attractive priorities in all sectors

↘ Figure 3-8

Number of actions with negative abatement cost identified in the GGAP of 3 provinces.



Source: Provincial Green Growth Action Plans & BTC

As per MPI guidance, the findings of the MACC curves are typically validated with local experts and authorities and suggest mitigation projects that could be implemented either voluntarily or with additional support. Analyses performed within MACC curves and resulting GGAPs are well documented and can be easily revisited periodically and adjusted based on the changing context – reflecting innovations in policy and fiscal frameworks and new technological opportunities.

11. Non-energy GHG emissions include industrial processes, agriculture, land use and forestry

The GGAPs aim to inspire the transition process – they are not the end in themselves. Their fast implementation nonetheless faces a few obstacles. The investment capital needs represent the first barrier. As an example, the provinces of Khanh Hoa, Binh Dinh and Phu Yen each require an average of US$570 million to implement their most ambitious scenario by 2020. Less than 10% of these capital investments is expected to come from the provinces, the remaining proportion needs to be secured from central budget, international sources or private capital (see Section 5 'Trends in expenditures for GHG mitigation').

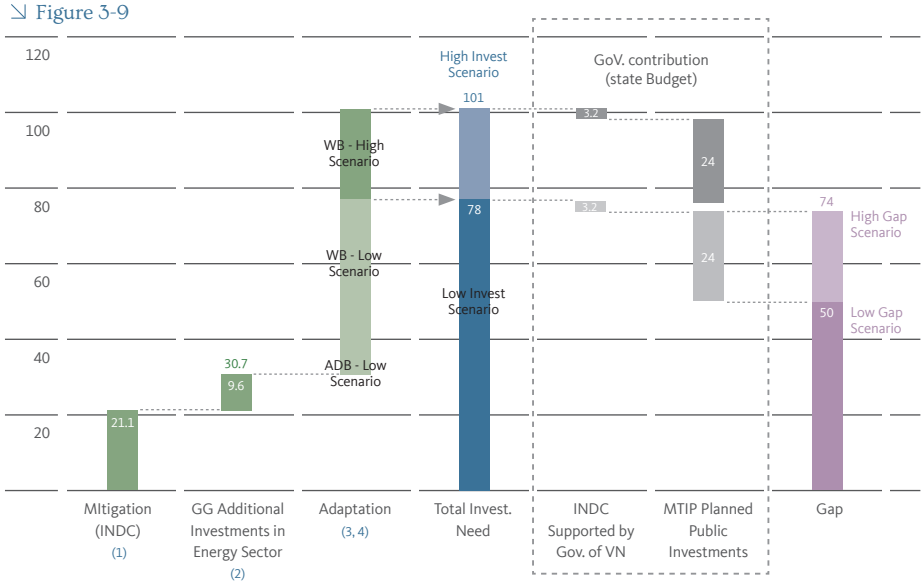
Other barriers to fast implementation include: (i) the limited appreciation of multiple benefits of proposed measures – such as direct benefits from energy savings or indirect benefits from e.g. improved air quality; (ii) limited economic incentives for investors to reflect environmental externalities in their actions (see Section 6 'Financing future GHG mitigation efforts and green growth'); (iii) the reliance on approved development plans, especially provincial power development plans, in identifying mitigation actions and setting GHG reduction targets, leading to a lower interest from potential private investors. The last barrier has been observed in the case of Ben Tre and An Giang provinces, where solar PV projects were first proposed at high scale but approved only at a much lower scale, and now the two provinces have to make adjustments on their solar PV pipeline in the list of prioritized green growth actions.

4. Financing needs for GHG emissions reduction and green growth

Estimating the investment needs for climate change adaptation and mitigation is a challenging and continuous task. Several studies provide indicative amounts for Vietnam by 2020 which, when compared to the government commitment to respond to climate change, gives the order of magnitude of the climate finance gap of the country (see Figure 3-9).

↘ Figure 3-9

Indicative break down of climate finance gap in Vietnam (US$ billion)[12)]



1. INDC : Total Investments for the period 2016-2030, including requiresd international support 57% of investment in Agiricultre
2. GG : Period 2014-2020. Excluding Non-Energy related investments. 90% of investment in Power supply sector
3. ADB (2009) : Minimum 0.2% of annual GDP investment needs to adapt to CC losses for 2016-2020
4. World Bank : Adaptation Investment range : Min : 4% of annual GDP, Max 6% of annual GDP

Source: ADB (2009), World Bank, MPI, MORNE, BTC analysis

12. These figures are indicative since the exact overlap between Green Growth and the NDC is not clear and its calculation falls beyond the scope of this paper.

The investment needs to implement Vietnam's conditional and unconditional mitigation commitment within the Paris Agreement are approximately US$21billion and more than half of this volume is dedicated to agriculture (INDC, 2015). For the energy-related emissions only, the VGGS requires at least an additional US$10 billion (World Bank, 2016). The mitigation investment needs therefore reach approximately US$30 billion. Most of these investments could be recovered in the future due to avoided expenses for energy and fertilizers and health condition improvements.

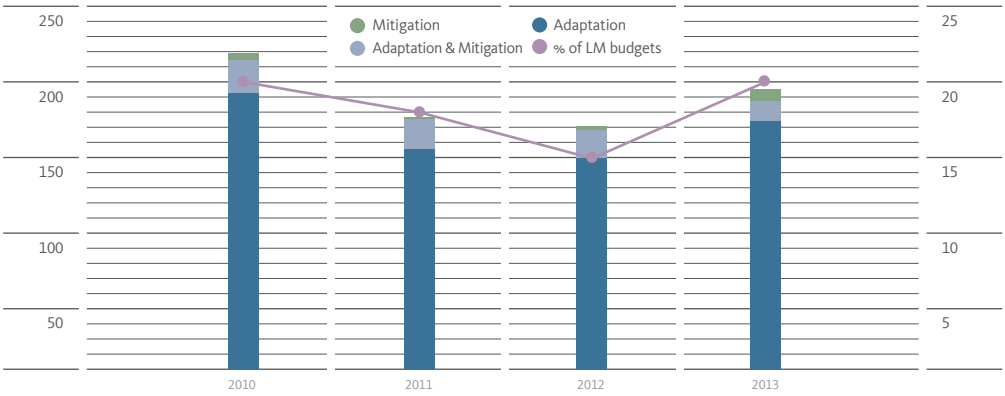
Precise calculations of climate-related expenditures in Vietnam are still evolving but the above figures illustrate an order of magnitude of the future spending that needs to be mobilized. The Government's contribution of approximately US$3 billion to the NDC's mitigation part and all planned US$24 billion of public investments in the national Medium-Term Investment Program for 2015-2020 only cover a small share of the total needs leaving a climate finance gap of more than US$50 billion to be supported by non-public sources (World Bank, 2016). Given the shrinking contribution of traditional ODA, the private sector needs to be mobilized to play an increasing role in the climate finance landscape of Vietnam.

5. Trends in expenditures on GHG mitigation

In 2015, the MPI released the first Climate Public Expenditure and Investment Review (CPEIR) aimed at analyzing the spending patterns related to climate change mitigation and adaptation and to help guide future climate change-related public expenditures and policy implementation. The CPEIR (MPI, UNDP & World Bank, 2015) provided – amongst others - basic analyses of spending patterns (see Figure 3-10) and the following overall conclusions:

↘ Figure 3-10

Total climate change appropriations (investment and recurrent) for five line ministries[13] in 2010–2013 (left Y axis: constant price 2010 USD million)



Adapted from: MPI, UNDP & World Bank (2015).

- The climate-related spending by central government (5 key line ministries) ranged from US$170-220 million annually between 2010-2013.
- While the total climate-related spending accounted for a significant 15-20% of the total budget of the 5 key line ministries, the majority of these expenditures had relatively low direct relevance to climate change and mainly provided indirect adaptation benefits (e.g. irrigation and transport road infrastructure upgrading).
- Most of the climate-related expenditure went to adaptation (88%), expenditures having both mitigation and adaptation functions accounted for 10% (forestry and infrastructure development) and only 2% of the expenditure was allocated to mitigation.

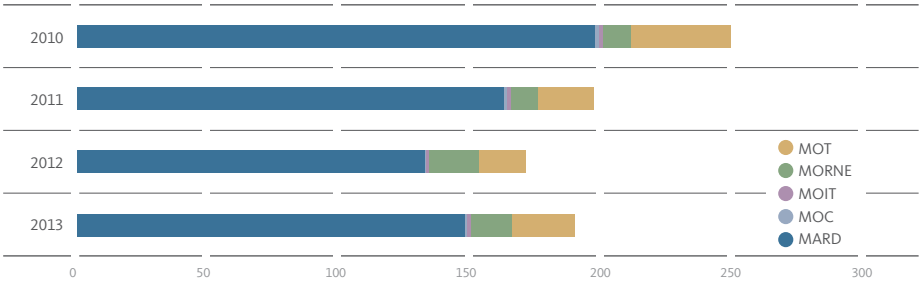
13. Including the National Target Program on Responding to Climate Change and the National Target Program on Energy Efficiency

The limited spending on mitigation does not support the ambitions formulated within the VGGS. Most mitigation activities fall under responsibilities of Ministry of Industry and Trade (MOIT) which is managing the power sector and industry. These sectors recorded the lowest public climate-related expenditures amongst the five central ministries (see Figure 3-10).

Most of the climate-related investments occurred within the MOIT-managed National Target Program on Energy Efficiency which attracted various ODA projects that planned to utilize economically attractive opportunities for improved energy management in energy intensive enterprises which are often wholly or partly state-owned. Despite the complex regulatory reforms initiated in 2006, the wider uptake of energy efficiency was nonetheless constrained by low energy prices that did not offer economic incentives for energy savings. As of 2017, however, the gradual increases in energy prices have begun to make such investments more attractive and there is a growing interest in mobilizing financial sources for energy efficiency by international financial institutions (e.g. World Bank, 2017) as well as by domestic commercial banks (SBV, 2017).

↘ Figure 3-11

Total CC expenditures (investment and recurrent) by line ministries from 2010–2013 (2010–2012 implemented, 2013 budgeted, by constant price 2010 VND billion)



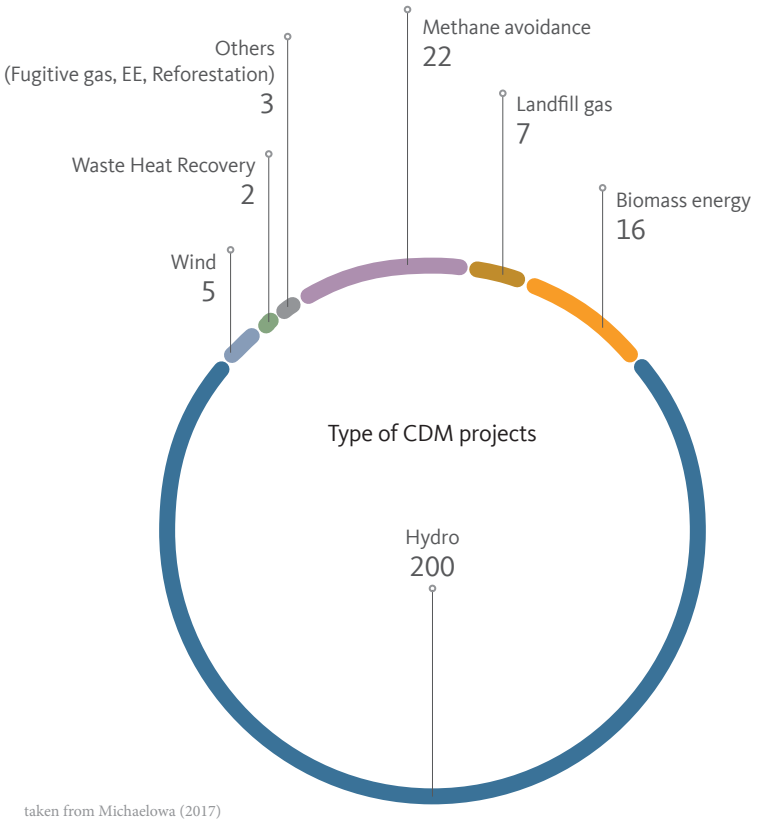
Source: Provincial Green Growth Action Plans & BTC

Figure 3-11 illustrates only public expenditures and may not provide the full picture since most of the mitigation-related spending comes from private investments that are not captured in the CPEIR framework. To fill in this gap, the MPI has initiated a new Private Climate Expenditure Review which will be prepared in October 2017.

For sake of completeness, the reported figures also exclude predominantly private investments into hydropower and private projects implemented through the Clean Development Mechanism (CDM). As of October 2016, Vietnam had 255 officially registered CDM projects and ranked number 4 internationally in terms of registered projects and reached the 8th rank globally with 16 million Certified Reduction Units which account for about 0.9% of their global issuance (Michaelowa 2017). Vietnam's CDM portfolio is illustrated in Figure 3-12 - hydropower projects account for 86.7%, waste treatment for 11.4%, reforestation and afforestation for 0.4% and other projects for 1.6%. More than half of the hydropower projects (i.e. 107 out of 200, or around 42% of the total portfolio) are large scale projects above 15 MW.

↘ Figure 3-12

Vietnam's CDM portfolio. Source: UNEP DTU (2016)



taken from Michaelowa (2017)

Michaelowa (2017) observes that due to a sharp decline in the price of Certified Emission Reductions (CERs), by around 98% between 2011 and 2013, their current price levels are insufficient for most registered activities to undergo the issuance process. Hence only around 34 projects (13% of the Vietnam's portfolio), most of which are hydropower projects, are still issuing CERs. A question remains how the current CDM portfolio will restructure once cooperative approaches and a sustainable development mechanism under the Paris Agreement (based on its Articles 6.2 and 6.4) get implemented as their requirements for environmental integrity and need to foster sustainable development may rule out the inclusion of large-scale hydropower projects.

6. Financing future GHG mitigation efforts and green growth

In 2012, Vietnam introduced an environmental protection tax law and was perceived as a pioneer in environmental tax reform in Southeast Asia (Green Fiscal Policy Network, 2017). Environmental protection taxes were levied on refined fuels and coal as well as on environmentally harmful substances in the form of consumer unit taxes (see Table 3-3 for details). As evident from this table, the rate of the newly introduced environmental taxes, however, appears to be rather low.

↘ Table 3-3

Specific tariffs in Vietnam's Environmental Protection Tax established in 2012

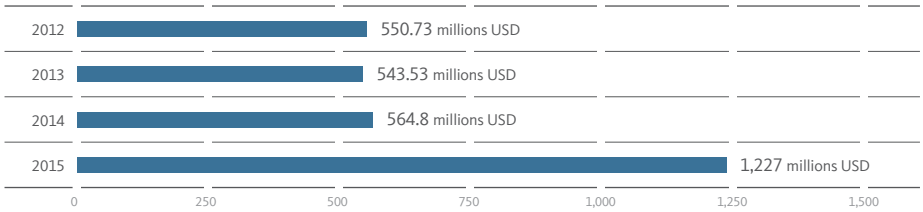
No	Goods	Calculation unit	Tax rate (USD)
I	Gasoline, oil, grease		
1	Gasoline, excluding ethanol	Liter	0.050 - 0.200
2	Aircraft fuel	Liter	0.050 - 0.150
3	Diesel oil	Liter	0.025 - 0.100
4	Petroleum	Liter	0.015 - 0.100
5	Fuel oil	Liter	0.015 - 0.100
6	Lubricants	Liter	0.015 - 0.100
7	Grease	Kg	0.015 - 0.100
II	Coal		
1	Lignite	Ton	0.480 - 1.440
2	Anthracite Coal (Anthracite)	Ton	0.960 - 1.440
3	Fat coal	Ton	0.480 - 1.440
4	Other coal	Ton	0.480 - 1.440
III	HCFC	Ton	0.050 - 0.250
IV	Taxable-plastic bag	Ton	1.440 - 2.400
V	Herbicide which is restricted from use	Ton	0.025 - 0.100
VI	Pesticide	Ton	0.050 - 0.150
VII	Forest product preservative which is restricted from use	Kg	0.050 - 0.150
VIII	Warehouse disinfectant which is restricted from use	Kg	0.050 - 0.150

Source: National Assembly of Vietnam (2012)

At its dawn, environmental taxation contributed to a stable proportion of government budget, of approximately 1.5% on average for the period 2012 – 2014 (GSO, 2012 - 2014). Amongst the taxes levied, fuel taxes stand out as a key instrument. Fuel tax alone generates substantive revenues for the state budget which between 2014-2016 were estimated to have grown by 131% from US$1.227 billion (See Figure 3-13). With regard to future trends, the Green Fiscal Policy Network (2017) estimate that the environmental protection tax could significantly increase the Vietnamese government's revenues by about 3.5%.

↘ Figure 3-13

Collected revenue from Environmental Protection Tax 2012-2015.



Source: General Department of Taxation (2016)

Despite these taxes, energy prices in Vietnam remain low by international comparison, and provide little incentive for both domestic and international investors to invest in energy efficiency measures and in renewable energy (UNDP, 2016). Since existing taxes and fees are largely unable to provide economic incentive for investors to move towards less-carbon-intensive behaviors, the CIGG project (2017b) started in 2017 conducted preparatory analyses of opportunities for introducing a carbon tax in Vietnam. While carbon tax generally appears as a promising tool to support GHG reduction and green growth, an appropriate carbon price and compliance need to be first considered carefully through the coordination of the Ministry of Finance, the Ministry of Environment and Natural Resources and the MPI.

In addition to the environmental protection tax, the Government also introduced separate environmental protection fees on wastewater, solid waste and extractive industries including coal gas, natural gas, crude oil and metallic and non-metallic minerals, and other mined natural resources. However, the revenues collected from these fees have not been sufficient to offset the cost of collection and treatment of wastewater and solid waste and the entire system has been hampered by low compliance (GIZ, 2013).

In this context, efforts to increase engagement of private sector into the low emission development process have become another major focus of the VSSG. GIZ (2015) noted that 88% of the commercial banks and financial institutions within the country were aware of the great business potential of operating in greening sectors, and 68% of them were already planning to expand to green crediting in the short- and medium-term. An array of legal frameworks was then launched to support green growth through the banking system.

To this end, in 2017, the State Bank of Vietnam has issued a decree supporting the development of green credit lines and mainstreaming environmental and social risk management into crediting process within the banking system (SBV, 2017). Other sophisticated financial instruments promoting investments into energy efficiency and renewable energy are currently being developed in the country with the help of international financial institutions.

7. Conclusions

In 2010, Vietnam became a lower middle-income country. With remarkable achievements in education and health and poverty falling from more than 58 percent in 1993 to around 10 percent in 2014, Vietnam became one of the world's best-performing countries in the Human Development Index.

The impressive economic and social achievements, however, have started to take a significant toll on the environment and the use of natural resources. Even though Vietnam's total GHG emissions are still relatively low, the country experiences one of the highest relative emission increases in the world.

The key emission reduction potential lies within the power sector which is being gradually locked into a high GHG emission model. The planned major investments into coal-based power generation will be a major factor contributing to more than a threefold increase of the country's net GHG emissions between 2010 and 2030.

At the same time, the passage of the Vietnam's Green Growth Strategy in 2012 and subsequent elaboration of Green Growth Action Plans in 7 central authorities and 29 provinces laid out a solid foundation for numerous interventions that aim to shift the current rapid economic development in Vietnam towards a low-emission development pathway. The action plans formulate the priority actions that have been determined through a rigorous deliberative process which could be easily revisited and adjusted in the future.

Priority projects selected in provincial Green Growth Action Plans suggest investments with high carbon saving potentials which can be turned into pipelines of feasible projects if their environmental externalities were properly factored into decision-making. Nevertheless, the limited public resources for mitigation support, the present structure of environmental taxes and fees and the wider limitations of environmental decision-making do not offer sufficient incentives that would motivate major investments into low-emission solutions.

Initial support for private investments, which are essential in mitigation actions, already comes from the State Bank of Vietnam 2017 decree supporting the development of green credit lines and mainstreaming environmental and social risk management into crediting process within the banking system.

Significant private investments into green growth are, however, likely to be mobilized only if the private sector has clear overriding reasons for doing so. Important incentives could be established through increased environmental fees and their more stringent collection. Additional incentives can be phased-in through a gradual reflection of carbon price in the energy use through, for instance, a carbon tax. These policy interventions would help reflect environmental externalities and motivate private investments especially into energy efficiency which offers the most cost-effective GHG mitigation opportunity in the country.

In order to avoid adverse knock-on effects on the economy, such tools should be introduced incrementally through a carefully planned step-by-step approach. Phased-in introduction would also help ensure that new economic instruments are duly applied and enforced. Within this changing economic framework, pilot projects supported through international climate finance can play a useful role by demonstrating the benefits of lower-carbon solutions and developing innovative services.

All these tools would create favorable conditions for mobilizing the required private capital for green growth. At the time of writing of this paper, it was impossible to determine if, when and how such supportive frameworks will be developed in Vietnam and to what degree they could change the steeply growing GHG emission trajectory. It will be interesting to follow the progress made and draw lessons for other transitional countries that wish to embark on a green growth pathway. Vietnam offers numerous valuable lessons in this regard.

References

ADB (2009) The Economics of Climate Change in Southeast Asia: A Regional Review. Asian Development Bank. April 2009.

Audinet, Pierre, Bipul Singh, Duane T. Kexel, Suphachol Suphachalasai, Pedzi Makumbe, and Kristy Mayer. 2016. Exploring a Low-Carbon Development Path for Vietnam. Directions in Development. Washington, DC: World Bank.

CIGG (2017a) Monitoring and evaluation of Green Growth Action Plans on the local level. Working document of project on 'Strengthening Capacity and Institutional Reform for Green Growth and Sustainable Development in Vietnam (CIGG)" implemented by MPI and UNDP with support by USAID, July 2017.

CIGG (2017b) Study on the design of a national carbon tax coupled with a project-based offset system. Working document of project on 'Strengthening Capacity and Institutional Reform for Green Growth and Sustainable Development in Vietnam (CIGG)" implemented by MOF and UNDP with support by USAID, July 2017.

ECA (2016). Made in Vietnam Energy Plan. Prepared by Economic Consulting Associates Limited for the Vietnam Business Forum. October 2016

Green Fiscal Policy Network (2017). Vietnam. Green Fiscal Policy Network. UNEP. GIZ and IMF. http://www.greenfiscalpolicy.org/vietnam/, accessed 13 July 2017.

GHG Protocol (2014), Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC): An Accounting and Reporting Standard for Cities. Available at http://www.ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities, accessed on 1 August 2017.

GSO (2012 - 2014): Annual state budget revenue final accounts, period 2012 – 2014. General Statistics Office of Vietnam. http://www.gso.gov.vn/default.aspx?tabid=715

IMF (2017a). Vietnam: Staff Report for the 2017 Article IV Consultation. International Monetary Fund. May 2017

IMF (2017b). Vietnam: Selected Issues. IMF Country Report No. 17/191. International Monetary Fund. July 2017

INDC (2015). Intended Nationally Determined Contribution of Vietnam. http://www.unfccc.int/ndcregistry/PublishedDocuments/Viet%20Nam%20First/VIETNAM%27S%20INDC.pdf, accessed on 11 July 2017

Kreft S., Eckstein D., Junghans L., Kerestan C. and Hagen U. (2015), "Global Climate Risk Index 2015 -Who Suffers Most from Extreme Weather Events? Weather-related Loss Events in 2013 and 1994 to 2013", German watch Briefing paper, 2015, available at https://germanwatch.org/de/download/10333.pdf

Meessen J., Croizer C. and Verle P. (2015), "The Vietnam Green Growth Strategy: A review of specificities, indicators and research perspectives", 2nd Interdisciplinary Symposium On Sustainable Development, May 2015

Michaelowa, A. (2017). Solutions & Mechanisms to Promote the Development, Management, and Use of Carbon Credits and Develop Basis for Revision of Decision 130/2007/QD-TTG on Clean Development Mechanism. Report for Ministry of Planning and Investment, Ministry of Finance, UNDP and USAID, January 2017MPI, UNDP & World Bank (2016) Financing Vietnam's Response to Climate Change: Smart Investment for a Sustainable Future. Ministry of Planning and Investment, UNDP and World Bank. April 2015

MONRE (2015). Technical report, Vietnam's Intended Nationally Determined Contribution. Ministry of Natural Resources and Environment. Hanoi, November 2015.

MOIT (2017) Vietnam Energy Demand and National Power Development Plan. Presentation at Vietnam Energy Partnership. Ha Noi. June 2017.

PDP7rev (2016) Adjustments of the national Power Development Plan for the 2011 - 2020 period with a vision to 2030. Prime Minister Decision 428/QD-TTg. 18 March 2016.

SBV (2017) Directive On Promoting Green Credit Growth and Environmental – Social Risks Management in Credit Granting Activities, State Bank of Vietnam Directive No. 03/CT-NHNN. March 24, 2015.

Trinh N.T.D, Son H.D., Chung N.D. (2016). The methodology for elaborating PGGAP: learning from the pilot phase. Presentation in the VGGS/VGGAP review meeting by MPI/DSENRE. Hanoi. December 2016.

VCCS (2011). Vietnam Climate Change Strategy. Prime Minister's Decision 2139/QĐ-TTg. December 05, 2011.

VGGAP (2014) Vietnam Green Growth Action Plan, Prime Minister Decision 403/QD-TTg. March 20, 2014.

VGGS (2012) Vietnam Green Growth Strategy, Prime Minister Decision 1393/QD-TTg. September 25, 2012.

VSSD (2004) Vietnam Strategic Orientation for Sustainable Development. Prime Minister Decision No. 153/2004/QD-TTg, 17 August 2004.

USAID (2016). Greenhouse Gas Emissions in Vietnam. Available at https://www.climatelinks.org/resources/greenhouse-gas-emissions-factsheet-vietnam, accessed 13 July 2017

USAID (2017) Review of Provincial Green Growth Action Plans and Implementation Plan for Clean Energy Investment Support. Technical Paper under USAID Vietnam Low Emission Energy Program. August 2017.

UNDP & VASS (2016). Growth that Works for All. Vietnam Human Development Report 2015 on Inclusive Growth. United Nations Development Program and Vietnam Academy of Social Sciences. UNDP Vietnam. January 2016.

UNDP & World Bank (2016) Financing Vietnam's Response to Climate Change: Smart Investment for a Sustainable Future. April 2015.

UNDP (2014) Green Growth and Fossil Fuel Fiscal Policies in Vietnam: Recommendations on a Roadmap for Policy Reform. UNDP Vietnam. June 2014.

UNDP (2016) Greening the Power Mix: Policies for Expanding Solar Photovoltaic Electricity in Vietnam. UNDP Vietnam. March 2016.

UNEP DTU (2017): CDM pipeline. Available at http://www.cdmpipeline.org/. Accessed 13 July 2017.

UNEP & GIZ (2017). Green Fiscal Policy Network: Vietnam, http://www.greenfiscalpolicy.org/vietnam/, accessed 13 July 2017.

Vietnam News (2016). Hurdles for environmental impact assessments. Vietnam News. The National English Language Daily. http://vietnamnews.vn/opinion/342617/hurdles-for-environmental-impact-assessments.html#DOhiaMk6t01tfkXd.97

VietNamNet (2017). Vietnam develops coal power despite environmental concerns. VietNamNet Online Newspaper. http://english.vietnamnet.vn/fms/environment/173158/vietnam-develops-coal-power-despite-environmental-concerns.html

World Bank (2016) Mobilizing resources for Climate Change and Green Growth, A Stocktaking, May 2016.

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Dohyun Park[1)]

Climate Change ODA in Vietnam: Case Study on KOICA

1. Introduction

Global Trends in Climate Change

Given the Paris Agreement, the global efforts and cooperation to combat climate change are strengthening. The main goal of the Agreement is keeping global temperature rise below 2 degrees Celsius compared to pre-industrial levels. Furthermore, it urges the global community to try harder to limit temperature to 1.5 degrees, which is a massively ambitious target in the present carbon-intensive society.

It is clear that international development community has to take urgent actions, in a highly serious manner; otherwise, the planet will not be able to meet the temperature increase target within this century. The Paris Agreement calls on global participation of all countries, not just the responsibility of developed countries. In the process, international development cooperation is one of the key tools that will encourage developing countries' participation in the urgent agenda and set a global framework to restrain the temperature rise for future generations.

The Sustainable Development Goals (SDGs) of the 2030 Agenda set by the United Nations provide a global development direction considering economic, environmental and social sustainability that all countries must work to achieve. When it comes to implementation, bilateral and multilateral development agencies have a substantial role to play in triggering global cooperation for tackling climate change, as one of the 17 SDGs. For example, the OECD climate change work, which delivers significant policy implications to development agencies, is focusing on how to move countries to a low-carbon and climate resilient pathway, and how to improve the effectiveness of the global climate regime (OECD, 2017).

The main agents for emission reduction and climate adaptation are nations, local governments, enterprises and individuals. Development assistance plays a bridging role between developed and developing countries to maintain the global climate regime and ensure that protocols function adequately. The key is transferring and proliferating adequate finance and technology to the most needed countries or places.

KOICA Climate Change Actions

Established in 1991 as the grant-aid implementing agency of the Korean Government, the Korea International Cooperation Agency (KOICA) has been contributing multiple efforts to assist sustainable socioeconomic development of partner countries. With its mission “promoting amicable and cooperative relations and mutual exchange by rendering support for

↘ Sustainable Development Goals (SDGs)

1. Manager & Climate Policy Advisor, KOICA

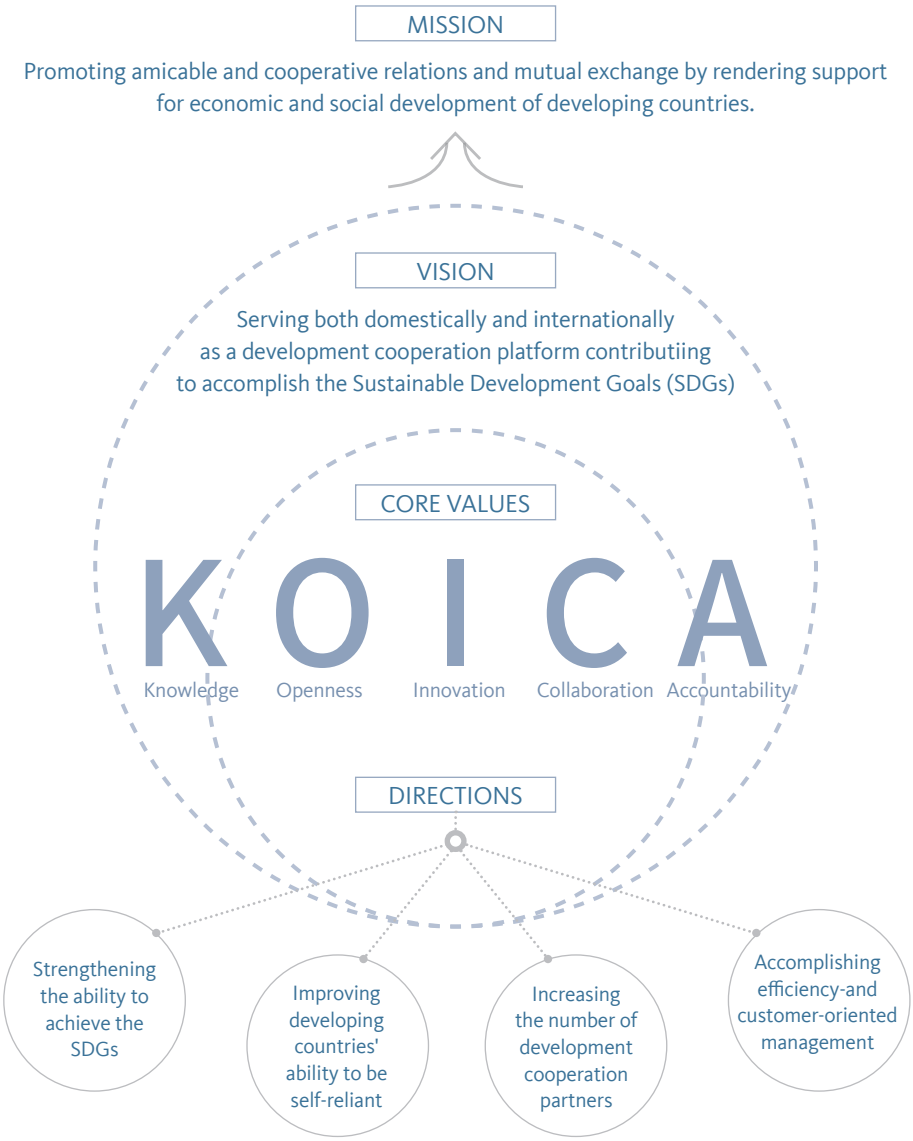
economic and social development of developing countries" (KOICA, KOICA Mission & Vision, 2017), KOICA carries out official development assistance (ODA) programs and projects in various sectors in close cooperation with both domestic and international partners.

As Korea's leading ODA platform, KOICA recently renewed its mid- and long-term strategy to strengthen its alignment with the second International Development Cooperation Plan 2016-2020 of the Korean Government, to deliver ODA programs in a more systematic manner and to contribute to achieving the SDGs. Under the mission described above, it declared 4 pillars of direction: 1) strengthen the ability to achieve SDGs, 2) improve developing countries' ability to be self-reliant, 3) increase number of development cooperation partners, and 4) accomplish efficiency- and customer-oriented management (KOICA, KOICA's Mid-term Sectoral Strategy 2016-2020, 2017).

↘ Figure 4-1

KOICA's Mission & Vision

The Korea International Cooperation Agency (KOICA) was established as a government agency dedicated to providing grant aid programs of the Korean government in April 1991. KOICA endeavors to combat poverty and support the sustainable socioeconomic growth of partner countries. By doing so, KOICA established and strenghtens friendly ties with developing countries.



Although it has a relatively short history and experience in the field of global development, KOICA enjoys a competitive advantage in sharing development knowledge. With experience as an ODA recipient country from 1945 to 1990, Korea is one of the youngest donor countries in the world with less than 30 years of donor experience. However, the up-to-date development knowledge and experience enables Korea to provide very practical development policy support to emerging countries. Taking the opportunity of joining the OECD Development Assistance Committee (DAC) in 2010, KOICA has committed to share Korea's unique development experience with the global development society. Currently, KOICA provides USD 741.9 million for development projects in 46 countries internationally (KOICA, Overview of KOICA, 2017).

During 2014-2015, approximately 18% of total project budget went to the technology, environment and energy sectors, which may be interpreted as climate change related projects. If the agriculture, forestry and fisheries sectors are also included, climate change related projects could account for over 30% of the budget.

↘ Table 4-1

KOICA Budget Allocation by Sector 2014~2015

Sector	2014		2015	
	USD	Share	USD	Share
Health	92,190	16.7%	92,813	16.5%
Education	131,053	23.8%	117,682	20.9%
Public Administration	90,687	16.4%	92,981	16.5%
Agriculture, Forestry and Fisheries	80,986	14.7%	82,890	14.7%
Technology, Environment and Energy	78,459	14.2%	101,005	17.9%
Emergency Relief	13,180	2.4%	14,024	2.5%
Others	64,743	11.7%	61,856	11.0%
Total	551,296	100.0%	563,250	100.0%

Consequently, KOICA's climate change work is a relatively new area. The work began with the East Asia Climate Partnership (EACP), which was the first development cooperation initiative in climate change announced by the Government of Korea. Entrusted by the Government, KOICA implemented the initiative with a total budget of USD 200 million from 2008 to 2012.

The purpose of the package program was to assist the climate response of Asian partner countries and to promote international cooperation. The Partnership focused on five specific areas: 1) water management, 2) low-carbon energy, 3) low-carbon city, 4) forestation and biomass, and 5) waste management. Each area's development target aligned with the Millennium Development Goals (MDGs) and aimed for low carbon green growth of the East Asian and Pacific Island countries.

The program served as a trigger for KOICA to start paying attention to the global climate change agenda and global cooperation. However, some limitations also exists. The EACP program evaluation results describe that linkage between project level activities was not highly considered and climate-related purpose was not clearly targeted differentiated from non-climate considering ODA projects.

2. Climate Change ODA Strategy

Country Partnership Strategy(CPS) for Vietnam

The Republic of Korea's Country Partnership Strategy (CPS) is a five-year national strategy and the highest-level national ODA policy. The Korean Government formulated CPS to maximize synergy effects and to improve ODA effectiveness through strategic concentration (Office for Government Policy Coordination, Country Partnership Strategy, 2017). The CPS covers 24 priority partner countries, including Vietnam, out of 134 partner countries.

CPS Vietnam 2011-2015

The Country Partnership Strategy for Vietnam 2011-2015 outlines Korea's proposed partnership programs for its development assistance in Vietnam, and sets out how official assistance from Korea could assist Vietnam in achieving its development goals to become a modern industrialized country. (Office for Government Policy Coordination, The Republic of Korea's Country Partnership Strategy for the Socialist Republic of Vietnam 2016-2020, 2011).

The core areas of the strategy are composed of three main pillars: 1) environment and green growth, 2) technical and vocational education and training, and 3) transportation. It is meaningful that Korea set the highest development cooperation priority to green growth in Vietnam. These target areas were identified in consideration of development coordination as well as careful study on Vietnamese needs.

Specifically, the first pillar of the strategy focused on three strategic areas: 1) water supply and sanitation, 2) waste management, and 3) response to climate change through the generation of renewable energy and forest management. This naturally led Korean ODA during the period to provide technical assistance, policy recommendations and capacity building programs to enhance Vietnam's capabilities, especially those related to green growth. In practice, all ODA projects delivered by KOICA and the Economic Development Cooperation Fund (EDCF)[2] focused on the three strategic areas during the period.

CPS Vietnam 2016-2020

Since Vietnam has achieved significant socio-economic development during the past decade, development priority and focus areas have been updated adequately. According to the Socio-Economic Development Strategy (SEDS) 2011-2020 of Vietnam, the central target was to achieve GDP per capita up to USD 3,500 and the following Socio-Economic Development Plan (SEDP) 2016-2020 supported the national strategy (Prime Minister Office, 2016).

The development strategy no longer aims at extreme poverty reduction and income generation only but targets a wider development scope. Unprecedented development environment of the nation requires higher structural reforms and governance enhancement together with consideration of environmental capital management. Considering the green growth spirit, therefore, the Government of Korea renewed the CPS to Vietnam accordingly.

The updated Country Partnership Strategy for Vietnam 2016-2020 sets out four priority cooperation opportunities: 1) transportation, 2)

2. Economic Development Cooperation Fund (EDCF) is the economic development assistance window of the Republic of Korea. Entrusted by the Ministry of Strategy and Finance (MOSF), the fund provides the nation's ODA loans. The Export-Import Bank of Korea (K-EXIM) is in charge of implementation

water management and healthcare, 3) governance (public administration) and 4) education. Among the priority areas, the water management and healthcare sector focuses on capacity building as a response to climate change, comprehensive rural development, water, sewerage, and industrial waste treatment facilities in major cities, and public health services (Office for Government Policy Coordination, The Republic of Korea's Country Partnership Strategy for the Socialist Republic of Vietnam 2016-2020, 2017).

Recognizing the vulnerability to the effects of climate change, the Vietnamese Government emphasizes climate change adaptation and risk prevention to natural disasters. Based on development needs assessment and strategic approaches, the program aims to improve general conditions for health services and sanitation considering the water and sanitation impacts of climate change. Generally, the strategy guides the approach, direction and implementation of Korean ODA during the period 2016-2020.

KOICA Climate Change Strategy

Between 2005 and 2015, KOICA devoted USD 380 million to projects responding to the impact of climate change. Mitigation and adaptation activities account for 29% and 53% respectively of the total volume and 18% of crosscutting projects (KOICA, KOICA's Mid-term Sectoral Strategy 2016-2020, 2017).

Green ODA Strategy 2013-2015

In the past, the EACP could cover only 10% of total project needs from partner countries due to the limited resources. In general, climate change related or green ODA takes roughly 15% share of the total ODA volume of KOICA. The figures vary according to definition and the scope of green growth work. Aiming to enlarge the portion of green ODA, KOICA developed its Green ODA Strategy 2013-2015, right after the EACP initiative, which is the forerunner of KOICA's climate change strategy.

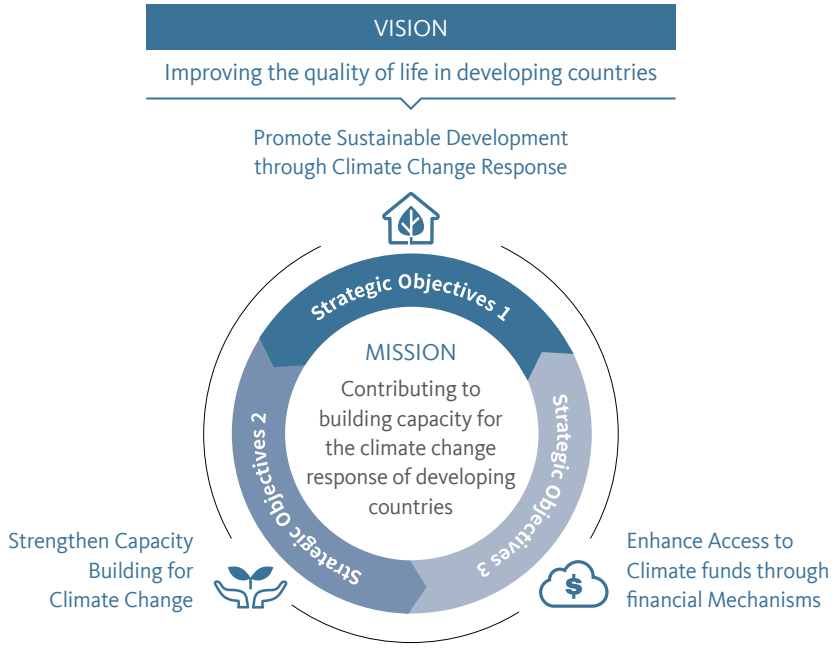
The Green ODA Strategy emphasized that activities of supporting developing countries must shift their development paradigm to greener economy. For implementation, the strategy established strategic framework for green ODA and the result-oriented approach. The term Green ODA was defined by referring to the UNEP and the OECD work and it covered various sectors including environment management, energy, water, agriculture, forestry, health and sanitation, fishery, and low carbon cities.

KOICA Climate Change Response Mid-term Strategy 2016-2020

Recently, KOICA established 10 major sectoral mid-term strategies including climate change. KOICA's Climate Change Response Mid-term Strategy 2016-2020 declares a new mission aimed at contributing to building capacity for the climate change response of developing countries by supporting three strategic objectives: 1) promoting sustainable development through climate change response, 2) strengthening capacity building for climate change, and 3) enhancing access to climate funds through financial mechanisms. Main indicators to monitor and evaluate the output and outcome of each objective have been developed (KOICA, KOICA's Mid-term Sectoral Strategy 2016-2020, 2017).

↘ Figure 4-2

KOICA Climate Change Response Mid-term Strategy 2016-2020



Promoting climate change consideration takes a two-track approach: development of mitigation and adaptation projects and mainstreaming climate consideration into other sectoral projects. Capacity building and supporting direct and international access to climate finance are also programs emphasized in the strategy.

According to the strategy, KOICA recognizes the significance of measurement, report, and verification (MRV) in monitoring and evaluating mitigation activities. Adopting a standardized MRV system is one of the issues to be addressed immediately. Adaptation support and capacity building activities are more likely to focus on the least developed countries and small island countries. The current version provides strategic direction rather than details. Therefore, follow-up work such as developing a climate change guideline and toolkit is required.

↘ Table 4-2

Programs, outcome, and indicators

Programs	Outcome	Indicators
• Support mitigation and adaptation projects • Mainstreaming climate projects	• Reduction in greenhouse gases	• The amount of CO_2 reduced (tons of CO_2-eq)
	• Improvement in climate adaptive capacity	• The distribution rate of water service and agriculture water (%) • The increased rate of major crops production (%)
	• Mainstreaming of climate projects	• The ratio of mitigation and adaptation technologies applied in the total number of projects (%)
• Enhance adaptive capacity • Support for establishing national GHG inventory	• Better capacity building for climate change	• Number of training courses on climate change response • Number of national greenhouse gas inventories
• Catalyst to access global development • Cultivating partnership and co-financing	• Improvement in access to climate funds	• Number of follow-up projects for feasibility study or master plan projects • Number of co-financing projects developed

3. Case Studies

KOICA's activities in Vietnam

During the last decade, Vietnam received the biggest share of Korean ODA almost every year. KOICA allocated a significant amount of grant ODA budget for supporting socio-economic development of Vietnam. At the same time, Vietnam was one of the biggest beneficiaries of the EACP both in terms of number of projects and budget allocation. During the EACP period, climate change projects in Vietnam included "Construction of Water Supply System Project in Buon Ho Town", "Establishment of the Electronic Manifest System for the Integrated Management of Hazardous Water", and "Feasibility Study on Bus Rapid Transit (BRT) System in Ho Chi Minh City".

In addition, KOICA provided budget support to multilateral development agencies delivering climate change and green growth projects. The earmarked supporting activities from KOICA include: 1) Economic Research on Climate Change and Low Carbon Growth Strategies in East Asia (ADB), 2) Low Carbon and Green Special Economic Zone Development (IFC), 3) Capacity Building in Asian Countries to Address Greenhouse Gas Emission from Ships (IMO), 4) East Asia Low Carbon Green Growth Roadmap Development (UNESCAP), and 5) Water Management and the Efficient Use of Resources to Support Low Carbon Growth in Asia. Most of these projects directly and indirectly involved Vietnamese beneficiaries considering that the main outputs came from capacity building of relevant governance or personnel and distributing research outputs.

KOICA also delivered various types of programs such as civil society partnership, fellowship, and volunteering program. Eventually, the EACP triggered KOICA's climate change and green growth work and significantly influenced the following development cooperation activities in Vietnam. However, various kind of activities were not connected with each other or did not fully considered follow-up activities beforehand. Counter-partner government bodies or organizations of project were differ and this occasionally occurred confusing in the donor community and market. This remains to be a demanding challenge to be improved for future KOICA programs.

On the other hand, Vietnamese national environment and desires for green growth was also strong and favorable. The Government of Vietnam announced the Vietnam Green Growth Strategy (VGGS) in 2011 and the Prime Minister's Office, the highest level of governance, managed the new national development paradigm. Along with the strong national policy drive, many international development agencies consulted with the Government of Vietnam to further develop and implement the strategy. Not only KOICA, but also UNDP, GIZ, Belgium, the EU, ADB, and USAID participated in the delivery of green growth in Vietnam.

Supporting Vietnam Green Growth Strategy

The Vietnam Green Growth Strategy was a symbolic project, which signaled the shift of Vietnam's development paradigm. It is noticeable that Vietnam is one of the fastest growing economy and one of the most climate vulnerable countries at the same time. Typhoons, floods, droughts and landslides are recurrent and were responsible for losses equal to 1.5 percent of annual GDP between 2001 and 2010 (USAID, 2017).

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d 

a. Announcement of Vietnam National Green Growth Strategy

b. Launching Workshop on Action Plan of Vietnam Green Growth Strategy

c. Kickoff Workshop on Project Supporting the Green Growth Strategy Imlementation in Vietnam

d. Final Workshop on Project Supporting the Green Growth Strategy Imlementation in Vietnam

The United Nations Development Program (UNDP) assisted the development of the National Green Growth Action Plan and KOICA supported the development of Action Plans at provincial levels, sponsoring 2 million USD. In the early stage, KOICA focused on three provinces: Bac Ninh, Ben Tre, and Quang Nam. Later, almost 40 other provinces in Vietnam replicated their Action Plans and the green growth movement gradually spread out nationwide.

The small-scale provincial-level activities produced significant policy implications. Each study identified sectors most vulnerable to climate change impact and the most promising sectors for green growth at provincial levels. In the process, KOICA's project team worked closely with national and local stakeholders to develop a shortlist of green growth pilot projects. Among nearly 100 potential green growth projects proposed initially, the project team together with the Vietnamese Government and external specialists identified the most feasible and the most needed items in each province.

As of 2017, one of the identified projects is scheduled to kick off in Bac Ninh province under the name of "Promoting Investment Market for Energy Efficiency in Industrial Sector in Vietnam". This project aims to collaborate with the World Bank to improve energy efficiency, which plans to provide investment lending as much as USD 312 million, and to scale it up in cooperation with the Green Climate Fund (GCF). The GCF offered to participate as a grant provider together with KOICA and a partial risk sharing facility for the bank lending. The project aims to directly provide benefits to local enterprises and reduce emissions through general improvement of efficiency and capacity to handle energy supply and demand.

Donor Coordination

Generally, the donor society recognizes Vietnam has one of the most favorable environments to perform ODA projects and aid effectiveness is relatively high. One of the reasons is that the Vietnamese Government plays an important role and successfully manages donor coordination. Considering that climate change and green growth ODA invites multi-stakeholders and facilitates the shift of Vietnam's development paradigm, donor coordination and harmonization is a critical factor for project success.

The V-KIST[3] project is a good case example. The main purpose of the project is to establish a national research institute for science and technology in Vietnam. The project allocated a significant amount of budget for building the construction component. USAID on its part focused on energy efficiency in buildings in Vietnam and the Vietnam Clean Energy Program is an example.

After a number of consultations, Vietnam, KOICA and USAID agreed on building the V-KIST as a symbolic green building in Vietnam. The main building of the institute is designed to be energy efficient and the process for obtaining green building certifications including the G-SEED and LOTUS[4] certification is underway.

Denmark is another important green growth partner of Vietnam. Based on the bilateral agreement for global green growth

3. V-KIST: Vietnam-Korea Institute of Science and Technology. The leading Korean national institute KIST participated in the project as a core partner to establish a customized Vietnamese national institute for science and technology. The project marked one of the biggest grant aid projects of KOICA in terms of budget
4. G-SEED and LOTUS certifications are official green or environmentally friendly building certification standards of Korea and Vietnam respectively. Government bodies authorize and manage the both certifications.

implementation between the governments of Korea and Denmark, the three parties, including Vietnam, held a trilateral workshop taking the opportunity of Asia LEDS Partnership[5] held in Ho Chi Minh City, Vietnam in 2015. Through the workshop, the three parties reviewed possibilities to access climate funds including the GCF, and discussed project pipelines and potential benefits. The Korean side presented the key results of green growth supporting project in Vietnam and progress of project pipeline development for energy efficiency in Bac Ninh Province.

Donor coordination and collaboration is not limited to the above-mentioned two cases. The two cases, however, showed that harmonization is critical for successful development cooperation and that country ownership is essential. The Vietnamese Government has constantly expressed its strong will to participate in climate change works and has proved its capabilities. Any kind of development cooperation work would not have succeeded without the strong policy support from Vietnam.

Governance for climate change agenda is still not clear in many countries and Vietnam's case either. In often cases in Vietnam, Ministry of Planning and Investment plays coordinator responsibility because climate change agenda is regarded as additional pipeline of financial inflow. However, any single government body is not able to handle climate change agenda because it contains institutional issue, technology issue, and financial issue and so on. To enhance country ownership and donor coordination in climate change and green growth agenda, enhanced governance is required. Multi-governmental participation and private sector's role may be encouraged for the future governance. This report only raises the governance issue but additional research and careful feasibility-study is required.

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a. Bird's-eye view of the V-KIST Project
b. Signing Ceremony of the V-KIST Project

4. Conclusion

Vietnam is now a leading green growth country in the region. This is unique because considerations for climate are likely to be regarded as development interference for many developing nations. Hard work of the Vietnamese Government, such as Vietnam Green Growth Strategy (VGGS), Action Plan and implementation struggles, were very timely and proactive. Indeed, all the success was possible thanks to the Vietnamese Government's ownership and partly due to international development cooperation. It is never too early to take actions given the scale and growth rate of the economy. Because the development experiences around the world which use to call for "development first and clean up later" tended to cost a lot more in the end.

Development cooperation and fighting climate change are not opposed to each other as once thought. The key is always finance and technology transfer with adequate development direction and providing right signals to the market. Global climate change work will succeed when good policies succeed in delivering the right signals to the market and individuals who are the implementing entities. It is important to persuade key stakeholders that climate business opportunities are huge and even cost-effective for development. Implementation and market creation is the next step, which may follow naturally. Vietnam's policy and institutional setup for climate change response and green growth is quite complete and now it is at the

5. Low Emission Development Strategies Global Partnership (LEDS Partnership): founded in 2011, the global partnership facilitates peer learning, technical cooperation and knowledge sharing for low emission development strategies. It has four regional platforms including Asia and six crosscutting working groups (http://ledsgp.org).

implementation stage. Continuous efforts are required at various levels and sectors.

In addition, country ownership, appropriate governance and development harmonization is another key for success. From that perspective, Vietnam could be a model case for the global development community. Development agencies, including KOICA, are committed to making the most of development work in terms of development effectiveness, which is ensured under the premise of harmonized condition. Interventions from international development agencies will only function given the conditions that development assistance strategies meet the on-the-ground needs and local strategies. In this sense, the importance of country ownership cannot be emphasized enough. Appropriate governance is an institutional basis to maintain all these works.

For future climate change ODA projects, this report draws few policy recommendations: 1) enhancing climate change governance and having multi- stakeholders is necessary, 2) country ownership and development harmonization is key for success, 3) having joint evaluation for climate change project.

Realization of national and local climate change responding strategies and the green growth paradigm depends on future collaboration. Vietnam is one of the most important partner countries for Korea and cooperation relationship is becoming more elaborate. As Korea's development assistance also matures, hopefully the two countries will find sustainable win-win opportunities and build up strategic partnership as core development partners in the future.

References

KOICA. (2017). KOICA Mission & Vision. Retrieved from KOICA: http://koica.go.kr/

KOICA. (2017). KOICA's Mid-term Sectoral Strategy 2016-2020. Seongnam: KOICA.

KOICA. (2017). Overview of KOICA. KOICA.

OECD. (2017). OECD Climate Change. Retrieved from OECD: http://www.oecd.org/env/cc/

Office for Government Policy Coordination. (2011). The Republic of Korea's Country Partnership Strategy for the Socialist Republic of Vietnam 2016-2020. The Government of Republic of Korea. Retrieved from ODA Korea: http://odakorea.go.kr/eng.policy.CountryPartnershipStrategy.do

Office for Government Policy Coordination. (2017). Country Partnership Strategy. Retrieved from ODA Korea: http://www.odakorea.go.kr/eng.policy.CountryPartnershipStrategy.do

Office for Government Policy Coordination. (2017). The Republic of Korea's Country Partnership Strategy for the Socialist Republic of Vietnam 2016-2020. The Government of the Republic of Korea.

Prime Minister Office. (2016). Socio-Ecoomic Development Strategy, Socio-Economic Development Strategy. Hanoi: Government of Vietnam.

USAID. (2017, January). Climate Risk Profile: Vietnam. Retrieved from Climatelinks: https://www.climatelinks.org/resources/climate-change-risk-profile-vietnam

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Aryanie Amellina[2)]

Joint Crediting Mechanism: Opportunities for Low-Carbon Technology Transfer in Vietnam

1. Introduction

Vietnam is a tropical country with areas of low-lying land and a long coastline of over 3,000 km, running through major cities and key economic zones. Accordingly, the country is particularly sensitive to the impacts of climate change such as sea level rise and tropical cyclones. According to World Bank forecasts, Vietnam is one of five countries in the world most severely affected by the adverse impacts of climate change (World Bank, 2011).

Climate change is considered as one of the key development issues in Vietnam due to the continued negative impact on both the environment and socio-economic development, especially in the delta and coastal areas of the country. Both adaptation and mitigation associated with development are being given equal attention and priority. Vietnam also considers this challenge as an opportunity to change to a new development path, to speed up the development, transfer and deployment of environmentally friendly technologies for a low-carbon economy.

As a Non-Annex I Party to the United Nations Framework Convention on Climate Change (UNFCCC) Vietnam has no obligation to reduce emissions. However, it has continued to prove its commitment to the framework through submissions to the National Communications, Greenhouse Gas (GHG) inventory and Biennial Update Report, while continuing to explore mitigation options and adaptation measures. Most recently, Vietnam submitted its new climate action plan to the UNFCCC as Vietnam's Intended Nationally Determined Contribution (INDC), identifying a GHG reduction pathway in the 2021-2030 period. Vietnam's INDC clearly stated that the country will aim to use domestic resources and reduce GHG emissions by 8% by 2030 compared to the Business as Usual scenario (BAU). In fact, this figure could increase up to 25% with international support through bilateral and multilateral cooperation, as well as through the implementation of new mechanisms under the Paris Agreement.

Consequently, the Joint Crediting Mechanism (JCM) is one of the important cooperation between the Government of Vietnam and the Government of Japan since its initiation in July 2013. The JCM is an initiative by Japan which aims to facilitate diffusion of leading advanced low-carbon technologies, products, systems, services and infrastructure as well as implementation of mitigation actions, contributing to the sustainable

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development of Japan's partner countries. It also supports the realization of Japan's international commitments to reduce GHG emissions and contributes to the achievement of global goals in climate change response.

The main purposes of this chapter are: (i) to review the existing regulatory and policy framework for low-carbon development in Vietnam; (ii) to provide an overview of the JCM, its implementation progress in partner countries with special focus on Vietnam, and to discuss how the JCM could facilitate low-carbon technology transfer and contribute to sustainable development of the country; and finally (iii) to discuss highlighted projects related to JCM in Vietnam.

2. Regulatory and climate policy framework for low-carbon development in Vietnam

Since the early 2000s, issues related to climate change have received a great deal of attention from the Government of Vietnam and in 2008, it announced the National Target Program to respond to climate change. The program aimed to assess the impacts of climate change in different sectors and areas as well as its impact on the country's sustainable development, and to orient the development of adaptation and mitigation measures. The Ministry of Natural Resources and Environment (MONRE) was designated by the Prime Minister to take the lead and serve as the focal point for policies and actions related to climate change.

Climate change has now been mainstreamed into the National Socio-Economic Development Strategy (2011-2020), and in 2011, the National Strategy for Climate Change was announced by the Government of Vietnam, setting targets for 2011-2015 and 2016-2050 to put Vietnam on course for a low-carbon economy and sustainable development. In 2012, the National Green Growth Strategy was adopted, setting targets and measures to reduce GHG emissions. In addition, in 2014, the Government passed the amended Law on Environmental Protection, including an entire chapter dedicted to climate change. Most recently, the Government submitted Vietnam's INDC to the UNFCCC Secretariat, demonstrating its legal commitments to reduce GHG emissions and climate change adaptation after 2020 (Table 5-1).

Major climate policies to support the country's efforts for low-carbon development

↘ Table 5-1

2002	Ratified the Kyoto Protocol
2003	Submitted Initial National Communication to UNFCCC Secretariat
2008	National Target Program to Respond to Climate Change
2010	Law on Economical and Efficient Use of Energy
	Submitted Second National Communication to UNFCCC Secretariat
2011	National Strategy on Climate Change
2012	National Green Growth Strategy
	National Action Plan on Climate Change
2013	Law on Natural Disaster Prevention and Control
2014	New Law on Environmental Protection
2015	Submitted Vietnam's INDC to UNFCCC Secretariat
2016	Vietnam signed the Paris Agreement
	Law on Technology Transfer (Amendment)

Source: prepared by the authors, 2017

In its Initial Biennial Updated Report submitted to the UNFCCC, Vietnam reported total GHG emissions of 246.8 million tCO_2e in 2010. The largest proportion of emissions (53.05%) comes from the energy sector, reaching 141.1 million tCO_2e, followed by agriculture (33.2%) (MONRE, 2014). The World Bank also estimated that Vietnam's emissions will increase 4.5 times compared to the reference scenario (BAU) between 2010 and 2030. In a study, the World Bank team reviewed and evaluated a range of highly feasible economically technological options in a wide range of areas. The results of the study show that if effective investments in low-carbon technologies are put in place, especially in energy conservation and the electricity industry, total CO_2 emissions could be reduced by 845 $MtCO_2$ by 2030 (Audinet et al., 2016).

Such plans are described in Vietnam's INDC. In mitigation, intended contributions to reductions in GHG emissions focus on energy, agriculture, land use, land use change and forestry, and waste management sectors. Particularly for the energy sector, emission reduction activities cover fuel combustion for energy production, manufacturing industries, construction, transportation, and civil services.

However, according to Vietnam's INDC Team Leader, Department of Hydrology, Meteorology and Climate Change (DMHCC), MONRE, Vietnam can only earmark USD 3.2 billion out of a planned budget of USD 21 billion to achieve the 25% target mentioned in INDC. The remaining USD 17.8 billion will depend on international support (DWRM, 2015).

There is evidently huge scope for investments in energy saving and renewable energy technologies, but frameworks to mobilize capital from private as well as from bilateral and multilateral sources are still extremely limited to date. It is therefore an imperative for Vietnam to establish frameworks that will maximize opportunities for financing and investments in projects/program that promote low-carbon technologies.

Vietnam has cooperated with international partners to address investment barriers and explore an ideal framework for promoting low-carbon technologies, such as participating in Technology Needs Assessment, Climate Technology Center and Network, Clean Technology Fund, and submitting Nationally Appropriate Mitigation Actions, all under the UNFCCC. It also cooperates with other countries such as Germany (solar energy), ASEAN countries (energy cooperation), and Japan (JCM), among others. Eliminating investment barriers will allow Vietnam to demonstrate its intended contribution to mitigation of global climate change impact and make stronger future commitments.

3. An overview of the JCM and its implementation progress in the partner countries

Overview of the JCM

In December 2015, the first ever binding climate change agreement called the Paris Agreement was adopted by 197 nations at UNFCCC COP21. According to the Paris Agreement, all Parties are obliged to "prepare, communicate and maintain successive nationally determined contributions" and "pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions". Moreover, the Paris

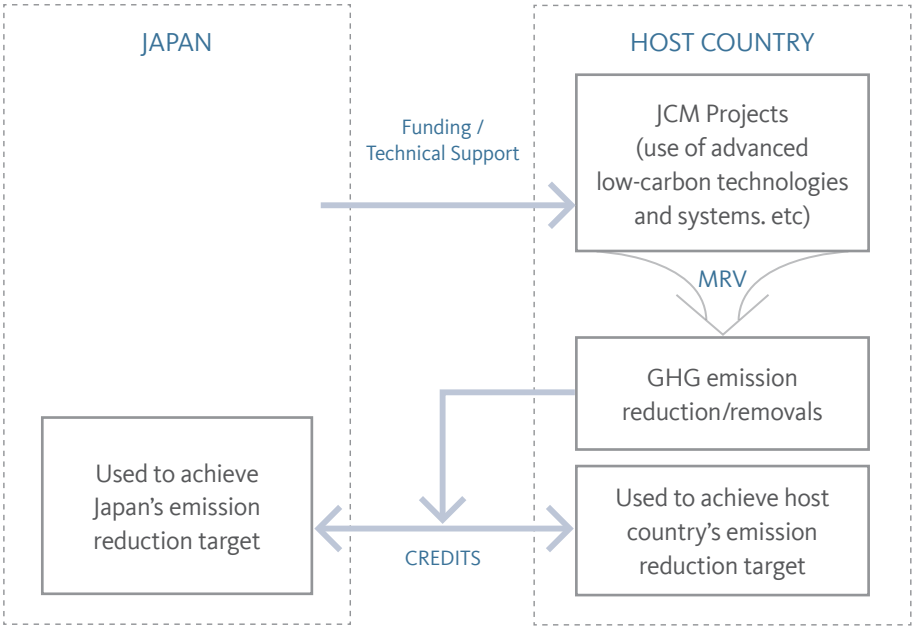
Agreement clearly paved the way for the use of voluntary cooperation between countries through "cooperative approaches" stipulated in Article 6. The JCM is regarded as an example of a cooperative approach. It was also proposed by the Japanese Government as a complementary mechanism to the Clean Development Mechanism (CDM).

It is strongly believed that the technology-driven transition to low-carbon energy is well under way, a trend that made the 2015 Paris Agreement possible, but in reality, there is still a long way to go to decarbonize the world economy (Figueres et al., 2017). Therefore, promotion, replication and effective utilization of low-carbon technologies, as well as increased access to diverse financial sources all play a crucial role in reducing GHG emissions effectively. Recognizing this need, particularly in developing countries, Japan introduced the JCM in 2013 as a means to address the needs of developing countries and through this new mechanism, developing countries are able to access financial support and take advantage of advanced low-carbon technologies at a lower cost.

Conversely, the JCM will also help Japan and the JCM partner countries achieve emission reduction targets and ensure sustainable development (Figure 5-1). The JCM is designed to ensure transparency, simplicity and practicality, but it also addresses the issue of potential double counting of emission reduction through its procedures and registry systems established by Japan and each JCM partner country. A registry system can also help ensure that registered JCM projects are not claimed in other international climate mitigation schemes.

↘ Figure 5-1

Overview of the Joint Crediting Mechanism scheme



Note: GHG = greenhouse gas, JCM = Joint Crediting Mechanism, MRV = monitoring, reporting, and verification.

Currently, the JCM is implemented as a non-tradable crediting mechanism based on bilateral cooperation agreements between Japan and each partner country. Therefore, JCM credits cannot be traded on the international market but can only be transferred between Japan and the partner countries, or traded domestically within Japan and each country. The potential of JCM to be approved as a tradable crediting mechanism on the international market may be explored in the future.

As of June 2017, 17 countries have signed bilateral agreements on the JCM with Japan: Mongolia, Bangladesh, Ethiopia, Kenya, Maldives, Vietnam, Laos, Indonesia, Costa Rica, Palau, Cambodia, Mexico, Saudi Arabia, Chile, Myanmar, Thailand and the Philippines. Vietnam and Japan signed the agreement on July 2, 2013. Original agreements set the JCM to operate until the Paris Agreement comes into effect, which is scheduled for 2020. However, both Japan and each partner country may decide to extend this agreement, as has been decided between Japan and Mongolia, allowing the JCM to operate until 2030.

Joint Committees between Japan and each partner country develop the JCM Project Cycle Procedures and other JCM Rules and Guidelines to be followed by project participants. The emission reduction credits will be distributed to project participants on both sides and to the respective governments. Accordingly, both Japan and the partner country can use the JCM credits towards their own GHG emissions reduction goal.

Calculation of GHG emission reductions in JCM projects

The amount of emission reductions credited under the JCM is calculated as the difference between "reference emissions" and "project emissions" (Equation 1). Reference emissions and project emissions are to be calculated based on the appropriate approved methodology.

$ERp = REp - PEp$ (1)

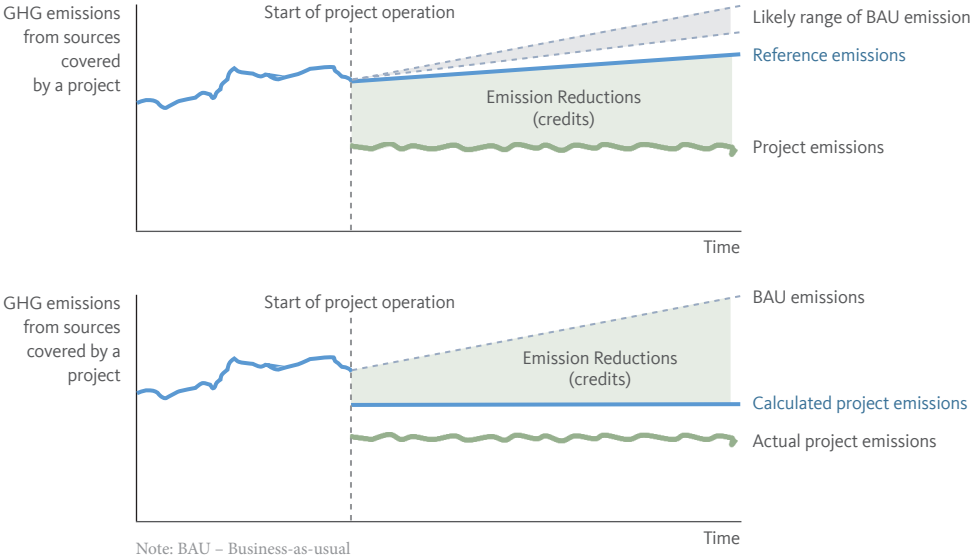
ERp : Emissions reduction during the period p [tCO_2/p]
REp : Reference emissions during the period p [tCO_2/p]
PEp : Project emissions during the period p [tCO_2/p]

There are two possible approaches to ensure a net decrease and/or avoidance of GHG emissions by JCM projects (Figure 5-2). The first approach is calculating reference emissions lower than BAU emissions. The reference emissions are set by considering one or more of the following factors: (i) current situation and performance; (ii) average historical performance; (iii) performance of similar products and technologies that compete with the project technology; (iv) legal requirements; and (v) best available technology in Vietnam (JC-JCM Vietnam, 2016).

The second approach is calculating project emissions using conservatively set default values provided in the applied methodology, instead of using actual values obtained through monitoring. This approach often results in obtaining calculated project emissions that are higher than the actual project emissions. Both approaches widely use default values to reduce the burden for monitoring, and to simplify the validation and verification process by third party entities (TPEs).

↘ Figure 5-2

Calculation of emission reductions using (i) calculated reference emissions and (ii) calculated project emissions



Note: BAU – Business-as-usual
Source: adapted from Government of Japan (GOJ), 2017

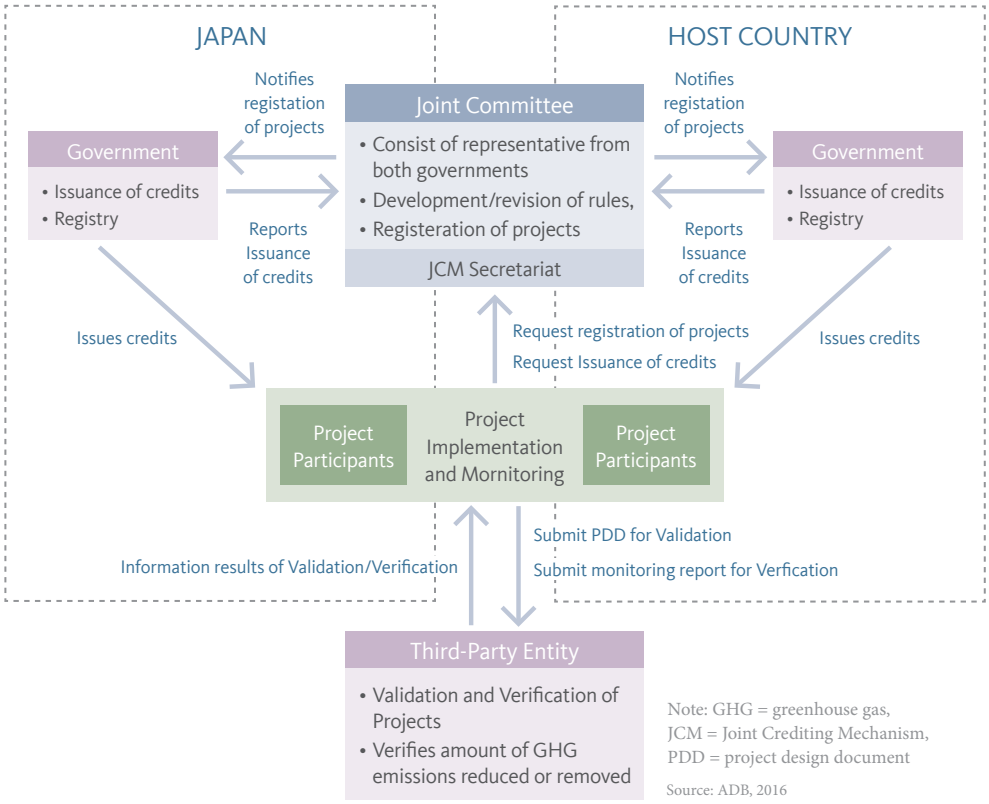
Stakeholders and their roles in the development, implementation and management of JCM projects

The relationship and division of roles between the Government of Japan, partner countries, the Joint Committee and other stakeholders in the JCM implementation are shown in Figure 5-3. A Joint Committee consists of representatives from both the Government of Japan and the host country. This Committee will have two co-chairs, one from Japan (usually represented by a minister-counsellor from the Embassy of Japan in the partner country) and one from the partner country (usually an official from the Ministry of the Environment or relevant Ministry). Since the Joint Committees between Japan and each country establish the JCM Rules and Guidelines separately, different countries may have different detailed rules set based on domestic circumstances. For example, project participants in Vietnam are required by domestic regulations to provide project documents in the Vietnamese language. In Indonesia, projects are required to pass a review on "Sustainable Development Criteria" in order to request credits issuance.

A JCM Secretariat is established in each country to provide direct support to the Joint Committee and facilitate implementation of the JCM according to applicable rules. The governments of partner countries usually also establish a local JCM secretariat which serves as a focal point for domestic coordination and implementation. In Vietnam, the DMHCC under MONRE is assigned as the focal point.

↘ Figure 5-3

Stakeholders and theirs roles in Joint Crediting Mechanism



Note: GHG = greenhouse gas, JCM = Joint Crediting Mechanism, PDD = project design document

Source: ADB, 2016

The JCM financial support program

Since the beginning of the JCM, the Government of Japan has been providing financial support programs to assist project development and implementation, as well as providing capacity building of governmental authorities in the partner countries, and information dissemination on the JCM to business sectors on both sides (Table 5-2).

↘ Table 5-2

Major JCM financing programs provided by the Government of Japan

Support Program	Financial Support Structure
JCM Model Project (funded by the Ministry of Environment, Japan)	- Up to half (<50%) of the initial investment cost for facilities, equipment, vehicles, etc. that reduce CO_2 from fossil fuel combustion. - The upper limit of finance rate (%) for projects depends on, among other factors, the number of already selected projects using a similar technology in each partner country. - May be implemented in collaboration with JICA and other government-affiliated financial institutes.
JCM REDD+ Model Project (funded by the Ministry of the Environment, Japan)	- Finances part of the project cost. - Encourages participatory monitoring of illegal logging, disaster prevention, forest restoration, and provision of alternative livelihoods.
Japan Fund for JCM (Japan Trust Fund Managed by ADB)	- Applicable for projects co-financed by the ADB. - Grant for incremental cost of technologies public and state-owned entities projects. - Interest subsidy to ADB-financed loans for non-government projects, private sector borrowers and financial institutions.
JCM Demonstration Projects (funded by the Ministry of Economy, Trade, and Industry, Japan)	- Finances part of the initial investment costs associated with implementing advanced low-carbon technologies, including basic design costs, manufacturing cost of equipment, costs of international transport, and costs associated with JCM MRV and the TPE (ADB, 2016)

Source: IGES, 2015

Through the financing programs, the Government of Japan is committed to providing full or partial financial support (up to 50%) of the total initial investment cost of the project, mainly targeting the cost of procurement, installation of advanced low-carbon technologies and construction costs, and costs for MRV. The average annual budget for the JCM Model Project Program has increased from JPY 1.2 billion in fiscal year (FY) 2013 to JPY 3 billion in FY2017 (GOJ, 2017). The fund entrusted to the ADB JFJCM for FY2017 is JPY 1 billion, and the budget for JCM Demonstration Projects for FY2016 is about JPY 2.4 billion (GOJ, 2017).

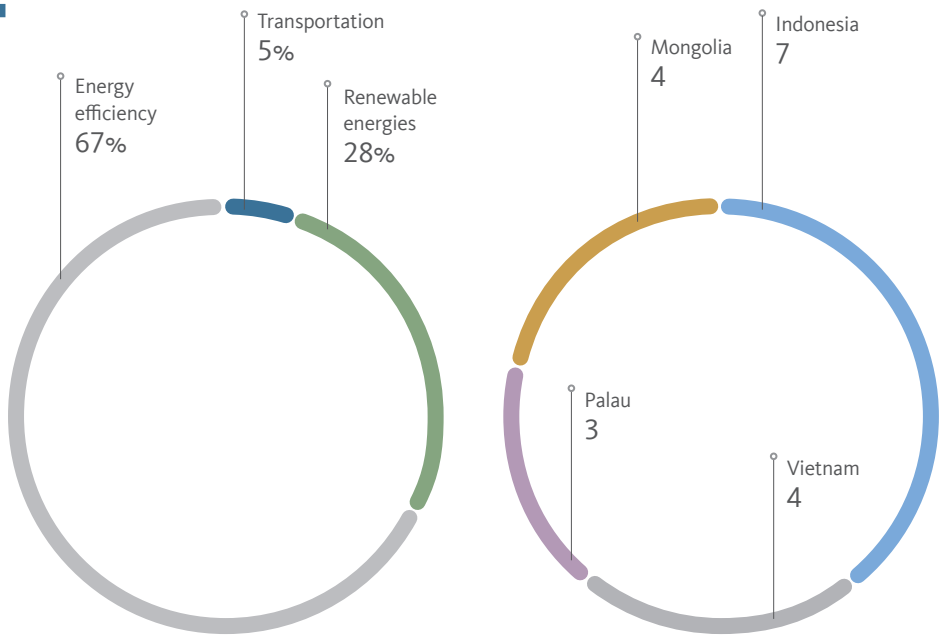
In addition, the Government of Japan also provides financial and technical assistance for JCM feasibility studies, capacity building programs, and development of JCM methodologies, project design documents (PDD) and implementation of MRV. Since 2010, more than 400 JCM feasibility studies have been conducted in more than 40 countries, including 22 in the Asia-Pacific region (IGES, 2017). The feasibility studies identified feasible low-carbon technologies, potential projects, and helped develop the JCM methodologies. Areas of focus were renewable energies and energy-saving technologies and systems.

On-going progress on JCM implementation in the partner countries

- Registered JCM projects: As of June 2017, 18 JCM projects have been successfully registered, including seven projects in Indonesia, four projects in Vietnam, four projects in Mongolia and three projects in Palau. Most of the projects are related to energy efficiency (67%) and renewable energy (28%), while the remaining 5% are related to transport (Figure 5-4).

↘ Figure 5-4

Percentage and number of registered JCM projects by type and country



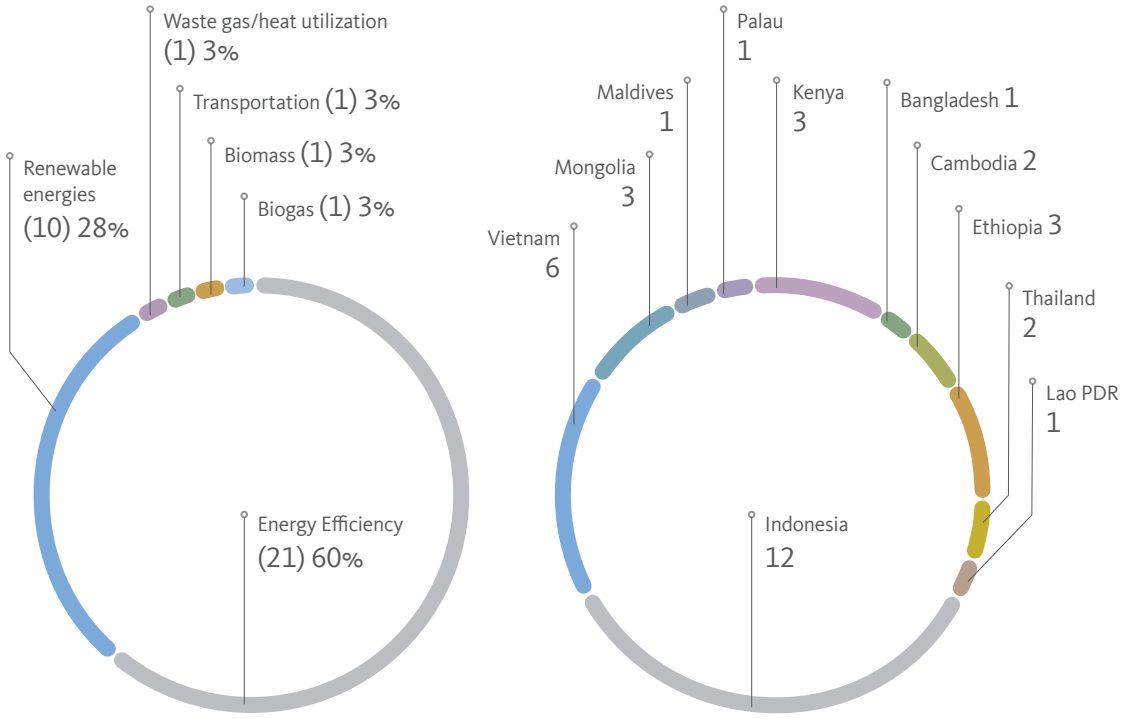
[Percentage of registered projects by type] [Number of registered projects by country]

Source: IGES, 2017

- Approved JCM methodologies: A total of 35 JCM methodologies have been proposed and approved by the Joint Committees in JCM partner countries, focusing on energy efficiency and renewable energy related areas (Figure 5-5)

↘ Figure 5-5

Percentage and number of approved methodology by type and host country

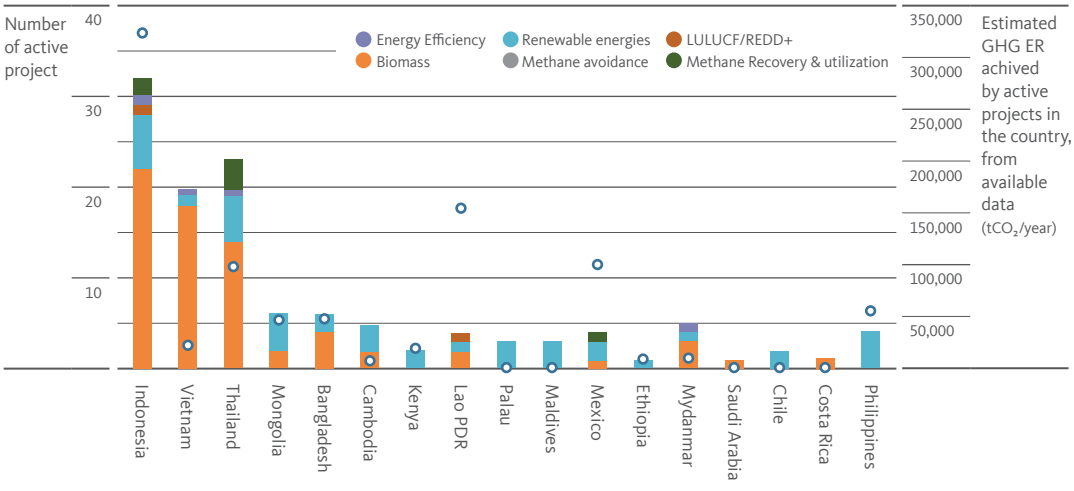


[Percentage of approved methodology by type] [Number of approved methodology by host country]

Source: IGES, 2017

↘ Figure 5-6

Number of active JCM financed projects by type, country, and the amount of estimated GHG emission reduction, as of June 2017



Source: IGES, 2017

- Estimated reduction in CO_2 emissions by JCM financed projects: As of June 2017, a total of 122 JCM projects have been successfully registered, approved for finance or are being implemented, with a total amount of GHG emission reductions around 752,000 tCO_2/year (IGES, 2017) (Figure 5-6). The high estimation of GHG emissions reduction in Indonesia and Lao PDR owes to REDD+ Model Project in each country, which accounts for more than 80,000 and 140,000 tCO_2 of annual reductions respectively.

Advanced low-carbon technologies transferred through JCM projects

Through the JCM programs, a number of advanced low-carbon technologies have been transferred to partner countries in different sectors, including:

- Energy production: The JCM has approved financing for 40 renewable energy projects (solar photovoltaic, hydropower, wind) as well as waste heat recovery technology in industries such as textiles, cement and others.
- Energy saving: Particularly for buildings and commercial centers. Transferred low-carbon technologies include: LED lighting, heat pump systems, air conditioners with inverters, high efficiency refrigerators, high efficiency centrifugal chillers, and high efficiency water pumps (both raw water intake and distribution pumps).
- Power transmission and distribution: energy-efficient transformers such as amorphous high efficiency transformers and low loss type aluminum conductors.
- Manufacturing: High efficiency heat only boilers, regenerative burners, agricultural biomass for combined heat, and power plants to replace diesel in the flooring industry.
- Transportation: Eco-driving technology utilizing a digital tachograph system, whereby fuel saving is triggered through analysis and feedback provided by the system, which helps drivers to change their behavior for better fuel efficiency.
- Waste management: Technologies that convert waste into energy, consequently reducing GHG emissions and significantly alleviating other problems arising from solid waste management. Typical advanced low-carbon technologies that have been transferred include: high efficiency waste-to-energy plant and industrial wastewater treatment system.

4. Implementation of the JCM and opportunities for advanced low-carbon technology transfer and emissions reductions accounting

Japanese Ministry of Environment through the Institute for Global Environmental Strategies (IGES), has provided extensive technical assistance through the JCM Capacity Building Program and MRV Development Program in Vietnam over the last four years. For example, Vietnam-Japan Business Forums have been organized in Hanoi, Da Nang and Ho Chi Minh. The programs target governmental officers, especially the JCM Secretariat of Vietnam, as well as businesses. The programs also support the development of JCM methodologies.

As a result, MONRE Vietnam issued a national regulation document on the JCM development and implementation; Circular No. 17/2015/TT-BTNMT dated April 6, 2015. Moreover, MONRE and IGES jointly published a guidebook on JCM implementation called “JCM in CHARTS”.

As of June 2017, Vietnam has 20 active JCM financed projects, the third largest in terms of the number of active projects among partner countries. In addition, as of June 2017, Vietnam has six methodologies and four registered projects (Table 5-3). Although the estimated emission reduction from projects in Vietnam (23,115 tCO_2/year) is quite modest compared to the estimated amount from non-REDD+ projects in Indonesia (284,342 tCO_2/year), Mexico (99,423 tCO_2/year) or Thailand (96,088 tCO_2/year), the number of JCM projects in Vietnam is expected to increase significantly in the coming years. Between 2010 and 2015 alone, 74 JCM feasibility studies have been financed and conducted in Vietnam (IGES, 2017).

JCM implementation status in Vietnam (as of June, 2017)

↘ Table 5-3

Item	Number	Item	Number
Registered projects	4	Renewable energy projects	1
Financed projects (including registered projects)	20	Transportation projects	1
		Approved methodologies	6
Estimated GHG emission to be reduced by financed projects (tCO_2/year)	23,115	Designated Third-Party Entities	8
		Joint Committee Meetings organized	5
Energy efficiency projects	18	Feasibility studies completed	74

Financial incentive opportunities for energy sector in Vietnam

The energy sector is the main source of GHG emissions in Vietnam, contributing to more than half of the nation's total emissions. In fact, the key GHG source categories recognized in Vietnam's Biennial Update Report are road transportation, and two categories in the energy sector, namely public electricity and heat production. Consequently, Vietnam puts high priority on the energy sector in its INDC, including reduction of fuel consumption, energy reform in the industry and transportation sectors, and promotion of renewable energies. These sectors can benefit from the JCM as the scheme mainly supports projects that reduce energy-related CO_2.

The JCM has the flexibility to choose the type of advanced and environmentally-friendly technologies that are implemented. Financial support is given to projects that meet the evaluation criteria of the relevant financing program. Selection criteria for the JCM Model Projects in FY2017, for example, are provided in Figure 5-7. Vietnam also applies eligibility criteria such as compliance with domestic laws, strategic priorities and development planning, contribution to Vietnam's sustainable development, and implementation on a voluntary basis in compliance with international laws.

Evaluation criteria for selecting JCM Model Projects in FY2017

↘ Table 5-4

Eligibility Criteria	Assessment Review
- Project contribute to sustainable development, its installation and operation comply with the country's laws and regulations - Reduce emissions of energy-related CO_2 that can be quantiatively calculated, not resulting from decreased activities, and can be clearly separated from the reductions by other factors - Technology is internationally in practical use, but not adequately utilized in the partner country - Technology is evidently superior and has high performance - Project have no adverse effect on the environment or social-economic circumstance - Project expense appropriately estimated - Project shall not receive andy other financial support/grant from the Government of Japan → Facility/equipment shall not receive any other financial support/grant from the Goverment of Japan - For collaboration with JICA etc.: Project shall collaborate with either a project of which an equity participation/loan agreement has been signed with JICA/other government-affiliated financial institution, or a project which is going to applay for such support	- Robustness of the project implementation, including profitability and financial plan (40%) - Amount of emission reductions of energy-related CO_2 and cost-effectiveness of emission reductions (40%) - Potential of the dissemination of the technology (10%) - Concept and status of developing JCM methodology (10%)

Source: Summarized from GEC, 2017b

Financial support is given to a project consortium made up of Vietnamese and Japanese participants and represented by the Japanese participant. The amount of financial support is considered based on the number of projects already selected that use a similar technology in each country (Table 5-5) to encourage new projects and optimize the benefit of JCM support.

The maximum financial support that can be given to new project application

↘ Table 5-5

Number of already selected projects using a similar technology in each country	Percent of financial support for new project application
No project (0)	Up to 50% (determined by participants)
1-3 projects	Up to 40% (determined by participants)
More than 3 projects	Up to 30% (determined by participants)

The Vietnamese Government can further promote the JCM by focusing on the industrial and power sector, connecting it with the Government's energy programs, reaching out and expanding domestic policy and financial incentives for business investments that use the JCM scheme for renewable energies and transportation systems as key sectors. Businesses from both Vietnam and Japan can take the initiative to connect with each other through, for example, the IGES Matchmaking Platform and the Overseas Environmental Cooperation Center (OECC), tasked by the Japanese Ministry of the Environment with finding projects in partner countries including Vietnam.

Necessary framework for accounting JCM credits towards national GHG emissions reduction

In addition to ensuring net emissions reduction, the JCM emphasizes robust GHG accounting at the international level, which needs to be assured at the national level. The projects must not be claimed by other international climate mitigation schemes. The JCM rules address this by requesting that TPEs check statements to avoid double claiming by project participants.

The JCM credits to be issued must be tracked and reported in a robust manner. For this purpose, three components are necessary. The first component is a bilateral policy for allocation of credits agreed between the Vietnamese and Japanese governments. The second component is a domestic policy for reporting issued credits in future Vietnam NDC reports and/or GHG emissions reports. Both reports should indicate the amount of issued credits whose ownership has been transferred to Japan as well as those accounted for as part of the Vietnamese Government's reduction. The final component is a domestic registry for recording and tracking JCM credits, with specifications agreed on with the Japanese Government. As of June 2017, the Vietnamese Government is developing a JCM registry system.

Establishing this accounting framework is necessary for Vietnam to meet its GHG reduction target and avoid double counting. Furthermore, the framework will help Vietnam strengthen its national and sectoral MRV systems as is intended by Vietnam in its INDC.

5. Highlighted JCM projects implemented in Vietnam and possible contribution to Sustainable Development Goals (SDGs)

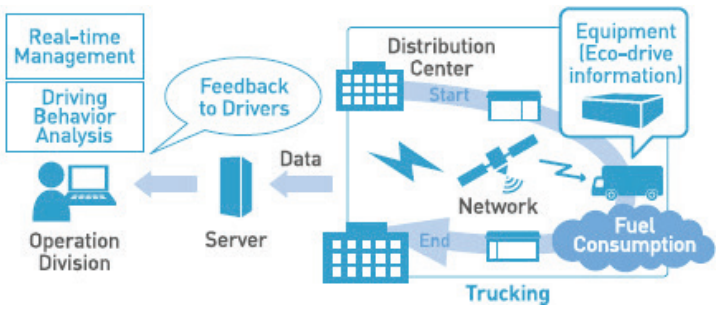
Observed from the existing policy framework as well as continuity and comprehensiveness of reporting to the UNFCCC, Vietnam may not face significant challenges in meeting the SDG 13.2 on "integrating climate change measures into national policies, strategies, and planning". In regard to Goal 13.3 on "improving education, awareness raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction, and early warning", Vietnam can consider communicating the role of the JCM scheme and projects in improving human and institutional capacity to implement mitigation actions and technology transfer. Moreover, the JCM projects also may contribute to other SDGs such as Goal 7 (ensure access to affordable, reliable, sustainable and modern energy for all) and Goal 11 (make cities and human settlements inclusive, safe, resilient and sustainable). Examples from projects indicate it may be worthwhile for Vietnam to elaborate those potentials while building the SDGs monitoring framework.

Eco-driving by Utilizing Digital Tachograph System in Vietnam

This project is implemented by Nippon Express Japan and Nippon Express Vietnam logistics company. In this project, 130 logistics trucks are equipped with a digital tachograph system. The system consists of hardware and software components as well as a tailor-made driver training system. The hardware component consists of an onboard terminal with a feedback indicator as well as a server that will collect and process all information received via wireless signals from each vehicle. Sound indicators will warn drivers in instances of inefficient driving. All the information, including quantity of fuel consumption, running distance, and driving behavior of drivers are continuously collected and processed using specialized software and evaluated.

This project develops the eco-driving capacity of local drivers which also promotes safe driving, one of the Vietnamese government's priority policies. Taking full advantage of the technologies and training, safer and more efficient driving patterns are expected to be introduced, leading to less fossil fuel consumption and ultimately less GHG emissions. Ultimately, the estimated emissions reductions are 328 tCO_2/year.

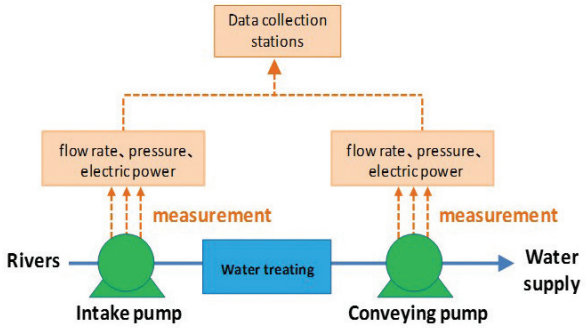
The project aims to contribute to safer driving behavior and a reduction in fuel consumption in the cities, and therefore it may contribute to SDG 11 (make cities and human settlements inclusive, safe, resilient and sustainable.)



Introduction of High Efficiency Water Pumps in Da Nang City

This project, implemented by Da Nang Water Supply One-member Limited Company (DAWACO) and Yokohama Water Company, aims to replace existing conventional raw water and distribution pumps with high efficiency ones in two water pump stations of the DAWACO water treatment plant, Cau Do. The pumps to be installed are highly efficient because the pumps are customized to specific conditions and requirements of the recipient plants. Energy saving achieved by replacing the pumps is estimated to contribute to reducing emissions by around 1,145 tCO_2/year. The project aims to contribute to the sustainability of Da Nang city, so it may contribute to SDG 11 (make cities and human settlements inclusive, safe, resilient and sustainable).

Source: GEC, 2017b

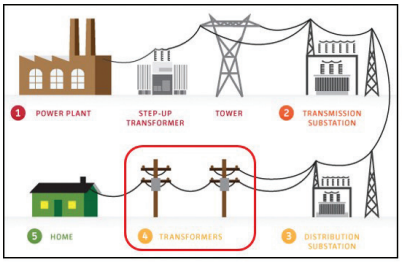


Introduction of Amorphous High Efficiency Transformers in Power Distribution Systems in Northern, Southern and Central Power Grids of Vietnam

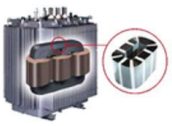
This project aims to reduce CO_2 emission from electricity distribution losses through the promotion of amorphous high efficiency transformers in northern, southern and central power distribution systems of Vietnam. It involves Hitachi Metals Japan as a supplier of amorphous alloy to be used as core of the transformers. From the Vietnamese side, THIBIDI and HANAKA Vietnam fabricated the transformers in the country, benefiting from business creation and industrial capacity expansion. This is an example of industrial technology transfer.

The project started its first phase by introducing 4,834 transformers to the southern and central power grids. The second phase expands to the northern power grids and introduces 3,672 transformers in total. Compared to the cost required under regular tender process, the initial investment cost was estimated to be reduced by around 40% due to the financial support received from the JCM financing program (OECC, 2017). As the project continues into its third phase, it is expected to reduce emissions by more than 6,500 tCO_2/year.

The project can make an impact on grid efficiency improvement, related to SDG 7.3 (rate of improvement in energy efficiency) and SDG 7.a (international cooperation to promote investment in energy infrastructure and clean energy technology).



"④TRANSFORMERS" in the above are the subjects of the project.



Amorphous high Efficiency transformer

Source: GEC, 2017b, EVNSPC and YUKO-KEISO Co., Ltd., 2016

6. Acknowledgements

The authors wish to thank Mr. Yuji Mizuno, Program Director (Climate and Energy), Mr. Kentaro Takahashi (Program Manager) of Climate and Energy – Institute for Global Environmental Strategies (IGES), and Ms. Emma Fushimi (Editor of IGES) for their insightful and valuable comments and contributions to this chapter.

References

ADB (2016). Handbook for Developing Joint Crediting Mechanism Projects. Published by Asian Development Bank, Manila, Philippines.

Audinet, Pierre, Bipul Singh, Duane T. Kexel, Suphachol Suphachalasai, Pedzi Makumbe, and Kristy Mayer. (2016). Exploring a Low-Carbon Development Path for Vietnam. Directions in Development. Washington, DC: World Bank. doi:10.1596/978-1-4648-0719-0.

DWRM (2015). Vietnam and its committments at COP-21. Official website of the Department of Water Resources Management – Ministry of Natural Resources and Environment. Available on: http://dwrm.gov.vn/index.php?language=vi&nv=news&op=Hop-tac-quoc-te/Viet-Nam-va-nhung-cam-ket-o-COP-21-4759

EVN Southern Power Corporation (EVNSPC) and YUKO-KEISO Co., Ltd. (2016). JCM Project Design Document Form: Introduction of amorphous high efficiency transformers in power distribution systems in the southern part of Viet Nam (VN004). Available on: https://www.jcm.go.jp/vn-jp/projects/15

Figueres, C., et al. (2017). "Three years to safeguard our climate". COMMENT in Nature, 546 (7660), 593-595. doi:10.1038/546593a. Available on: https://www.nature.com/news/three-years-to-safeguard-our-climate-1.22201

GEC (2017a). Guidelines for Submitting Proposals (Tentative translation), Call for Proposals for JCM Model Projects in 2017. Available on: http://gec.jp/jcm/kobo/mp170407/

GEC (2017b). Database on JCM Projects/Studies in Vietnam. Published by Global Environment Center Foundation. Available on: http://gec.jp/jcm/?country%5B%5D=vietnam&p_type%5B%5D=model&s=&operator=and

Government of Japan (GOJ) (2017). Recent Development of The Joint Crediting Mechanism (JCM), May 2017.

IGES (2017). IGES Joint Crediting Mechanism (JCM) Database (As of 30th June 2017). Published by the Institute for Global Environmental Strategies (IGES) (Author: Aryanie AMELLINA).

IGES (2015). Operationalizing the Paris Agreement Article 6 through the Joint Crediting Mechanism (JCM) - Key Issues for Linking Market Mechanisms and the Nationally Determined Contributions (NDCs). Published by Institute for Global Environmental Strategies, Hayama, Japan.

JC-JCM Vietnam (2016). Joint Crediting Mechanism Guidelines for Developing Proposed Methodology, version 2.0. Available on https://www.jcm.go.jp/vn-jp/rules_and_guidelines

MONRE (2014). The Initial Biennial Updated Report of Vietnam to the United Nations Framework Convention of Climate Change. Ministry of Natural Resources and Environment (MONRE) – Socialist Republic of Vietnam. Vietnam Publishing House of Natural Resources, Environment and Cartography.

Nippon Express Co., Ltd. and Nippon Express (Viet Nam) Co., Ltd. (2015). JCM Project Design Document Form: Eco-Driving by Utilizing Digital Tachograph System (VN001). Available on: https://www.jcm.go.jp/vn-jp/projects/7

OECC. (2017). Introducing expected project seeds in Laos from experiences in Vietnam. Presentation material for IGES Workshop on the Progress of the Joint Crediting Mechanism, Vientiane, January 2017.

World Bank. (2011). Vulnerability, Risk Reduction and Adaptation to Climate Change – Vietnam (Climate Risk and Adaptation Country Profile). Published by World Bank. Available on: http://sdwebx.worldbank.org/climateportalb/doc/GFDRRCountryProfiles/wb_gfdrr_climate_change_country_profile_for_VNM.pdf

III

Affordable and Clean Energy

6.
Clean and Renewable Energy in Vietnam: Status, Regulatory Policies and Challenges

7.
The Role of Technical Assistance in Promoting Renewable Energy Sector in Vietnam – Insights from GIZ

6

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Clean and Renewable Energy in Vietnam: Status, Regulatory Policies and Challenges

1. Introduction

What does renewable energy (RE) mean for Vietnam?

As a country with rich natural endowments, Vietnam has abundant renewable energy sources, which include solar energy, wind power, biomass, solid waste and small-scale hydropower. Comprehending the need to shift to more sustainable power sources with less dependence on conventional power, the Vietnamese government has recently paid greater attention to renewable energy development's with the issuance of regulations and policies. These include the Electricity Law, encouraging the investment in renewable energy and the Revised Power Development Plan 2011-2020 (revised PDP7) aimed at increasing the proportion of RE from 5% to 10% of total primary power capacity. However, only a very small proportion of renewable energy, except for small hydropower, has been generated until now. Wind power, for example, from the existing plants, generated only a capacity of 52 MW out of the total potential of rated power of 27 GW (GIZ, 2015).

By 2015, it was estimated that renewable energy and small hydropower accounted for a meager 5.3% of national total power generation capacity (ADB, 2015), resulting from a heavy dependence on non-renewable sources, which are currently more affordable and reliable than renewable ones. The industrial sector is currently the biggest consumer of electricity accounting for 53.9%, followed by households 35.6%, commercial, agricultural and other sectors. Any projection for future change to green energy should be calculated in consideration of this market structure.

The recent assessment of Vietnam's power sector pointed out several hindrances to the supply of renewable energies, including the lack of (i) a strong institutional and regulatory framework to support renewable energies and effectively facilitate the development of a renewable energy market and industry, (ii) a strong supporting mechanism and fund for upfront investment, and (iii) technical capacity (ADB, 2015).

Renewable energy in Vietnam generally includes commercialized sources such as wind power, solar power, waste energy, biomass, and small hydropower with an installed capacity of less than 30 MW. Large hydropower plants account for a major proportion in total energy in Vietnam and have larger environmental and social impacts than those from small-sized hydropower energy. They are therefore not recognized as clean energy sources by national standards.

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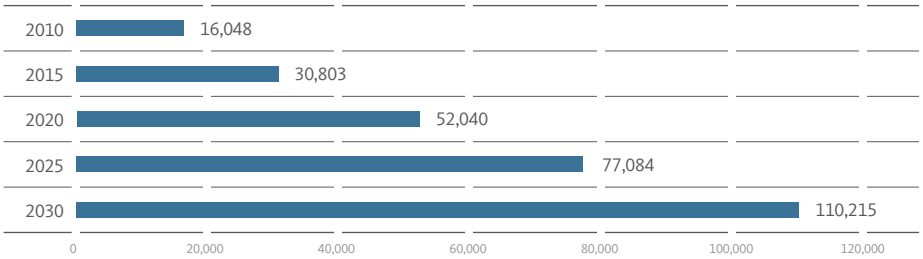
Growth in primary energy demand in Vietnam

Vietnam's primary energy demand has increased annually by 10.84% for the period 2011-2015, and is expected to reach 176 billion kwh in 2017 (EVN 2016). In the Power Development Plan 7 (PDP7), Vietnam's electricity generation demand is projected to increase by 400% by 2030, from 143.7 billion kilowatt hours (kwh) in 2015 to 256 billion kwh in 2020 and 572 billion kwh in 2030. The growth is attributable to increasing demands from three key power consumers - industrial, residential and transport sectors.

↘ Figure 6-1

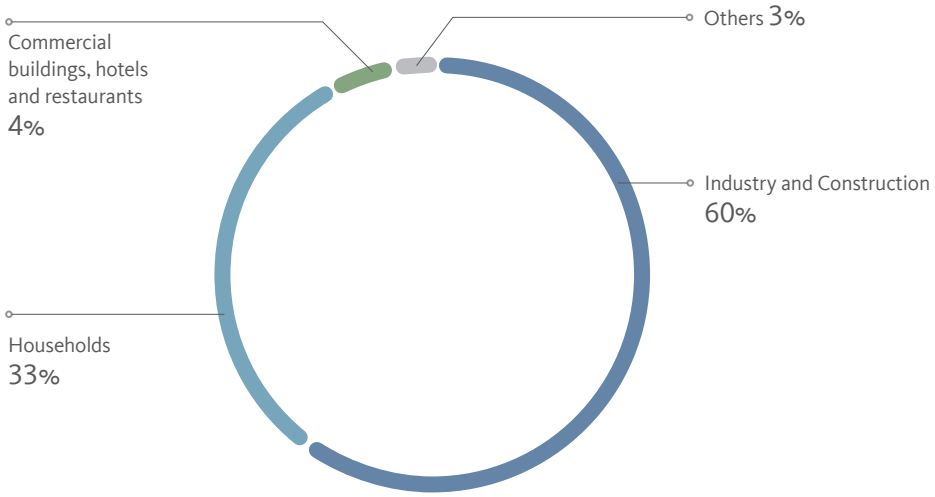
Growth in primary energy demand in Vietnam (MW)



Source: MOIT (2016) Revised PDP7

↘ Figure 6-2

Structure of energy demand in Vietnam forecast for the year 2020 by economic sector



Source: ITA (2014), p.3

Challenges to energy security and emerging market for RE in Vietnam

Ensuring stable energy consumption and supplies is pivotal for Vietnam's economic growth (Chor Foon Tang et al., 2016). Vietnam's current energy supply is highly dependent on external sources as the country shifted from an energy exporter to a net importer (MOIT, 2017). The capacity of domestic coal reserves is expected to decline dramatically in the immediate future, as power production capacity remains limited i.e. medium and large scale hydro power plants are soon fully exploited. From Vietnam Electricity (EVN) report, substantial shortage of primary energy sources will be observed since 2017. These are the critical challenges that faces which must be tackled to ensure economic growth for the period beyond 2020.

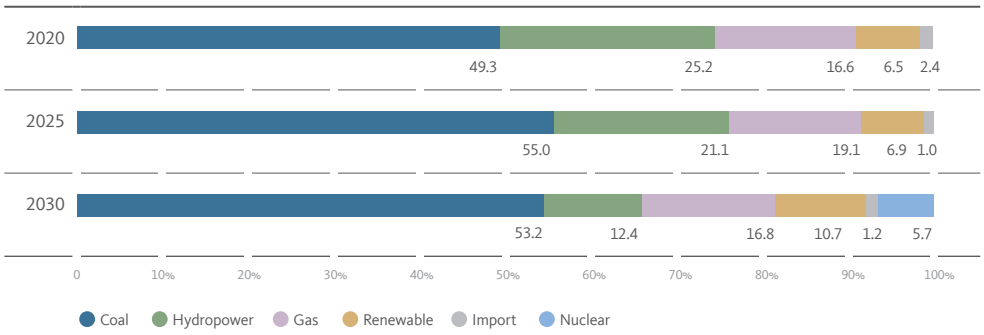
A huge amount of investment funds for meeting energy development is expected at about USD10billion for the period of 2016-2020 (Revised PDP7). State-owned corporations are now the largest investors in the energy sectors, however, the Government is planning to downsize its investment in order to increase efficiency and diversify the financial sources with increasing participation of international organizations and domestic private partners. Lack of fair competitive environment within the energy market is a hurdle, among others, for such participation.

Governance constraints in Vietnam's energy sector pose other development challenges. Among them, ineficient natural resources management, inadequate infrastructure, low rate of return for self-financing in coal and electricity subsectors and low transparency and governance capacity are prominent (ADB 2015). Therefore, the development of RE needs to be a part of the long-term strategy for energy security that highlights the reasonable use of natural resources and materials along side higher energy efficiency.

RE as an integral part of the energy sector, making the power market competitive is a necessary, but challenging task, in the transitional economy of Vietnam. With assistance from development donors in Vietnam, competitive and market-based power sector reform has been initiated and is expected to set the stage for the upturn of renewable energy. Though positive signs for renewable market are seen, as Vietnam plans to test the competitiveness of its power wholesale market during the 2016-2018 period, and begin official operation by 2019,[3] more delays in actual implementation can be expected.

↘ Figure 6-3

Structure of projected electricity production in Vietnam 2020 - 2030 by sources



Current state of renewable energy for industrial development

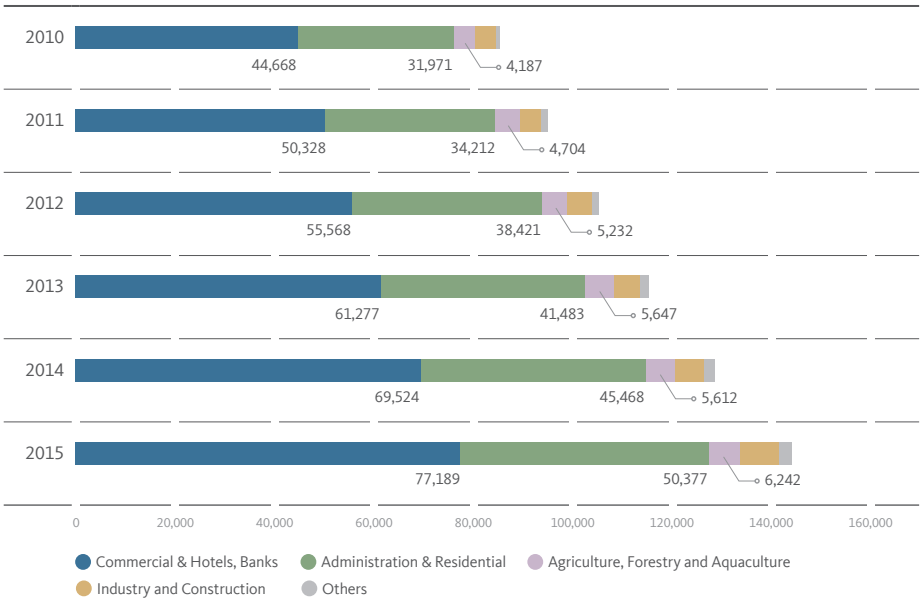
Structure of energy consumption

The structure of energy consumption in Vietnam has remained almost unchanged during 2010-2015, in which the service sector represents the majority, including public and commercial services and buildings, accounting for 87.5%. Energy consumption in industry as well as in agricultural sector, accounts for only 5% in the same period. There is a constant change in the structure of energy consumption between these two sectors. Over the period of 2010-2015, the energy consumption rate of the agricultural sector decreased by 0.5% while that of the industry sector increased by 0.9%.

3. Ministry of Industry and Trade's Decision No. 8266/QĐ-BCT issued in August 2015

↘ Figure 6-4

Energy consumption in Vietnam in 2010-2015



Source: Institute of Energy (2016)

Structure of energy generation in Vietnam

Vietnam's total energy production was 38.6 GW in 2015 (EVN 2016), mainly produced with domestic resources and fossil fuels. By 2030, the total energy production is projected to grow by 3.4 times to meet the energy demand for economic growth.

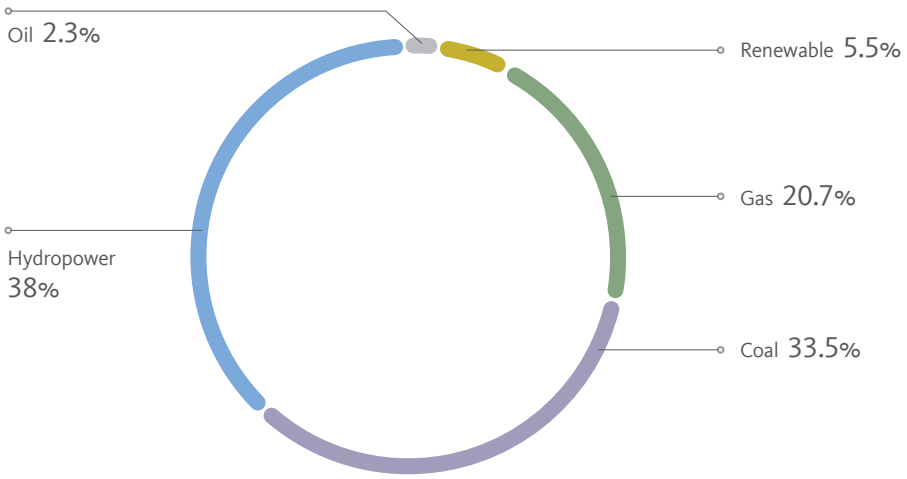
Vietnam's energy mix is made of three main sources, coal, hydropower and gas, which account for 33.5%, 38% and 20.7% respectively in the total energy production (see Figure 6-5 below). In particular, the coal reserves that can be exploited, are being depleted rapidly, while hydroelectric power is heavily dependent on external water sources. Coal energy accounts for about one third of the total energy production and its share in Vietnam's total energy production is still growing.

Since 2016, due to the increased depletion of domestic coal reserves, Vietnam has imported coal for energy production, and it is anticipated that by 2020, about 35 million tonnes of imported coal, 10 times the amount imported in 2016 (FPT, 2015) will be needed to meet the domestic energy demands. While official statistics on coal reserves show that domestic coal sources are still able to meet the demand for economic development in the foreseeable future, these data are regarded as over-optimistic and unreliable (FPT, 2015).

Hydropower in Vietnam accounts for the second largest share of the energy production. The sector is largely dependent on transboundary water flows, as 63% of Vietnam's surface water comes from outside the country (CEM, 2016). The two largest hydropower plants in Vietnam are Son La Hydropower and Hoa Binh Hydropower on the Da River, which account for 56% of the total hydropower generation capacity and both of which rely heavily on surface water from neighboring China, which owns multiple hydropower projects upstream.

↘ Figure 6-5

Power generation by source as of December 31st, 2015



Source: EVN (2016)

At present, RE production capacity in Vietnam is low, though an upward trend is forecasted in the future. By 2015, renewable energy production capacity in Vietnam was 2,141 MW, accounting for 5.5% of the total energy production capacity.

Small-sized hydropower. Vietnam has the capacity to generate about 95-100 billion kWh of hydropower, including about 70 billion kWh from its medium- and large-sized hydropower plants (with a capacity of more than 30 MW) and about 25-30 billion kWh from small-sized hydropower resources (revised PDP7). However, only small-sized hydropower plants of less than 30MW are considered as RE in Vietnam. Although all types of hydroelectricity uses energy from continental surface water which is renewable, large-sized hydropower plants require the construction of reservoirs leading to changes in river basin flow, as well as to local micro-climates and induces greater impacts on the ecological environment. Small hydropower plants that operate without reservoirs are largely dependent on flow regimes and pose less significant impact on the ecological environment. Small hydropower accounts for most of Vietnam's renewable electricity. By the end of 2015, the production capacity of small hydropower plants was 2006 MW, accounting for 93.69% of the total renewable energy production capacity. Small hydropower plants are mostly located in the north and the center of the country, with favorable river flow characteristics, topography and climate.

Wind power. Coastal provinces and central highland provinces of Vietnam have high potential to develop wind power. It is estimated that inshore wind power could generate between 40,000 and 50,000 MW. Taking into account the offshore wind potential, Vietnam may be able to generate over 100,000 MW of wind power. Vietnam's wind power capacity in 2015 was 135 MW, which was produced by the wind power plants in Bac Lieu and Ninh Thuan provinces.

A 95m wind tower in Phu Lac Wind Project with a capacity of 24MW in Binh Thuan Province. The fourth wind farm in Vietnam went into operation in late 2016. Photo credit: Minh Tran

Solar power. In tropical climate countries like Vietnam, solar energy can be utilized almost year-round. The average annual sunshine hours are about 1,500 hours in the Red River Delta provinces in the north and reach 2,700 hours in the central and southern provinces. Solar energy density varies from 3,000 to 5,000 kCal/m² (meteohydrological statistics, various years). There are two large-grid connected solar projects with a capacity of about 50 MWh developed in the provinces of Ba Ria-Vung Tau and Quang Ngai. With the issuance of regulation on incentives for solar power projects in Arpril 2017, more dozens of projects will be implemented in the central and southern provinces of Vietnam where high potential is recognized. By June 2017, U.S. Agency for International Development (USAID) reported that hundreds of solar power projects are registered for investment in Vietnam with total capacity of 17,000 MW.[4)]

4. http://nangluongsachvietnam.vn/d6/news/Chuyen-dong-dau-tu-dien-mat-troi-6-165-2128.aspx

Biomass energy. The potential of Vietnam's biomass energy was calculated as about 60 million TOE (tonne of oil equivalent) in 2015, and is expected to grow to 61.5 million TOE by 2020, about 70 million TOE in 2030 and potentially to 90 million TOE in 2050. Vietnam has developed household-based biogas programs, to make use of the domestic waste and agricultural by-products in rural areas, as a source of fuel for households. Primary energy consumption in households accounted for 76% in 2005, the remainder was used in industrial boilers (Arvo Leinonen and Nguyen Duc Cuong, 2013). In fact, sugar refineries started to recycle sugarcane bagasse for power generation, and the surplus power was partly sold to EVN in times of the nation's power shortage in 2009 (Institues of Energy, 2009). A total of 14.4 million TOE of biomass energy was used in 2015.

Renewable energy regulatory policies in Vietnam

The recent introduction of a series of central policies for RE by the government of Vietnam underlines its determination towards the long-term goals of improved environmental management and energy security. The rationale for strategies for general energy development and RE development is that cites can enjoy immediate and future environmental gains by reducing pollution and GHGs. That is, the power generated from solid waste and biomass means enhanced reuse of waste and agro-byproducts that reduces the disposal of waste to the environment and waste treatment costs.

In addition, renewable energy production will play an important role in ensuring energy security for Vietnam. The current use of domestic energy sources indicates major risks for power generation posed by a growing dependence on inputs from foreign countries, particularly in the post-2017 period. Furthermore, the exploitation of hydroelectric resources is becoming uncertain due to the impacts of climate change and higher resource competition from neighboring riverian countries and from domestic water users. Increased competition for water use has significant impacts on the ecosystem, including for downstream rivers with hydropower plants. Coal-fired power generation in Vietnam, though improved, is still heavily polluting the air. The continued development of coal-fired power generation using imported fuels, also exposes the sector to price volatility risk. Diversifying the energy portfolio with RE can only help Vietnam in achieving its sustainable development goals by 2030.

Among the most oft-cited constraints for realizing the favorable natural potential of Vietnam for the RE development are regulatory and institutional constraints. Although regulations related to clean energy, renewable energy and new energy have been mentioned in Vietnamese legal documents since 1999, only in 2004 was it prioritized as specific targets in the development strategies in general, as well as the development of the industry in particular in Vietnam. Overall policy development and regulations have laid the foundation for the development of clean and renewable energy sector. However, the lack of specific and proper policy designs, tools and mechanisms continues to be a barrier to the actual development of the energy industry, of renewable energy as well as the market for RE in Vietnam.

Analysis of development policies for renewable energy

General regulatory policies for RE

Vietnam has developed a regulatory system that facilitates the development of the RE sector. In terms of the overall energy development, the most important documents covering the development of the overall sector include the Electricity Law (2004, revised in 2012), the Electricity Development Strategy (2004), and the Power Sector Development Plan (2011, revised). The most relevant and important regulation is the Renewable Energy Development Strategy (2015) and the Decision for the Restructuring of the Electricity Sector towards sustainability during 2016-2020 with a Vision to 2030 by Ministry of Industry and Trade (Decision no.14318/QD-BCT in December 2015). As they are general and directional, as reflected in sectoral development strategies, the designed mechanisms that really facilitate the development of the RE sector seems less straightforward. Another important legislation is the 2005 Investment Law designed to attract investment in several 'encouraged' and 'specially-encouraged' sectors (including RE) and regions.

Vietnam's view on the development of RE is evident in legal documents that were immediately released following the launch of the Vietnam Agenda 21 in mid-2014 under the Prime Minister's Directive 153/2004/QD-TTg, forming the strategy for sustainable development in Vietnam. Accordingly, for the energy sector, Vietnam identified prioritized support activities for the research, transfer and application of environmentally friendly energy systems, including new energy and renewable energy sources. Financial incentives are granted through national energy development strategies, most notably, the development strategy for Vietnam's power sector for the period of 2004-2010 with a vision to 2020. In addition to promoting research in the energy sector, the strategy emphasized the need for the development of renewable energy plants, especially where the national grid is inaccessible, and to use government financing to support the supply of electricity from renewable energy sources.

By 2007, specific plans and targets for the development of RE in the energy sector, as well as the electricity sector in Vietnam, are shown in legal documents. Prominent is Vietnam's view that prioritizes the development of new energy and renewable energy in Vietnam's national energy development strategy until 2020 with a vision to 2050, in which specific targets for 2010 and 2020 are described by considering that the proportion of new and renewable energy sources will account for 3% and 5% of total commercialized primary energy. Unlike previous legal documents mentioning the development of new energy and renewable energy in Vietnam, the Decision 1855/QD-TTg approving Vietnam's national energy development strategy up to 2020 specifies several solutions on investment, financial mechanism, human resources and organizational structure as the basis for the development and implementation of subsequent policies.

In 2011, Vietnam proposed the National Power Development Plan VII (PDP7) with multi-dimensional goals to make efficient use of energy resources, provide sufficient high-quality electricity at reasonable prices for socio-economic development and ensure national energy security. Priority was given to specific objectives for the development of renewable energy sources for electricity, in order to increase the share of electricity produced from renewable energy sources in total production. In 2016, PDP7 was revised and adjusted to better reflect the status and development of new energy sector, in order to increase the share of renewable energy in Vietnam's overall power production.

↘ Table 6-1

Changes in targets for RE compared with other key power sources between PDP7 and revised PDP7 (unit:%)

Target	2020		2025		2030	
	PDP7	Rev.PDP	PDP7	Rev.PDP	PDP7	Rev.PDP
RE	4.5	6.5	na	6.9	6.0	10.7
Coal	46.8	49.3	na	55.0	56.4	53.2
Hydropower	19.6	25.2	na	17.4	9.3	12.4
Gas	24.0	16.6	na	19.1	14.4	16.8

Source: compiled from PDP7 and revised PDP7.

The adjustment is more compatible with the new milestone in the policy of developing clean energy and renewable energy in Vietnam after 2015 when the government of Vietnam developed a strategy for the development of the renewable energy sector. Therefore, the most obvious change in the revised PDP7 compared with the previous version, is a stronger emphasis on RE with power market liberalization as a prerequisite condition. Incentives include investment credits, tax exemptions, land-use rights, feed-in tariffs, net metering and others. These changes were followed by a number of guiding documents (circulars and decisions) from various ministries on grid connection and standardized sales contract.

In 2015, Vietnam's Renewable Energy Development Strategy to 2030, with a Vision to 2050, was released. According to the Strategy, efforts will be made to diversify investment in Clean and renewable energy, especially with private sector participation. The government has encouraged the mobilization of all resources for renewable energy development to enhance access to advanced, sustainable and reliable energy sources, at reasonable prices for all people. To realize this strategy, Vietnam has devised a policy aimed at attracting investment in RE in the form of public-private partnerships (PPP).

↘ Figure 6-6

Milestones in policy making for clean and renewable energy development in Vietnam

Clean and Renewable Energy

Targeting

2015

- Decision No. 2068/QĐ-TTg approving the development strategy of renewable energy of Vietnam 2030 with a vision to 2050

Planning

2007

- Decision No. 1885/QĐ-TTg dated 27 December, 2007 approving Vietnam's national energy development strategy up to 2020, with a vision to 2050
- Decision No. 110/2007/QD-TTg dated 18 July, 2007 approving the planning on national electricity development in the 2006-2015 period, with a vision to 2025 taken into consderation

Preparation

2004

- Law No. 28/2004/QH11 dated 3 December, 2004. The Electricity Law of 2004
- Decision No. 176/2004/QD-TTg dated 5 October, 2004 approving the strategy on development of Vietnam electricity industry in the 2004-2010 period, with a vision to 2020
- Decision No.153/2004/QD-TTg dated 17 August, 2004 promulgating the strategy for sustainable development in Vietnam (Vietnam's Agenda 21)

Beginning

Specific support mechanisms for RE in Vietnam

The support mechanisms for RE in Vietnam are a combination of financial incentives, fiscal incentives and market price support. They include: 1) Subsidy through the Vietnam Environment Protection Fund (VEPF) and exemption from environmental protection fees; 2) Avoided cost tariff (ACT)[5]; 3) Feed-in Tariff (FIT)[6] and 4) other incentives on land use rights, access to preferential capital, tax exemption, subsidized loan and credit provision for investment via the Vietnam Development Bank and regulation such as standardized power purchase agreement.

5. Avoided Cost Tariff is defined as the electricity tariff calculated by avoided costs of the national power grid when 1 kWh is generated to the distribution power grid from a small renewable energy power plant.
6. First FIT scheme was introducted in 2011 for wind energy purchases from EVN.

↘ Table 6-2

Summary of applicable incentives for specific subsectors in RE in Vietnam

Incentives	Small-sized hydropower	Wind power	Solar power	Biomass	Solid waste
VEPF subsidy	●	●	●	●	●
ACT	●			●	
FIT*		●	●	●	●
Other non-tariff support	●	●	●	●	●

*Note: FITs for specific RE are stipulated in the Prime Minister's Decisions as follows: 7.8 US cents/kWh for wind power (2011), 7.28-10.05 US cents/kWh for solid waste power (2015), 5.8 US cents/kWh for biomass power (2016), and 9.35 US cents/kWh for solar power (2017).

Source: Institute of Energy (2016)

Vietnam Environmental Protection Fund (VEPF) and Vietnam Development Bank (VDB)

The Vietnam Environmental Protection Fund (VEPF) is a state-owned financial organization. VEPF holds the total charter capital of VND 1 trillion, half of which has already been funded by the state budget. The total working capital by the end of 2014 reached VND 844.02 billion, representing an increase of VND 66.79 billion (equivalent to 8.6%) from that in 2013.

One of the main activities of VEPF is to provide financial support to environmental protection, biodiversity and climate change response programs, projects and activities at national, inter-sectoral and inter-regional level or severe local environmental issues.

Activities of financial support applied to businesses involved in the project include:

- Preferential loans
- Preferential interest rates
- Project grants

The Vietnam Development Bank (VDB) was established in 1996 as a governmental non-profit organization, on the basis of the Fund for Development Assistance. Its charter capital is VND 10 trillion, and credit balance is VND 300 trillion (2015), guaranteed by the government, and it is exempted from requirement for compulsory reserve, deposit insurance, taxes and state budget payments. The bank targets to provide support for investment credit and export credit.

Wind power incentives

Since 2011, Vietnam has developed policies to support the development of wind power projects. Wind power projects were the first to benefit from the FIT mechanism in Vietnam. Other incentives include tighter responsibility for the sole buyer (EVN), preferential investment capital, taxes, fees, preferential land infrastructure support, supported electricity prices for grid connected and off grid wind power networks. Particularly, price support mechanisms, as well as regulations on electricity purchase contracts, facilitates the development of wind power projects in the coastal provinces of Vietnam. In 2012, the Ministry of Finance provided more detailed guidance on financial mechanism for tariff subsidy for grid connected wind projects (Circular 96/2012/TT-BTC).

Biomass power incentives

A similar support mechanism was first introduced for biomass power projects in 2014 with the Prime Minister's Decision 24/2014/QD-TTg. Besides the FIT design, the biomass power projects can apply for ACT, for which they can sell surplus power generation to the grid at around 7.4 US cents/kWh.

Solar power incentives

The mechanism for supporting solar power has just been promulgated in Vietnam in April 2017 by a Prime Minister's decision. The content of the regulation is to support the requirements to buy electricity; Capital and tax incentives; Land incentives; Preferential pricing for solar power grid and other solar power projects. The mechanism consists of FIT for large-scale grid connected projects and net-metering schemes for rooftop solar applications, and specific regulations on electricity purchase contracts are provided more recently in a Circular issued by Ministry of Industry and Trade in September 2017.[7)]

Solid waste power incentives

The development of solid waste powered projects not only produces electricity for demand, but also embeds the core value of reducing solid waste generated from production and domestic activities. The solid waste

7. Circular no.16/2017/TT-BCT dated September 12, 2017 by Ministry of Industry and Trade on project development and electricity purchase contract specimen for solar power projects

support policy started in 2014, with similar subsidy, non-tariff supportive mechanisms. In addition, the rules on standardized power purchase agreements between the parties have been promulgated in 2015 (Circular 32/2015/TT-BCT by the Ministry of Industry and Trade).

Existing RE Incentive Schemes in Vietnam

↘ Table 6-3

Incentives		VEPF subsidy scheme	Avoided cost tariff	Wind feed-in tariff	Solar feed-in tariff
Introduced		2008	2009	2011	2017
Achievement to date,	MW	0		0	0
	GWh	0		0	0
Economically efficient		No (no incentives for developer to reduce costs or seek CDM)	Yes, in principle (though tariffs have yet to reach actual marginal cost)	No (level far below avoided social cost)	Too early for assessment
Market principles		No (first come, first served)	Yes	No (first come, first served)	No (first come, first served)
Sustainable recovery of incremental costs		No (no sustainable source of funding)	Not applicable	No (unclear whether VEPF can cover incremental costs)	No
Adaptability		Not applicable	Yes (updated annually, reviewed by regulators)	Limited (only adjustment for FOREX to maintain $ denominated price)	Limited (only adjustment for FOREX to maintain $ denominated price for grid connected projects)

Note: CDM = Clean Development Mechanism; FOREX = foreign exchange; GWh = gigawatt-hours; MW = megawatts; VEPF = Vietnam Environmental Protection Fund.

Source: Adapted from Meier et al. (2015)

Challenges to developing renewable energy in Vietnam

Outstanding issues

The Vietnamese government has made significant efforts in the development of RE over the past decade, which are reflected in its political commitment, as well as the issuance of policies to create incentives for enterprises to implement energy projects in Vietnam. Since 2015, with the advent of national renewable energy strategies, it is expected that an environment that promotes the development of RE will truly be created. For such development, technological, institutional, human and financial conditions need to be fulfilled. While recent technological advances in RE made renewable sources less costly and more accessible, other conditions remain as challenges, critically the institutional ones.

Policymaking and adoption shortcomings. Although Vietnam has been completing the policy system for clean energy and renewable energy development, since 2007, there are still policy gaps in the regulations. Overlapping authority between different state agencies, is one of the biggest issues in the management and development of clean and

renewable energy in Vietnam. In addition to technological, human and financial constraints, the real policy design and implementation has failed to boost RE energy projects due to the lack of market-based principles. Prior to 2015, the lack of policies for Clean and renewable energy development in Vietnam was seen as a big gap, especially with respect to investment and investment support mechanisms between parties (Choor Foon Tong et al., 2016; ADB 2015; DLAPIPER 2014; Nam Pham Khanh et al., Tien Minh Do and Deepark Sharma, 2011). With a series of new RE policies taking effect since 2015, investors had high expectations for a new and facilitating institutional environment for the development of the renewable electricity market. However, experiences of other countries that have successfully developed renewable electricity market shows that, a certain form of Law on Renewable Energy must be enacted to create a strong legal framework for RE development, rather than national strategies or Prime Minister's decisions, as in Vietnam. China, for instance, has enacted the Renewable Energy Law in 2006, creating the institutional framework for Clean and renewable energy in the country. In addition, China has many programs to develop renewable energy, making it the world leader in renewable energy development in many respects (DLAPIPER, 2014).

Given that some regulatory policies have been put in place, analysts have pointed out the faulty designs of these policies. For examples, Meier et al (2015) claims that RE targets set in PDP7 and related documents are groundless and over-optimistic, and the VEFP and wind FIT are poorly designed, not transparent and unsuccessful.

Lack of market participation. Compared to some countries in the region, Vietnam's policymaking and implementation in this area is still lagging behind when it comes to boosting the market participation, especially in the biomass electricity market. According to regulations on the roadmap, conditions and structure of the electricity sector, the establishment and development of electricity market levels in Vietnam was promulgated in 2006 (expired) and 2013 (replacing the 2006 document). Since 2015, Vietnam should have had a competitive electricity market and from 2023 there will be a competitive electricity retail market. However, Electricity of Vietnam remains the sole buyer in Vietnam's electricity sector and there is no electricity business units other than EVN affiliated purchasing companies. Regarding the power sector composition, the conventional coal power industry and business are largely state-owned and directed by the Ministry of Industry and Trade. This fact casts doubt on the liberated boost for RE in the foreseeable future.

Lack of financial capacity. The investment cost for high-tech RE electricity projects in Vietnam is high due to large compensation cost and high dependence on imported equipment. Though guaranteed by the government, access to credit for such projects are limited compared to conventional power projects, considering the difficulties in grid connection and uncertain outputs and returns. For example, for transmission connection from power development projects, the SPPA requires that developers be responsible for the costs of the connection to the nearest substation, or to the nearest passing transmission line. Macro financial conditions are also a concern of RE investors, as they discover the unreliability of policies, e.g. foreign exchanges, inflation rates and domestic currency devaluation (Nam et al., 2012)

Conclusion and policy implications

Diversification of energy sources is essential in terms of economic development, global warming and climate change. This is a direction compatible with the global development trend to reduce greenhouse gas emissions and pursue environmental protection. Vietnam has the potential to develop RE including hydropower, materials for biomass, solar power generation and wind power in many areas. These are favorable condition for Vietnam to exploit and use in the future support for electricity produced from traditional sources.

Over the past few years, Vietnam's policy and regulatory system brought about positive changes to the creation of incentives for the development of RE. Major changes in the Renewable Energy Strategy and PDP7 are more appropriate to the real situation, clearly defining the role of RE development in Vietnam. Vietnamese experiences are regarded as a success story for RE, as an example, the introduction of ACT without incremental cost to the government or consumers (Meier et al., 2015)

As in the case of other developing countries, the Vietnamese government's support for RE is hurdled by the dilemma of expanding access to affordable electricity for different power users while keeping the RE business attractive and profitable. Through an overview of RE legislation, it is found that there are major constraints to emerging RE energy markets in Vietnam. From the legal perspective, lack of an enforceable law or Government's Decree on renewable energy represents the absence of the highest legal basis for implementation. Support policies and incentives have little impact in attracting investors, except for some small-sized hydropower projects, while a competitive market in the power sector is still in the making. In addition, there are difficulties in connecting the grid and coordinating power purchase between parties.

The article concludes with the following recommendations:

1) It is necessary to formulate a long-term and comprehensive legal framework for RE development in Vietnam, with the best outcome being comprehensive legislation approved for RE . This helps avoid overlapping and confusion among different laws and sublaw documents, relating to RE. A set of national technical standards for RE should also be studied and released soon.

2) RE policies and incentives should be better designed with clearer rationale and better methodology for cost and benefit calculation. Disincentives should be applied to fossil fuels by removing coal subsidy and internalizing CO_2 emission cost. RE tariff calculation should be flexible and market-based.

3) It is crucial to simplify the procedures for setting up RE projects, from project initiation, approval, licensing, to grid connection.

4) It is crucial to speed up the process of building a competitive power market in Vietnam. Lack of competition is a hurdle to investors.

References

ADB (2015), Viet Nam: Energy Sector Assessment, Strategy, and Road Map. Accessed at https://www.adb.org/sites/default/files/institutional-document/178616/vie-energy-road-map.pdf

Arvo Leinonen and Nguyen Duc Cuong (2013). Development of biomass fuel chains in Vietnam. VTT Technology 134. Accessed at http://www.vtt.fi/inf/pdf/technology/2013/T134.pdf

CEM (2016). State of National Environment 2011-2015 (in Vietnamese: Báo cáo hiện trạng môi trường quốc gia giai đoạn 2011-2015). Hanoi.

Chor Foon Tang, Bee Wah Tan, and Ihan Ozturk. (2016). Energy consumption and economic growth in Vietnam, Renewable and sustainable energy reviews 54. 1506-1514.

DLA PIPER. (2014). Renewable energy in the Asia Pacific: A legal overview. 3rd edition. DLA PIPER.

EVN (2016). Vietnam electricity annual report (in Vietnamese).

FPT (2015). Power sector report (in Vietnamese).

GIZ (2015). Overview of Vietnamese Power Market – A Renewable Energy Perspective. Accessed at http://gizenergy.org.vn/media/app/media/PDF-Docs/Publications/GIZ_Vietnam%20Power%20Market%20Overview_2015-10-26_small.pdf

Institute of Energy (2016). Vietnam Energy Statistics 2015. Hanoi.

ITA (2014). Brief sector note on energy and renewable energy in Vietnam. Italian Trade Agency 2014. Accessed at: http://www.ice.gov.it/paesi/asia/vietnam/upload/198/Sector%20note%20on%20Energy%20&%20Renewable%20energy%20in%20Vietnam%20-%20Oct%202014.pdf

Meier, Peter, Maria Vagliasindi, and Mudassar Imran (2015). The Design and Sustainability of Renewable Energy Incentives: An Economic Analysis. Directions in Development. Washington, DC: World Bank.

MOIT (2016). Revised National Power Development Plan 7.

MOIT (2017). Vietnam Energy Outlook Report 2017. MOIT and Danish Energy Agency (DEA). Accessed at https://ens.dk/sites/ens.dk/files/Globalcooperation/Official_docs/Vietnam/vietnam-energy-outlook-report-2017-eng.pdf

Nam, Pham Khanh. Quan, Nguyen Anh. Binh. Quan Minh Quoc (2012). Investment incentives for renewable energy in Southeast Asia: Case study of Vietnam. IISD-TKN Policy Brief December 2012.

OECD (2013). OECD policy guidance for investment in clean energy infrastructure.

Tien Minh Do and Deepak Sharma. (2011). Vietnam's energy sector: A review of current energy policies and strategies. Energy Policy 39. 5770-5777.

Related policies

Issuing Agency	Year	Policy
National Assembly	2004	Electricity Law
	2012	Amended Electricity Law
Prime Minister	2004	Decision No.153/2004/QD-TTg dated 17 August, 2004 promulgating the oriented strategy for sustainable development in Vietnam (Vietnam's Agenda 21)
	2004	Decision No. 176/2004/QD-TTg dated 5 October, 2004 approving the strategy on development of Vietnam electricity industry in the 2004-2010 period, with a vision to 2020
	2007	Decision No. 110/2007/QD-TTg dated 18 July, 2007 approving the planning on national electricity development in the 2006-2015 period, with a vision to 2025
	2007	Decision No. 1885/QĐ-TTg dated 27 December, 2007 approving Vietnam's National energy development strategy up to 2020, with a vision to 2050
	2011	Decision 1208/QD-TTg (PDP 7) dated 21 July, 2011 provides for the national master plan for power development for the period 2011 to 2020, with an outlook towards 2030
	2011	Decision No. 37/2011/QĐ-TTg dated 29 June, 2011 on the mechanism supporting the development the wind power project in Vietnam
	2014	Decision No. 24/2014/QĐ-TTg dated 24 March, 2014 on support mechanism for development of biomass power project in Vietnam
	2014	Decision No. 31/2014/QD-TTg dated May 05, 2014, on supporting mechanism for development of power generation projects using solid waste in Vietnam
	2014	Decision 1539/QĐ-TTg approving the list of projects planning development of wind in Vietnam using Germany's assistance fund
	2015	Decision No. 2068/QD-TTg dated 25 November, 2015, approving the development strategy of renewable energy of Vietnam by 2030 with a vision to 2050
	2016	Decision No. 428/QĐ-TTg dated 18 March, 2016, approving the revisions to the national power development plan from 2011 to 2020 with visions extended to 2030.
	2017	Decision No. 11/2017/QĐ-TTg dated 11 April, 2017 on mechanism for encouragement of development of solar power in Vietnam
Ministry of Industry and Trade	2005	Decision No. 3454/QĐ-BCN on national hydropower plan
	2012	Circular No. 32/2012/TT-BCT of November 12, 2012, regulation on implementation of wind power project development and power purchase and sale contract form for wind power projects.
	2014	Circular No. 32/2014/TT-BCT dated October 09, 2014, procedures on establishment and application of avoidable cost tariff schedule and promulgation of specimen of power purchase agreement (PPA) to small hydropower plants.
	2015	Circular No.32/2015/TT-BCT dated 08 October, 2015 providing for development and template of electricity sale contract applicable to solid waste power projects
	2015	Circular No. 44/2015/TT-BCT dated 09 December, 2015, providing for development of avoidable cost tariff and template of electricity sale contract applicable to biomass power projects
	2016	Decision No. 942/QĐ-BCT, avoided cost tariffs for biomass projects in 2016
	2017	Circular No.16/2017/TT-BCT dated September 12, 2017 by Ministry of Industry and Trade on project development and electricity purchase contract specimen for solar power projects.
Ministry of Finance	2012	Circular No. 96/2012/TT-BTC of June 08, 2012, guidelines for financial mechanism to support electric price for grid connected wind power projects.

7

Quynh Chi Trinh[1)]

The Role of Technical Assistance in Promoting Renewable Energy Sector in Vietnam – Insights from GIZ

Abstract

After three decades of rapid socio-economic development, Vietnam has successfully transformed from one of the poorest countries in the world to a lower-middle-income country in 2009. Apart from its own efforts, this achievement of Vietnam could not be realized without continuous financial and technical supports from international donors and development partners. Since 1993 when the first Official Development Assistance (ODA) flew into the country, Vietnam has always been one of the largest recipients in the world, with more than $90 billion committed from over 50 bilateral and multilateral donors so far. The contribution of international aid has a visible role in all aspects of the country's socio-economic growth.

The energy sector – the fuel for all economic and social activities – has also attracted plenty of international aid since the start of the "Doi Moi"[2)], mainly for projects on improving the infrastructure and constructing new generation power plants. Together with the transition of the energy sector towards renewable energy (RE), the international support has also shifted more and more towards the promotion of RE and energy efficiency (EE) in the recent years. In line with the pathway to achieving the sustainable development goals (SDGs), it is therefore worthwhile to re-emphasize the contributions of international aid to the current development of the Vietnamese RE sector. Focusing on Technical Assistance (TA) – one of the two categories of ODA, besides Financial Assistance (FA) – this paper aims to provide some insights into the role of TA in supporting the development of the RE sector in Vietnam, through examples from the activities of Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. By analyzing the RE market from its struggling starting point, the development of the RE market to the current status, where motivations and commitments of all stakeholders are visible, will show a good example of how efforts from TA contributed to the promotion of RE sector in Vietnam so far.

1. Project officer, GIZ
2. "Doi Moi" – "The Renovation" is the economic reforms initiated in 1986 from which point the Vietnamese economic system turned from centrally planned to market-based with socialist-orientation.

1. Introduction

SDGs and development of renewable energy in Vietnam

Soon after "Doi Moi", Vietnam has gone through a period of rapid socio-economic development over the last three decades with remarkable achievements. The fraction of people living in extreme poverty decreased from over 50% in the early 1990s to 3% today. When fighting against poverty, Vietnam was also one of the star performers regarding the Millennium Development Goals (Overseas Development Institute, 2010). Throughout the process, the country witnessed an enormous and rapid increase in energy demands, which still continues to grow at double-digit rates annually. This status of the energy sector highlights the importance of the SDG 7 (i.e., ensure access to affordable, reliable, sustainable and modern energy for all) among other SDGs to Vietnam, which could be translated to the question of how to meet the economy's energy demand in an inclusive and sustainable manner.

Challenges related to climate change – by which Vietnam is one of the most affected countries – also put the energy sector at the center of Vietnam's urgent shift towards Green Economy. Accordingly, in the newly released National Action Plan on the Implementation of the 2030 Agenda for Sustainable Development, the Government has emphasized the priority given to the Renewable Energy Resources in order to end the energy poverty and to obtain sustainability (Decision No. 622/QĐ-TTg by the Prime Minister, 2017).

Technical assistance to renewable energy development in Vietnam

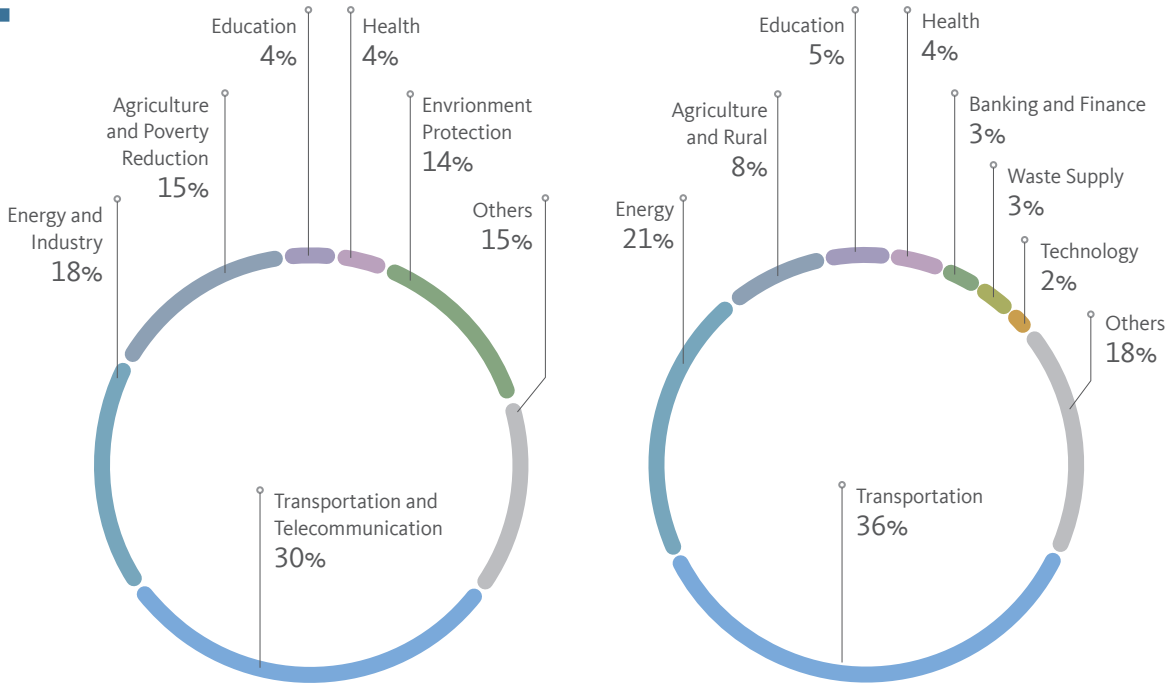
International development assistance, including both financial and technical support to developing countries, plays an important role in helping these nations in their efforts towards sustainable development. Technical Assistance (TA) in particular, is a form of development aid given to less-developed countries by international organizations or developing countries. Different from direct financial aid, TA is "the transfer or adaptation of ideas, knowledge, practices, technologies or skills to foster economic development" (World Bank, 1991). According to OECD, throughout the long history of international development aid, TA makes up about from one-quarter to half of all aid investment. To support development, TA often includes activities aiming for: 1) Policy development; 2) Institutional development; 3) Capacity building; and 4) Project or program support (World Bank, 1991).

Figure 7-1 illustrates the ODA implementation structure by sectors in Vietnam during the period of 1993-2014 (for general trends) and the period 2004-2015 (for the recent trend). These statistical numbers reconfirm the role of energy sector in the overall economic development of Vietnam. Together with transportation, energy is one of the two sectors that received the highest amount of ODA. In recent years, as shown in the figure, the energy sector continues to attract more ODA than the period before, as a result of the global transition towards RE and EE.

Being one of the largest ODA recipients, Vietnam also received large amounts of TA from development partners for various economic sectors. Particularly, during 1993-2013, the Ministry of Industry and Trade (MOIT)

↘ Figure 7-1

ODA to Vietnam by sectors throughout the ODA history



Source : Dinh, 2016

– the Government authority overseeing the energy sector – received about $11 billion for ODA projects of which energy sector took $10 billion, including loans and non-refundable aid for TA. In Vietnam, key development partners providing TA in energy sector include ADB, AFD, EU, GIZ, JICA/ JBIC, KfW, SECO, UNDP, WB, among others[3].

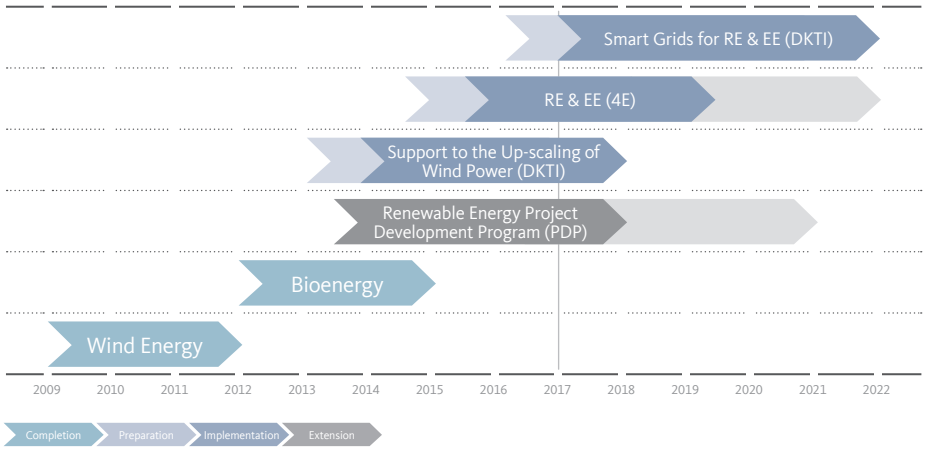
German Technical Assistance to RE in Vietnam - via MOIT/GIZ Energy Support Program

Germany has been a long-term development partner of Vietnam since the openness of the country. Engaged in development cooperation with areas where the German added value can best fill in the needs of the partner country, ODA and TA from Germany to Vietnam has focused on vocational training, technology transfer, and sectoral reform advisory. TA of Germany is commissioned by the Federal Ministry of Economic Cooperation and Development (BMZ, due its German abbreviation), the Federal Ministry for Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and the Federal Ministry for Economic Affairs and Energy (BMWi) and implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. GIZ - which is one of the largest technical assistance agencies worldwide – is a provider of international cooperation services for sustainable development. Owned by the German government, GIZ works with businesses, civil society actors and research institutions, fostering successful interaction between development policy and other policy fields and areas of activity. With more than 20 years of experience in Vietnam, GIZ has provided advisory and practical services to various Vietnamese governmental parties through projects across a wide range of sectors, namely vocational training, economic reform, environmental protection and energy, etc.

3. Names are presented in the alphabet order.

↘ Figure 7-2

TA Projects by MOIT/ GIZ Energy Support Program (ESP)



GIZ started the first energy project in Vietnam in 2009, with activities to promote the wind power sector. Since 2013, energy has become a priority sector in GIZ Vietnam, with focus on developing framework conditions for RE, and increasing energy efficiency, in close collaboration with the General Directorate of Energy (GDE) within the MOIT. Supporting the achievement of the sustainable development goals, the ESP provides TA which helps to improve the use of sustainable, safe, reliable, affordable and versatile RE in Vietnam, through ranges of activities from policy advisory to capacity building or private sector match-making, for all kinds of RE resources such as wind, solar, biomass, etc. Figure 7-2 summarizes projects that have been implemented and are currently ongoing of the MOIT/GIZ Energy Support Program in Vietnam.

2. RE market development in Vietnam: ten years of gradual progress

As an emerging economy, Vietnam requires continuously increasing amounts of energy for its development. The annual growth rate of power consumption in the last ten years has always been between 11-15% - almost twice as high as the growth rate of the gross domestic product (GDP). To satisfy such rapidly increasing demands, the power system also needed to expand its generation accordingly. Until now, the Vietnamese electricity sector has relied heavily on hydro and coal power resources, which account for 38% and 33.5% of the total installed capacity [4], respectively (EVN, 2016). The exploitation of these resources, however, is facing big challenges. Previously an exporter, Vietnam has become a net coal importer in 2016 for the operation of its power plants. Additionally, climate change with severe draughts and exploitation of river up-stream has pushed the hydropower generation to its limit. Security of power supply, therefore, is at high risk when main generation resources cannot be balanced with the continuous increase of demand [5].

The issues of security of supply, as well as the diversification of energy mix towards sustainable development in which renewable energies hold a key role, have been touched upon in Vietnam for quite a long

4. Numbers as of December 31st, 2015.
5. About 2-3% of the electricty generation in Vietnam is imported from China and Laos whereas the country exports less than 1% to Cambodia (EVN, 2016). However, for the security of supply, Vietnam aims for the less dependence on imported generation to satisfy its domestic demand.

time. In the National Energy Policy published in September 2004 where the Government sketched priorities for the period of 2000-2020, RE were mentioned for the first time in an official strategic document via a clear statement: "development of various forms of renewable energy needs to be encouraged".

However, after more than a decade, despite visible improvements as described in sections below, the RE sector and market seem to be developed below the expectations. In this section, the evolvement of the sector, including barriers and progress, is presented, mainly through reviewing technical assistance activities of the MOIT/GIZ-ESP.

The challenging starting point

Following the National Energy Policy in 2004 in which the role of RE in the power sector was first paid attention, the Government of Vietnam has gradually showed the aim of increasing the power system's reliance on renewable energy sources, through ambitious targets for RE development. In the (Decision No.110/2007/QĐ-TTg by the Prime Minister, 2007) approving "The plan on national electricity development in the 2006-2015 period, with a vision to 2025", the capacity from renewable resources (large-scale hydro power plants excluded)[6] was planned to add 241 MW/year in the period 2006-2015 and 160 MW/year in the period 2016-2025, equaling a total of 4.050 MW of additional capacity from RE by the 2025. Soon after, the (Decision No.1855/QĐ-TTg by the Prime Minister, 2007), approving the "National energy development strategy up to 2020, with a vision towards 2050", quantified the goals of RE development to be 3% of total primary energy consumption by 2010, 5% by 2020, and 11% by 2050.

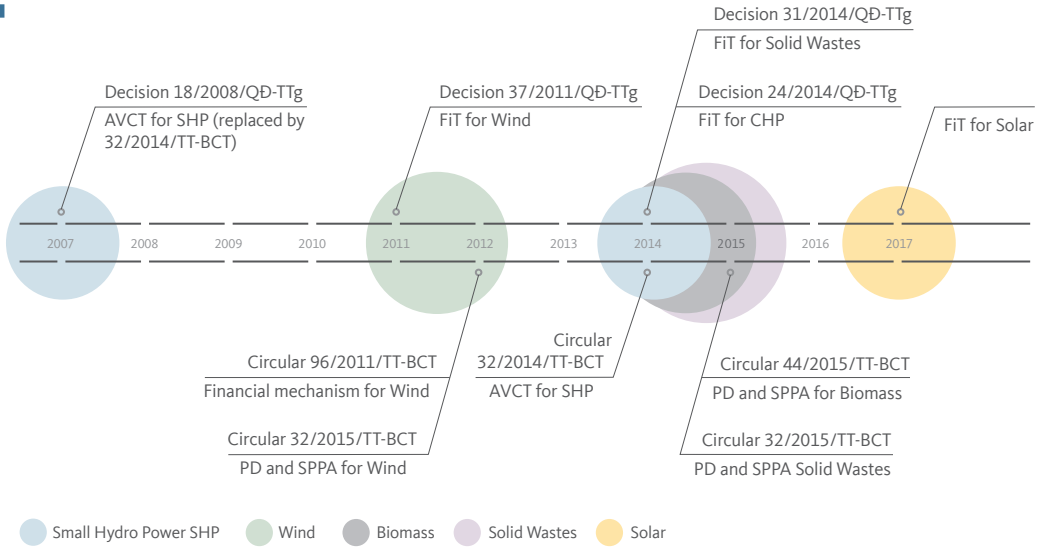
Despite clear and ambitious targets at that time, the RE sector was struggling with its own development pathway to achieve this political vision. In that early stage, the priority of the RE sector development in Vietnam was given to low-cost resources, such as small-scale hydro power, bioenergy, solid waste and towards off-grid projects that contributed to rural electrification purpose in remote areas (OECD/IEA, 2010). There was also a lack of supporting mechanisms for renewable energy technologies which could not compete with conventional resources about generation costs. As can be seen in Figure 7-3, during the period 2007-2011, only one support mechanism was released, for small hydro power.

Consequently, in 2009 when GIZ initiated the first renewable energy project in the country, the RE market in Vietnam was basically non-existent. Installed capacities of all RE resources (except large-scale hydro power) were at a negligible level, far below their estimated potential. At utility-scale, there was no RE project developed, no commercial electricity from renewables traded, and the potential of RE resources was still unclear. Commercial renewable energy did not seem an option in the Vietnamese power sector, under the shadow of missing capacity within Vietnam's energy market and key actors, the lack of supporting policies and a general perception of high generation costs and a reluctance in regard to the volatile RE generation.

6. Vietnam has a large energy production from hydropower. Indeed, some statistical reports claimed that more than 40% of installed generation capacity of Vietnam comes from renewable energies (i.e., hydropower). However, at large-scale, the exploitation of hydropower creates other ecological and social issues, making this resource unsustainable and therefore not being considered as RE. In this paper, focusing on SDGs, renewable energies do not include large-scale hydropower.

↘ Figure 7-3

Summary of key legislations on Support Mechanisms for renewable energy sector in Vietnam



Note: PD = Project Development, SPPA = Standardized Power Purchase Agreement, AVCT = Avoided Cost Tariff, FiT = Feed-in Tariff

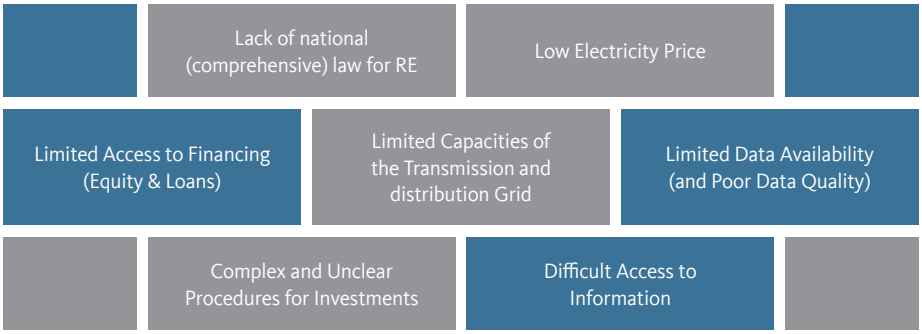
Source: MOIT/GIZ Energy Support Program

Barriers to the RE market advancement

The levelized costs of electricity from renewable energy sources (such as wind, solar PV, solid waste, biomass) – particularly in the past - are often above those of large-scale conventional generation, making them unattractive from a purely financial standpoint. Differently speaking, renewables are considered as not cost-competitive for power supply. The deployment of RE, therefore, depends heavily on supporting policies from governments worldwide. Similarly, the advancement of the RE market relies strongly on the promoting conditions which include regulatory frameworks, human capacity, and technological aspects, among others. When these preconditions are missing or unfavorable, the market faces significant barriers to attract interests and investment. That was the situation of the Vietnamese RE market in its early phase. Identifying these barriers (Figure 7-4), many TA activities from different development partners have been developed throughout the last decade, gradually lifting the barriers and fostering the RE market. For wind energy in particular, investors' opinions about obstacles of the wind power development in Vietnam had been surveyed as shown in Figure 7-5.

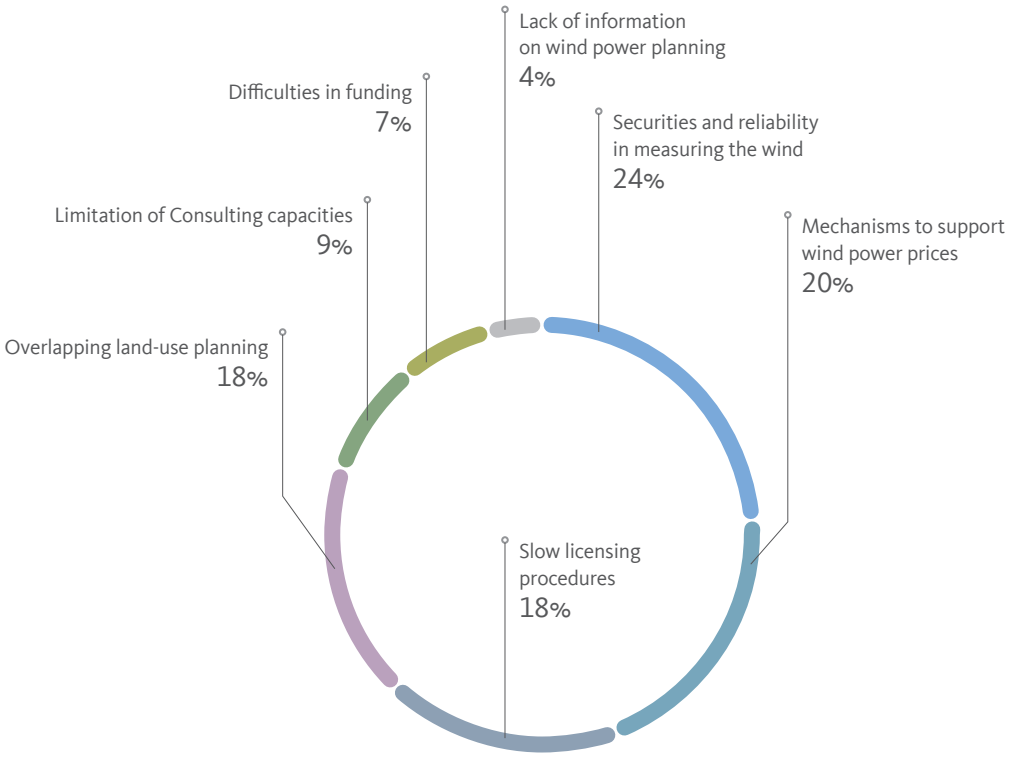
↘ Figure 7-4

Barriers for investments into RE sector in Vietnam



↘ Figure 7-5

Investors' opinions on obstacles of Vietnamese wind power sector



Source: Cuong & Dersch, 2014

From a development point of view, the identified obstacles can be translated to critical gaps between required/expected and current conditions for the sector promotion. In particular, barriers of the RE sector development in Vietnam include i) policy and regulatory gaps; ii) knowledge and capacity gaps, and iii) risk and financial viability gaps, all of which are inter-linked. Knowledge gaps imply the lack of information (e.g., about resource potential) for both public and private actors; the lack of financial structures or institutional capacity to make investments, to develop policy frameworks or to design interventions to target specific risks and costs. Risk gaps consist of technology risks, financial risks, political risks and market risks that prevent public and private stakeholders from investing in renewable energies. Viability gaps occur where the costs of a RE project are greater than available revenues, considered on a net present value basis. (Stadelmann & Falconer, 2015)

Technical Assistance to fill the gaps

As the power sector holds a crucial role in the development of Vietnam, it has been receiving support from most of major development partners active in Vietnam. Previously, during the poverty reduction period (i.e., before 2009), support from development partners focused on increasing power generation via support to new power plants and power system expansion. Recently, attentions are paid mainly on sector reform and market development, energy efficiency and renewable energy. Details of support by development partners for power sector in Vietnam are summarized in Table 7-1.

Development partners' support for power sector in Vietnam

↘ Table 7-1

Areas of Assistance	Development Agencies
Power development plan	ADB, WB, JICA
Sector reform and market development	ADB, WB, AFD, UNDP
Energy efficiency and renewable energy	ADB, WB, JICA, AFD, KfW, GIZ, EIB, Danida, Sida, DFAT, SECO, UNDP
Generation	ADB, WB, JICA, AFD
Transmission	ADB, WB, JICA, AFD, KfW, GIZ
Distribution and rural electrification	ADB, WB, AFD, KfW, GIZ, JICA, Sida
Environmental impacts and climate change mitigation	ADB, WB, JICA, AFD, KfW, GIZ, Danida, EIB, Sida, DFAT
Regional interconnections	ADB, WB, AFD, Sida
Public-private partnerships	ADB, AFD, EEAS

ADB : Asian Development Bank, AFD : Agence Francaise de Development (French Development Agency), Danida : Danish International Development Agency, DFAT : Austrian Department of Foreign Affairs and Trade, EEAS : European External Action Service, EIB : European Investment Bank, JICA : Japan International Cooperation Agency, SECO : Swiss Secretariat for Economic Affairs, Sida : Swedish International Development Cooperation Agency, UNDP : United Nations Development Program, WB : World Bank

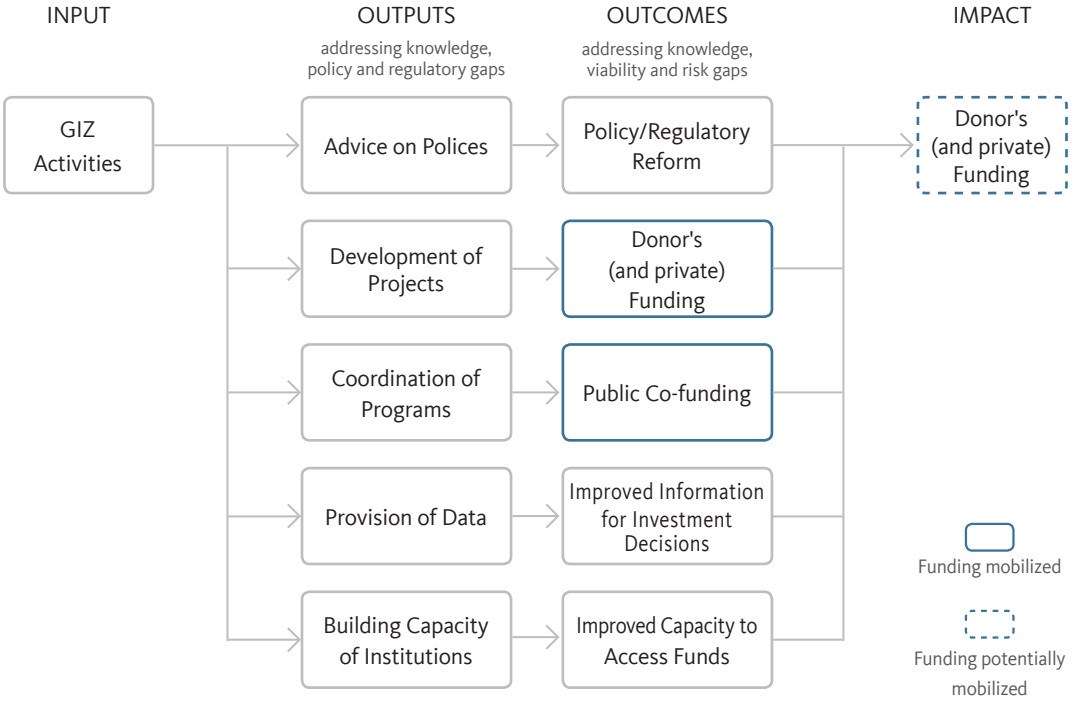
Source: Asian Development Bank

As shown in the table, compared to other sub-sectors, RE and EE are receiving engagements from more development partners. However, support from many development partners are under the form of Financial Assistance (i.e., loan). Support via TA activities takes smaller proportion and mainly focus on analytic and advisory for strategic policy development such as renewable energy resource mapping (the World Bank), capacity building and regulatory framework establishment (GIZ). In the section, TA and its rationales are presented, with extensive examples from MOIT/GIZ-ESP's activities.

Filling gaps is the most efficient measure that TA can offer to support the development of a sector or a country. Depending on the gaps identified, suitable TA activities are developed. For example, training and capacity building is the most relevant action area to address the knowledge gaps. In-depth studies and advisory reports contribute to the development of policies and measures, thereby tackling policy and regulatory gaps. By reducing investment risks (for example, via providing more reliable data) and contributing to the establishment of incentivizing public policies (for example, renewable energy Feed-in-Tariffs), TA activities address the risk and financial viability gaps.

↘ Figure 7-6

Mapping between TA activities and gaps – Examples of GIZ



Source: Stadelmann & Falconer, 2015

Under the framework of MOIT/GIZ Energy Support Program, the above mentioned gaps were identified and addressed accordingly. Overall, the TA aims to improve preconditions of the market for investment in RE, by providing the right incentives, knowledge, resources and skills to stakeholders. The main activities of the TA towards expected outputs/ outcomes are illustrated in Figure 7-6. Notable activities and their impacts are introduced in Boxes 1, 2, 3 and images below.

Filling policy and regulatory gaps

Regulatory frameworks and policies are the foremost conditions that influence a market by either constraining or incentivizing private investment in renewable energies. Investment cannot be triggered, obviously, if regulatory framework puts an inappropriate price for risks taken or lowers the rate of return of possible investment opportunities. On the other hand, well-designed policies require adequate knowledge and proper approaches to be developed. Filling the policy gaps, therefore, includes advisory services for designing suitable regulations, as well as engaging in policy consultations with the government.

Since 2009, GIZ had supported the Vietnamese government in studying the suitable supporting mechanisms for RE. For example, based on capital and operational expenditures as well as wind data in Vietnam, a tool had been developed to help the government calculate a Feed-in-Tariff (FIT) that would be economically viable under the Vietnamese context. GIZ also elaborated comprehensively a cost analysis of Vietnam's wind power projects (for operating projects as well as ones in preparatory phases) to provide the government an evidence-based overview for decision-making. Similarly, the FITs for biomass and solid waste have been released in 2014, with support from the GIZ.

Box 1. Project highlight: Biomass Energy Planning

The GIZ Renewable Energy and Energy Efficiency (4E) project – funded by the German Federal Ministry of Economic Development and Cooperation (BMZ) – supported the Ministry of Industry and Trade (MoIT) in developing the Vietnamese National Biomass Energy planning (NBEP) for the period until 2020 with vision to 2030. The NBEP is expected to help policy makers at both central and provincial levels to assess theoretical, technical and commercial potential of biomass resource and to prepare adequate infrastructure for the development of biomass energy projects. Additionally, this planning exercise could faciliate the investment process by reducing several licenses required by the government authorities. At provincial levels, through the Cimate Finance Ready component (commissioned by the BMZ and partly co-financed by the USAID) under the 4E Project, GIZ is helping Gia Lai and An Giang province to develop their Provincial Biomass energy planning (PBEP).

These Plannings are conducted based on planning methodologies that include resources assessment, grid planning, environmental, social and economic impact assessment while using participatory approach that combines desk research, questionnaires, field trips and in-depth survey for data collection and verification. Methodologies and preliminary results of the biomass resource assessment have been presented at Inception Workshops in which relevant Ministries and Departments at provincial and district levels responsible for biomass energy, biomass investors and universities were invited for comments, opinions and finalization.

The NBEP was finalized and submitted to MoIT in March 2017 and is now under appraisal for approval by the Prime Minister. The NBEP has identified a technical biomass potential of 12,236MW in 2020 including 3,654MW of wood based biomass plant and 8,159MW from bagasse, husk and straw fueled plant. For 2030, these figures are 13,644MW; 4,436MW and 8,772MW, respectively.

The PBEP for Gia Lai and An Giang are under development and planned to be completed by end of 2017.

a

b

c

d

a. Summer School on Wind Power Energy for German-Vietnamese students

b. Study tour on Solar PV for government officers in Germany

c. Match-making for Vietnamese-German researchers on Wind Power

d. Training on cash-flow modelling for banks

Bridging knowledge gaps

Knowledge, including awareness, expertise, data and information, and mutual understanding, is requirements for long-term and sustainable development of the sector. In particular, as the RE sector in Vietnam is still at its infancy, limited capacity in technology manufacturing and servicing as well as the lack of skilled technicians for installation and maintenance of technologies hold back the introduction and expansion of RE technologies. To bridge knowledge gaps, TA often focuses on human resources development and institutional capacity building, carries out market studies, capacity assessment, resource audits, as well as facilitating dialogue between stakeholders (e.g., between government and private sector).

Actors that benefited from GIZ's TA on filling knowledge gaps range from national and provincial governmental officers, investors, banks and consultancy companies, project developers, researchers as well as the youth (e.g., students). This comprehensive, sector-wide approach is expected to improve the awareness and capacity of all market players, making the market well-prepared for sustainable development.

The provision of data and information, as well as sharing lessons and project development experience, is one part of TA activities needed to overcome knowledge gaps. For example, aiming at getting reliable data for the wind power planning, as well as supporting to the project development, MOIT/GDE and GIZ started a Wind Measurement Campaign in 2011 at ten different sites in seven provinces in Vietnam. As a result of three years of implementation, the wind measurement campaign had contributed to the wind power development plan of provincial planning. Additionally, the data collected from these ten sites had been successfully integrated into the World Bank ESMAP Program contributing to the development of the reliable wind atlas for Vietnam[7].

By bridging the knowledge gaps, TA activities have not only built stronger capacity for relevant stakeholders but also strengthened the trust and long-term relationships between stakeholders within the sector, such as between governmental authorities with private sector. The improvements by these TA activities also help to create more confidence on the prospects of the sector that are the essential consideration of potential investors.

Mitigating viability and risk gaps

Enabling the market environment : Apart from the supporting mechanisms, investment in RE market is often hindered by complex and non-transparent administrative procedures. Together with limited and unreliable data of the RE resources, it is very difficult for private investors to evaluate the feasibility hence bankability of an investment decision. By providing information addressing these knowledge gaps, TA can reduce investment risks, improve the competiveness of the sector, and at the same time enable mutual understanding and dialogues between the government and private sector.

Supporting the private sector : The TA also supports business activities in RE by connecting investors and developers towards potential win-win partnerships. By matching potential partners, the activity helps making investments possible even under difficult context and conditions. Establishing links between investors and technology providers of appropriate technologies, including German know-how is considered as one measure to reduce the risks of investment and increase the rate of returns.

7. Measurement data is accessible at: https://energydata.info/dataset/vietnam-wind-measurements-giz

Box 2. Project highlight : Wind Investment Guidelines

On behalf of the Ministry of Industry and Trade (MOIT) and its General Directorate of Energy (GDE), GIZ has been working in close cooperation with the USAID PFAN-Asia on the Handbook of Wind Power Investment Guidelines which is comprised of two volumes focusing on Project Development (Volume 1) and Project Financing (Volume 2). Aiming at providing more transparency and clarity on the different development phases of a wind project in Vietnam, from the administrative perspective under the current regulatory framework, and bringing clarity on different financing possibilities, the handbook is seen to be a useful document for all interested stakeholders who take part in the development of and investment in wind power in Vietnam.

The Launching Event of the Handbook on Wind Power Investment Guidelines was joined by senior officials from relevant Ministries such as the Ministry of Industry and Trade, the Ministry of Planning and Investment, the Ministry of Finance and relevant provincial departments of Southern provinces including the Department of Industry and Trade, the Department of Environment and Natural Resources, the Department of Planning and Investment, as well as commercial and development banks, and the private sector. At the workshop, participants were provided with official information on processes and permits needed to develop a wind power project in Vietnam, as well as with financial options for wind power projects in Vietnam.

The impacts of this Handbook on Wind Power Investment Guidelines have gone far beyond the scope of a launching workshop. Many investors and researchers as well as interested stakeholders expressed their appreciation on the first systematic instruction about investment on wind power projects, helping them to have a clearer and more comprehensive estimation of the investment efforts.

Box 3. Project highlight: Solar PV Rooftop – Swire project

In an effort to tap the solar photovoltaic (PV) rooftop potential in Vietnam, the Renewable Energy Project Development Program (PDP), implemented by GIZ under the German Federal Ministry for Economic Affairs and Energy's (BMWi) German Energy Solutions Initiative, conducted a market analysis in embedded PV generation for industrial and commercial sectors. The study recommended attractive market segments to German solar companies and has led to the realization of a 300 kWp rooftop solar project at a cold storage facility.

The analysis included various support measures: initiating project ideas in line with the companies' demand to reduce energy costs and their commitment in sustainable operation and environmental protection; supporting pre-feasibility studies and sharing contacts of reputable and competitive German solar companies.

The tender of the 300 kWp PV rooftop system was publicly disseminated among local and international contractors and finally awarded to a German company. PDP sets out to not only support the project in marketing activities towards relevant stakeholders but also to employ experiences obtained in terms of project development, implementation and administrative procedures to upscale PV rooftop application in cold storage and other sectors.

Mobilizing finance

Apart from the direct investment to bridge the policy, knowledge and capacity gaps, one of the main focused activities of TA is to mobilize additional public and private investments into the sector's development. According to (Green Growth Action Alliance, 2013), public finance could be mobilized financial resources from private sectors which are four to five time higher than contributions made by public sector. More specifically, (GIZ, 2015) has quantified the finance mobilization power of TA across GIZ's five technical assistance programs. The study has estimated that one Euro spent by GIZ for its technical assistance activity could mobilize from 0.9 to 15 Euro investments (direct and indirect[8]) from different public and private sources. For example, with 43 million Euro non-refundable aid provided by GIZ (through technical assistance program), up to 37- 233 million Euro public and 412 million Euro private investment could be mobilized.

Although there is currently no study on the mobilization power of the TA for the Vietnamese RE sector, it is rational to state that the increasing investments and interests into the sector as described in the following section happened with significant contributions from TA of international development partners in general and of GIZ ESP in particular.

A market about to accelerate

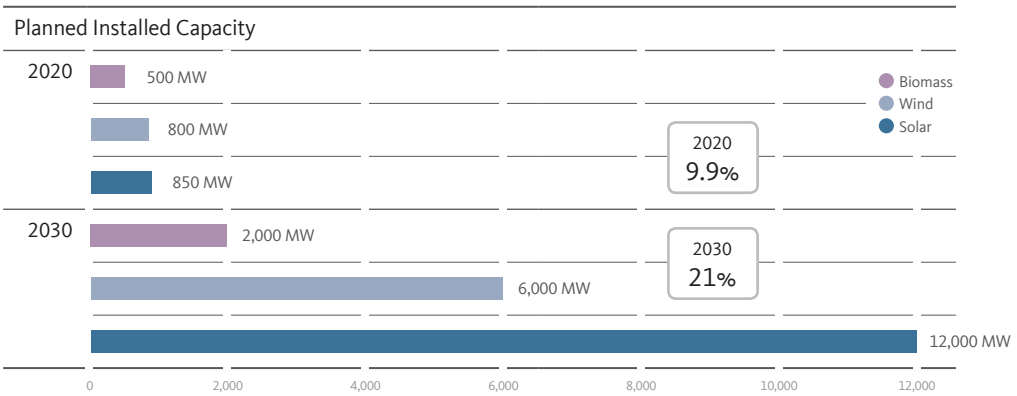
The section on 'Technical Assistance to fill the gaps' only listed a few of the various activities of TA that have been provided by development partners to promote renewable energies in Vietnam. Although the progress is still relatively slow and the share of renewable energy generation in the energy mix is marginal, the sector in recent years shows a positive movement which implies acceleration in the near future.

Stronger government's commitments and supports

In line with the global trend and under the visible impacts of climate change, RE has now become an urgent solution for power system development in Vietnam, expressed through high political goals from the government (Figure 7-7).

↘ Figure 7-7

Vietnamese renewables targets for 2020 and 2030



Source: Revised PDP VII (calculated on the basis of projected electricity production in 2020/2030)

8. Direct mobilization is when TA agencies use their initial financing to develop programs that attract direct co-financing from donors, recipient country' government or the private sector. Indirect mobilization is when TA mobilizes finance by supporting the creation of policy environments and markets that are conducive to the sector development. (GIZ, 2015)

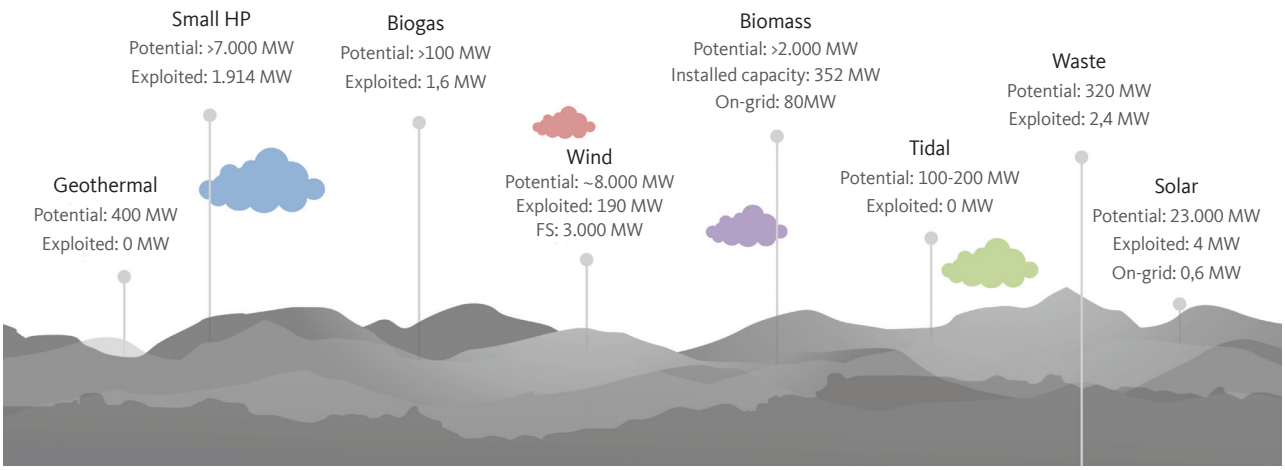
It is worthwhile to mention the efforts of development partners to increase the government's interests in renewable energies for sustainable development. Areas supported, including studies on large RE potential in Vietnam, evidences on environmental impacts of traditional power resources, study tours and experience sharing from developed countries, updates on generation costs and others have gradually contributed to the changes in the government's view towards RE. RE technologies are no longer considered as too expensive for Vietnam, but have become feasible and promising solutions for economic development. In particular, at provincial level, power development planning witnessed the rise of renewable energies, in some cases, to replace the expansion of conventional resources. The province of Bac Lieu, for example, has recently announced to drop a coal-fired power plant project and planned for more wind and solar PV power[9]. Renewable Energy Development Plans are being developed not only at the national level, but also for more and more provinces individually.

Attracting private investors

As a result of stronger government's commitments and planning, many support mechanisms for RE are currently available (e.g., FIT for wind energy, biomass and solid waste). Most recently, the draft Circular on Regulating Solar Power Project Development has been released, with FIT for grid-connected solar power projects to be at 9.35 USct/kWh. Though these FITs are still relatively modest to attract investors, they contribute to increasing involvements of the private sector. Many foreign investors and commercial banks have expressed their interests in RE markets in Vietnam (Vietnam Investment Review, 2016), with more than USD 778 million invested in the green energy sector (Vietnam Economic Times, 2017).

↘ Figure 7-8

Vietnamese renewables potential and exploitation status up to 2017



9. http://dantri.com.vn/kinh-doanh/bac-lieu-xin-loai-bo-mot-du-an-nhiet-dien-vi-moi-truong-thuy-san-20160920173947882.htm

3. Opportunities and remaining challenges

Whereas the last decade could be considered as the infancy of the Vietnamese RE sector, it is expected to mature quickly in the coming period, with increasing opportunities for development, including:

- Renewable energies become the inevitable trend in power sector development globally. Investment in clean energy – as one of the most crucial solutions for climate change mitigation – attracts more and more finance. Currently, the global emerging trend is pouring financial resources towards climate change solutions in developing countries. Vietnam – being one of the most affected countries – therefore would be a big beneficiary of these resources of which RE projects account for a large portion.
- Thanks to technological advancements, generation costs of RE nowadays have declined significantly and even could compete with conventional sources of energy, making RE projects more attractive and profitable than ever before.
- Together with increased awareness of environmental issues, the acceptance and support to RE development in Vietnam have been improved significantly. Many and new actors involve and contribute to the sector such as researchers, students, and others whom will in turn create better resources (i.e., knowledge, labor forces) for the market.
- Lessons learnt as well as up-scaling effects from pioneer projects help to ease fears and risks as markets develop. The learning curve will positively improve the benefits for new and developing projects.

Yet, in order to take advantages of the above opportunities, the Vietnamese RE sector still have to overcome some of the remaining challenges, including:

- The ODA will be significantly reduced and probably phased out in the near future as Vietnam is recognized as a middle-income economy. Concessional loans and international supports will no longer be the main push factor for RE development anymore. Investments will then rely heavily on the private actors which require a lot of improvements in regulation and policy framework, as well as institutional capacity of the sector.
- The Vietnamese energy market itself is undergoing a mid- to long-term liberalization and unbundling process which on the one hand could complicate the integration of RE into the market, and on the other hand opens up the monopoly by the state-owned Electricity of Vietnam (EVN).
- The grid infrastructure and management is limited, which may not be able to catch up with the growth of the sector without serious investment and upgrading.
- There is a lack of transparent and a common legal framework that provides clear instructions to private investors, especially on licensing and permits issuance.
- RE development master plan is not yet available; list of invested projects is not developed, creating risks for investors.

More efforts of Vietnamese stakeholders themselves and continuous supports from development partners therefore are required even harder to tackle these issues. A more comprehensive approach is needed in order to take into account all of the above aspects as well as the rapid changing RE sector and the power system reform.

4. The way forward

International TA so far has contributed largely to Vietnam's movements towards RE. The success and achievements of these TA activities were based on suitable approach and factors, including i) the long-term engagement and solid in-country presence, ii) strong cooperation and trust between governments, iii) understanding local government's needs and priorities as well as the national context, iv) providing high-quality expertise and wide ranging active networks to support the private sector, and v) extensive outreach to all stakeholders.

The rapidly changing socio-economic context, at both international and national levels however, is urging development partners to adapt their TA activities for the next steps.

Using and mobilizing Technical Assistance in the new context

Concession loans will no longer be the supporting resource for development that Vietnam can rely on after becoming a middle-income country. The TA for Vietnam will also be affected negatively. Therefore, during the last period when TA is still available, it is critical to spend this resource in an optimal way that ensures sustainable results for the sector even after the TA phase-out.

With limited budgets, the new trend of TA is not only to provide expertise and fill in gaps but also to mobilize other financing sources for investment in the sector. Typically, TA agencies use their initial financing to develop programs that attract direct co-financing (from donors, developing country governments or the private sector) (Stadelmann & Falconer, 2015). For Vietnam, in the new context of power sector's market mechanism transition - where the role of private sector dramatically increases, efficient TA programs will need to focus on how to best use limited public resources to drive the private investment towards sustainable development, while avoiding the creation of unhelpful market distortions. Indirectly, TA can mobilize private finance, by supporting the creation of policy environments and markets that are conducive to investors.

Grid integration of renewable energy

Power market reform and the growth of RE will create new challenges to the existing system, including infrastructure and management. Accordingly, for the sustainable development of RE sector, attentions need to be paid not only to the generation side (i.e., increasing capacity, energy mix) but also to the integration of the renewable energies into the network and to their harmonization with other energy sources.

Hence, TA for RE sector in the next period should prioritize the task of ensuring the reliability, stability and security of the grid. For example, GIZ considers Energy Efficiency and Smart Grids as the most effective and efficient solution to promoting the RE development as well as its integration into the Vietnamese power system. Under the framework of its long-term commitments for supporting RE sector in Vietnam, GIZ will therefore also focus on and prioritize the issues of Energy Efficiency and Smart Grids in upcoming TA activities, in supplement to its current sector-wide approach for cooperation development.

References

ADB. (2016). Vietnam - Energy sector assessment, strategy, and roadmap.

Cuong, N., & Dersch, D. (2014). Proposal of an appropriate support mechanism for wind power in Vietnam. Hanoi: Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) GmbH.

Decision No. 622/QĐ-TTg by the Prime Minister. (2017, May 10). National Action Plan on the Implementation of the 2030 Agenda for Sustainable Development. Retrieved from https://thuvienphapluat.vn/van-ban/Thuong-mai/Quyet-dinh-622-QD-TTg-2017-Ke-hoach-hanh-dong-quoc-gia-thuc-hien-Chuong-trinh-nghi-su-2030-348831.aspx

Decision No.110/2007/QĐ-TTg by the Prime Minister. (2007). Approving the Planning on National Electricity Development in the 2006-2015 period, with a vision to 2025 taken into consideration. Retrieved from http://moj.gov.vn/vbpq/en/lists/vn%20bn%20php%20lut/view_detail.aspx?itemid=3464

Decision No.1855/QĐ-TTg by the Prime Minister. (2007). Approving Vietnam's National Energy Development Strategy up to 2020, with 2050 vision. Retrieved from http://moj.gov.vn/vbpq/en/lists/vn%20bn%20php%20lut/view_detail.aspx?itemid=3063

Dinh, Y. t. (2016). Financial Resources and ODA for Energy Sector in Vietnam. UNESCAP, EGM on SDG7. Retrieved from http://www.unescap.org/sites/default/files/Vietnam_ODA%20management%20for%20energy%20sector%20in%20Vietnam.pdf

EVN. (2016). Vietnam Electricity Annual Report 2016.

GIZ. (2015). The role of Technical Assistance in mobilizing climate finance - insights from GIZ programs. Climate Policy Initiative Brief.

Green Growth Action Alliance. (2013). The Green Investment Report: The ways and means to unlock private finance for green growth. World Economic Forum.

OECD/IEA. (2010). Deploying Renewables in Southeast Asia.

Overseas Development Institute. (2010). Millenium Development Goals Report Card: Measuring progress across countries.

Stadelmann, M., & Falconer, A. (2015). The role of technical assistance in mobilizing climate finance - Insights from GIZ programs. Climate Policy Initiative.

Vietnam Economic Times. (2017, April 6). $778 million invested in green energy projects. Retrieved from http://vneconomictimes.com/article/vietnam-today/778mn-invested-in-green-energy-projects

Vietnam Investment Review. (2016, June 24). Foreign investors rush Vietnamese solar power sector. Retrieved from http://www.vir.com.vn/foreign-investors-rush-vietnamese-solar-power-sector.html

World Bank. (1991). Managing Technical Assistance in the 1990s. Washington, D.C.: Report of the Technical Assistance Review Task Force.

IV

Life on Land

8.
Sustainable Forest Management in Vietnam

9.
Global Environment Facility's Support for Biodiversity Conservation in Vietnam

8

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Sustainable Forest Management in Vietnam

1. Introduction

Since the Rio Summit in 1992, sustainable development has become a popular term and an objective pursued by countries around the world, including Vietnam. Along the nation's development and integration processes, the Vietnamese forestry sector has become increasingly aware of sustainability in development, first and foremost of sustainable forest management - which is a soft tool encouraging forest protection and development as well as gaining socioeconomic and environmental benefits at not only local and national but also international levels.

Recognizing the role of sustainable forest management, the Vietnamese government has developed guiding documents, to mobilize all social resources involved in forest protection management and development, in support of sustainable livelihoods and national environmental security, while at the same time, aiming to mainstream international commitments for gradual integration into the global forestry sector.

However, Vietnamese forestry has faced many challenges from the pressures of socio-economic growth, population growth and limitations in the awareness on the role and benefits of sustainable forest management and the management capacity of forest owners. To face these challenges, there must be coordinated, smart objectives and achievable solutions developed, in order to intensify the effectiveness of sustainable forest management towards the achievement of national sustainable development goals. Aimed at providing an overview of sustainable forest management in Vietnam, this article focuses on a number of related key issues, and proposes critical recommendations for forestry's sustainable protection, management, and development in Vietnam.

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2. Analysis of the current situation

The principle of sustainable forest management in Vietnam

Concept relating to sustainable forest management

Sustainable forest management is a process of stable forest management using appropriate measures in order to achieve defined objectives on the basis of ensuring socioeconomic and environmental sustainability (Tran, et al., 2006); in which:

- Economic sustainability is to ensure constant long-term forest business and development by increasing productivity and efficiency;
- Social sustainability is to ensure that forestry must conform to laws, fulfil society's contributing obligations, guarantee rights and interests as well as concerns of people and local communities;
- Environmental sustainability is to ensure that forests are able to maintain environmental protecting capacity and forest biodiversity, while at the same time not damaging other ecosystems.

In addition, sustainable forest management must ensure equality and justice for the use of forest resource within and among generations; ensure reasonable and effective (not overwhelming) use of forest resources based on the principles of sustainable forest management.

Vietnam's code for sustainable forest management (Circular No. 38/2014/TT-BNNPTNT dated November 3, 2014) incorporates ten rules outlined below; with each one accompanied by set criteria and indexes.

- Rule 1, to conform to Vietnam's laws and nationally-ratified international commitments;
- Rule 2, to perform rights and obligations of long-term use of land and forest resources;
- Rule 3, to conform to locals' rights on management and use of forest and forest land;
- Rule 4, to ensure communal linkages and workers' rights towards enterprises' business management activities;
- Rule 5, to effectively use forest's diversified products and services. Production and business must not diminish benefits from forest and must ensure socioeconomic and environmental sustainability;
- Rule 6, to preserve biodiversity and its values; to protect water and land resources as well as particular, vulnerable ecosystems and habitat; to maintain forest's ecological and intact functions;
- Rule 7, to construct sustainable forest management projects suitable to forestry production's scale and intensity, with specific objectives and measures;
- Rule 8, to periodically supervise forest statistics, the product chain of custody, forest management activities and their social, environmental impacts;
- Rule 9, to maintain forests with high conservation values;
- Rule 10, to construct and manage planted forests in accordance with above rules.

Thus, along with the process of recognizing sustainable development, a legal framework for sustainable forest management has been encompassed in Vietnam over time. The important issue in forest

management is to emphasize the multiple values of forest resources and ecosystem's, based on comprehensively defined standards and criteria, which represents sustainability in terms of economic, social and environmental aspects rather than merely its economic values. Furthermore, the code also underlines the critical role of local and communal participation in management as well as coordination among these players; it does not focus only on the "natural" aspect and ignores the "human" aspect as in the past (Tran & Nguyen, 2012).

Role of sustainable forest management for development in Vietnam

Sustainable forest management plays a crucial role in Vietnam's development process in achieving the sustainable development goals. In order to achieve this goal, it is required to construct plans for effective, management and use, based on a precise and comprehensive evaluation of forest values. In other words, sustainable forest management contributes to effective preservation and development of natural resources, biodiversity, and other geo-ecological regions in order to create forces for socioeconomic development, maintain ecological values and support habitats for communities with the motto Development for Conservation, Conservation for Development (Tran & Nguyen, 2012).

Sustainable forest management is a tool which maintains the causal relationship between sustainable forest production and protection and with development, through the transformation of production methods and change in forest coverage. Indeed, forest protection and development are preconditions for stable production. It is when forest resources are secured, that other resources are able to maintain their stability of production means, ensuring investment opportunities for development of all economic backgrounds, stabilizes incomes and changes all aspects of social life, and directly contributes to economic development. Advances in all aspects of the economy and society will be the driving force behind accelerating the achievement of sustainable forest protection and development.

It is possible to interpret this relationship by examining the connection between poverty alleviation and the forest situation in Vietnam. Vietnam's poor are disproprtionately distributed across regions: Areas with high poverty rates are often mountainous regions with a high proportion of forest land. Almost 95% of the nation's poor and marginalized people live in rural areas, including the ethnic minority communities in the Northwest region and Highlands. In fact, livelihoods in mountainous regions depend significantly on forest products and services. For many locals who suffer the loss of forest land, they still convert the forest areas lost into agricultural cultivation land, which guarantees their food security. In order to support forest owners to stabilize their incomes with forest-related occupations, and to alleviate poverty, proper attention must be given to forest protection and development, especially on effective forest management methods.

Sustainable forest management is the best way to conserve biodiversity and reduce the negative impacts of climate change, as well as providing necessary environmental products and services for socioeconomic growth and improved living standard. Implementing sustainable forest management contributes to the achievement of forest's sustainable protection and development, and is an essential part of the national development strategy in which more products and services are renewable and highly valuable.

Status of sustainable forest management in Vietnam

Legal framework related to sustainable forest management

The management of forest protection and development has received much importance in terms of state management, since the national unification in 1975, through legal promulgation on the protection of forest resources, suitable to management.

Before the reform in 1986, forest management was implemented by plans and quotas assigned from the central government, without open policies and international exchanges and with little attention paid to the environment. Furthermore, advanced knowledge of laws and experiences in forest protection management during previous historical periods, were not integrated. Consequently, Vietnam's total forest area declined noticeably from 33% during the period 1954-1975 to 29% during the period 1976-1985.

Since the reform, Vietnam's socioeconomics status has been transformed, from centralized planning mechanism to socialist-oriented market mechanism, with remarkable changes in the nation's economic structure both in terms of quantity and quality. Challenges and opportunities continue to arise. Under these circumstances, the state management agencies have promulgated many legal documents, to adjust social relations in the field of forest management. At the same time, they have regularly modified and completed legal papers corresponding to new conditions of national context and global integration.

Law on Forest Protection and Development is an important legal document was promulgated in 2004 (modified version) with 8 chapters and 88 articles. Among those, regulations on sustainable forest management have been represented through the following principles (Article 9): (i) Activities in forest protection and development must ensure sustainable development in terms of economy, society, environment, national defence, and security; in accordance with sustainable development strategies in socioeconomic and forestry development; (ii) Forest protection is the responsibility of all agencies, organizations, households, and individuals. All forest protection and development activities must comply with principles of sustainable forest management; (iii) Forest protection and development must correspond with planning for land use, ensure long-term stability towards socialization in forestry; (iv) It must ensure harmony of benefits between government and forest owners, between forest's economic values and benefits in environmental protection and natural reserve; (v) Forest owners must perform rights and obligations during their forest use duration in accordance with this law and other related regulations without prejudice to the legitimate interests of other owners.

The above principles are the regulations and obligations that apply to all nationwide forest protection activities. This was truly a remarkable advance in the development of legal documents on forest protection and development designed to ensure systematization and comprehensibility.

Based on the Law of Forest Protection and Development enacted in 2004, and other related regulations, many supplementary and specific documents regarding sustainable forest management have

been enforced, such as: National strategy on forestry the 2006-2020 period issued with the Prime Minister's Decision No. 18/2007/QĐ-TTg dated February 5, 2007, which is oriented to the nation's long-term forestry development. This strategy has harmonized various factors: forest protection and development, at the same time, sustainable livelihood for forestry workers and enhancing occupational security. The importance of stabilizing livelihoods for people especially those who live in special-use and protected forests has been reconfirmed and specifically regulated in Prime Minister's Decision No. 186/2006/QĐ-TTg dated August 14, 2006, which governs forest management regulations and stipulates that all forests must be organized for management, protection, development and sustainable use and be compatible with the planning and schemes for forest protection and development.

In addition to orienting policies and documents, the Vietnamese government has completed many supporting guidelines for sustainable forest management, such as: Decree on Arrangement, Innovation and Development, Enhancement of Agricultural and Forestry Enterprises (Decree No. 118/2014/NĐ-CP dated December 17, 2014); Prime Minister's Decision No. 2242/2014/QĐ-TTg dated December 11, 2014 approving the scheme for strengthening timber harvesting in natural forests for the period 2014-2020. Through many efforts to evaluate and transform the managing mechanisms, the Ministry of Agriculture and Rural Development enforced Circular No. 38/2014/TT-BNNPTNT on the scheme guidelines for sustainable forest management, which marked a new progress for sustainable forest management in Vietnam. The Circular constitutes a concrete message about sustainable forest development in Vietnam, based on its provisions on preparation, assessment, approval, inspection, supervision and implementation of the plan for sustainable forest management and forest certification, for each type of forest and forest owner, from all economic backgrounds. The Circular is attached with the National Code for Sustainable Forest Development consisted of 10 rules, 52 criteria and 146 indexes, and the code has oriented and mainstreamed Vietnam's international regulations and commitments on sustainable forest management and forest certificate. In order to specify the Circular and promote the implementation of sustainable forest management and forest certificate, the Ministry of Agriculture and Rural Development promulgated Decision No. 2810/QĐ-BNN-TCLN dated July 16, 2015 approving of action plan for sustainable forest management and forest certificate for the 2015-2020 period; Decision No. 83/QĐ-BNN-TCLN dated January 12, 2016 on approving the scheme for implementation of sustainable forest management and forest certificate for the 2016-2020 period; Decision No. 4061/QĐ-BNN-TCLN dated October 5, 2016 establishing the steering committee on sustainable forest management and forest certificate for the 2016-2020 period. These Decisions have proposed detailed planning for each area in order to gradually raise the awareness and complete policy mechanisms on evaluation, supervision, and implementation.

Therefore, with such support and the evolution and synchronization of policies, sustainable forest management in Vietnam has made significant advances with specified solutions, and reasonable and effective natural resource use based on national principles and standards of sustainable

forest management. Promulgating relating policies is an important factor for policy implementation on sustainable forestry development in Vietnam.

System for executing state management

An organizational system for forest management has been constructed from central to local governments with specific roles, functions, and tasks under the control of the state government.

State management system at central level

The Ministry of Agriculture and Rural Development is designated by the state government to be in charge of executing state management in forest protection and development on national scale (Law No. 29/2004/QH11 dated December 3, 2004; Decree No. 15/2017/NĐ-CP dated February 15, 2017); and in charge of co-ordinating with relevant ministries and departments to manage forest system. The Administration of Forestry which is directly under the control of the Ministry of Agriculture and Rural Development, is responsible for advising and supporting the Ministry of Agriculture and Rural Development in state management and law reinforcement in forestry and forest's ecosystem protection nationwide, as well as organizing public services in the field of forestry and forest's ecosystem protection compatible with regulations (Decision No. 28/2017/QĐ-TTg dated July 3, 2017).

Other ministries and ministerial-level agencies are responsible for coordinating with the Ministry of Agriculture and Rural Development in the fields of forest management, protection, and development.

State management system at the local level

At the local level, the organizational system is divided into three levels (Decision No. 07/2012/QĐ-TTg dated February 8, 2012) including province, district and commune.

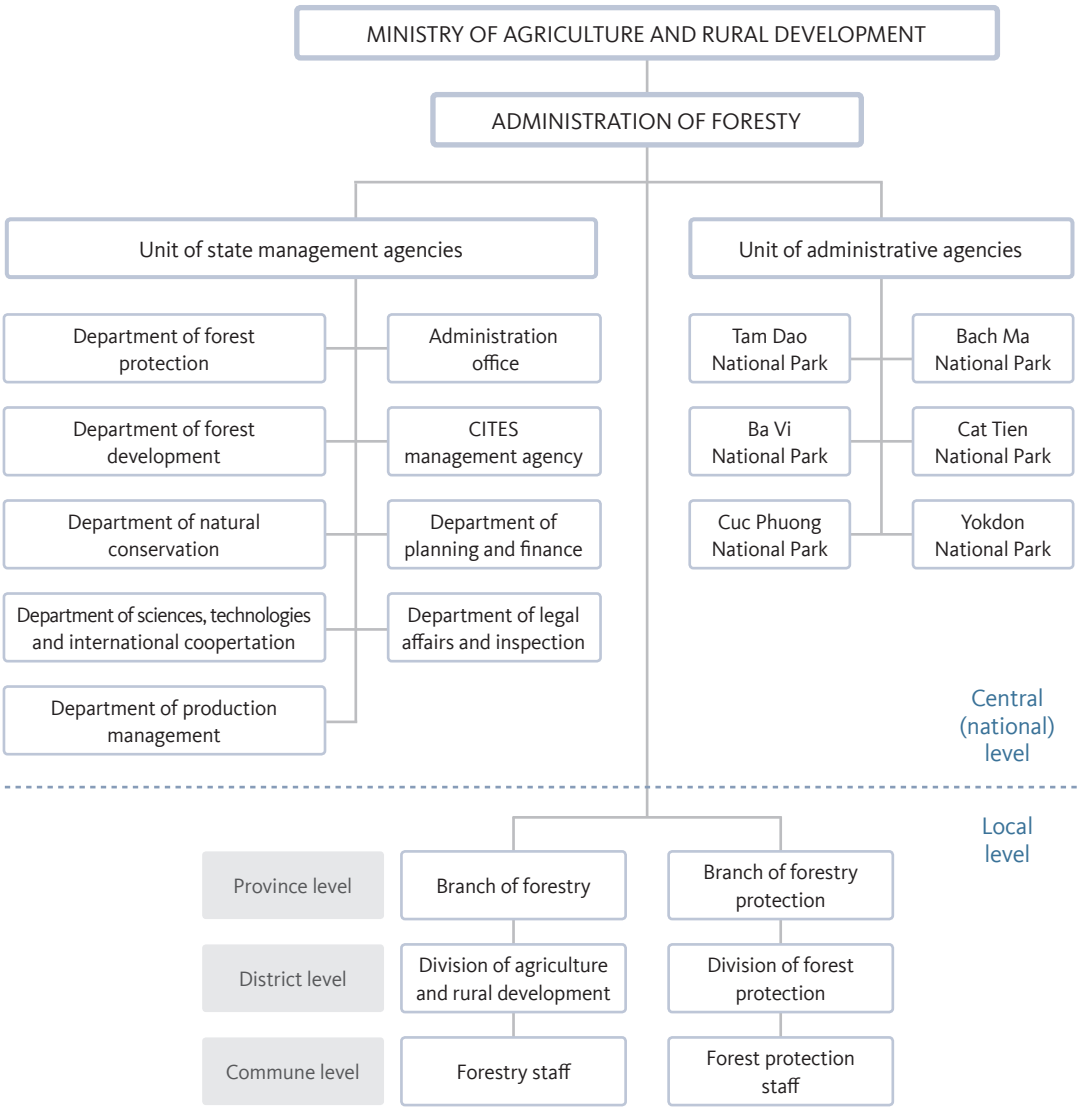
Provincial level: The Provincial People's Committee executes state management for local forest system. The Department of Agriculture and Rural Development is in charge of local special forest management. Related agencies include Branch of Forest Protection, Forestry Development Branch, and Agriculture and Forestry Extension Center.

District level: The District People's Committee manages forest resources at district levels. Division of Agriculture and Rural Development plays a consultative role for district people's committee on state management in the forestry sector.

Commune level: Commune authorities are an important linkage between functional authorities and local communities in natural resource management. Commune People's Committee involves in forest managing and coordinating activities in the commune.

↘ Figure 8-1

Organizational system of forest management in Vietnam



Source: Decision No. 28/2017/QĐ-TTg dated July 3 2017

In general, there are two underlying forms of management agencies: steering agency and executing agency. The steering agency is responsible for designing general planning, while the executing agency is a specialized organization that performs tasks assigned by the steering agency. Therefore, when examining the overall state management system, there are two linkages among agencies at all levels, namely vertical relationship among steering agencies and among executing agencies at different levels; and non-vertical relationship between steering agencies and executing agencies (Tran, Nguyen, & Mai, 2005).

Achievements in sustainable forest management

Sustainable forest management is confirmed as a foundation for Vietnam's forestry development (Decision No. 18/2007/QĐ-TTg dated Februrary 5, 2007). The executing scale is closely linked with the nation's socioeconomic development planning in each period. With such efforts from the society and authorities, there are achievements in forest protection management and development, represented by the following:

The forest coverage has been significantly improved

The total area of forests nationwide has promptly recovered and is increasingly improving in terms of quality.

↘ Table 8-1

Changes in forest area and coverage during the 2005-2016 period

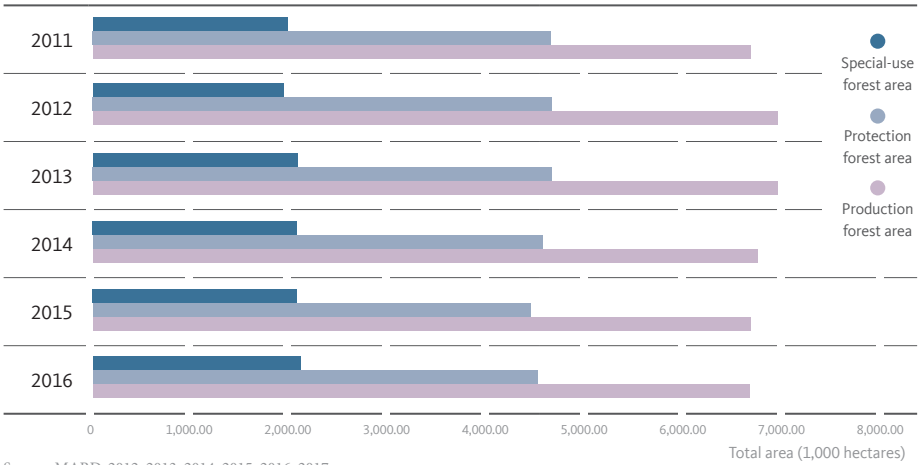
Year	Total area (hectare)	Natural forests (hectare)	Planted forests (hectare)	Coverage (%)
2005	12,616,699	10,283,173	2,333,526	37.00
2010	13,388,075	10,304,816	3,083,259	39.50
2012	13,862,043	10,423,844	3,438,200	40.70
2015	14,061,856	10,175,519	3,886,337	40.84
2016	14,377,682	10,242,141	4,135,541	41.19

Source: MARD, 2006, 2011, 2013, 2016, 2017

According to the statistics up to December 31, 2016, there are over 14 million hectares of forests nationwide with forest coverage of 41.19%. Vietnam has become one of the countries in the region having increasing forest area, with an annually average amount over 143,000 hectares during 2011 - 2016 period. In which, area of natural forest decreased over 43,000 hectares (annually 7,000 hectares/year); area of planted forest increased about 900,000 hectares (annually 150,000 hectares/year), coverage rate increased 1.49% (annually 0.25%). However, changes in the total area of different forest types classified by function are uneven, depending on different periods with different development priorities. During the 2001-2005 period, total area of protected forests and special-use forests tended to increase over 1 million hectares, while production forest area tended to decrease in complex patterns. During the 2006-2010 period, changes in the types of forest reversed, in which production forest area increased significantly with an average of 205,000 hectares annually, raising its proportion to over 48% of total nationwide forest area. Protection and special-use forest areas tended to decrease by about 1.4 million hectares. During the 2011-2015 period, all types of areas tended to remain stable, special-use and production forests tended to increase slightly while the area of protected forests decreased nearly by 200,000 hectares. This is a reasonable tendency in the functional conversion of forests in order to guarantee environmental security and eliminate poverty for households participating in cultivation and production of forest land.

↘ Figure 8-2

Changes in nationwide forest area classified by function during the 2011-2016 period



Source: MARD, 2012, 2013, 2014, 2015, 2016, 2017

Along with the increase in forest area, reserves, and biodiversity values are also being maintained and preserved in a better manner. According to final report on National forest survey and inventory project during period 2013 - 2016 has shown that in 2016, total forest reserves reached 1,182.81 million m³, in which reserve of natural forest was 992.8 million m³, and of planted forest was 190.01 million m³. Compared to the previous period, total reserve increased 370 million m³, in which total reserve of natural forest increased 234 million m³, and of planted forest increased 136 million m³. Especially, the protection and special use forests are well planned up to 50% to guarantee their functions in protecting nature and preserving biodiversity (MARD, 2017). The yield of wood and forest products increased swiftly to 8.6716 million hectares in 2015 (increased by 12.6% compared to the previous year); in which the highest volume came from non-state economic backgrounds, accounting for 69% of total yield (GSO, 2016).

↘ Table 8-2

Changes in forest area classified by geographical regions during the 2011-2016 period

Region	Year	Total area (1,000 hectares)	Natural forest (1,000 hectares)	Planted forest (1,000 hectares)
Red River Delta	2011	95.37	46.67	48.70
	2015	87.87	47.09	40.78
	2016	83.59	45.77	37.83
Northern Midlands and Mountainous Region	2011	4,746.50	3,595.90	1,150.60
	2015	5,486.33	3,850.71	1,635.62
	2016	5,502.23	3,844.61	1,657.62
North Central and Central Coast	2011	4,796.70	3,569.40	1,227.30
	2015	5,179.72	3,720.91	1,458.81
	2016	5,522.04	3,795.34	1,726.70
Central Highlands	2011	2,848.00	2,610.60	237.40
	2015	2,567.97	2,246.07	315.90
	2016	2,558.65	2,234.44	324.20
Southeast Region	2011	423.00	246.00	177.00
	2015	473.93	246.76	227.14
	2016	485.03	257.79	227.24
Mekong River Delta	2011	260.10	60.90	199.20
	2015	272.03	63.98	208.05
	2016	226.15	64.19	161.96

Source: MARD, 2012, 2016, 2017

Most of Vietnam's forests are located in the midland and mountainous regions, which accounted for over 90% of all forests, equal to 13.23 million hectares (in 2015). Among those, natural forest accounts for 74% of all forests with the coverage rate of over 50%. During the 2011-2016 period, all types of forests tended to increase remarkably in several regions; in which Northern Midlands and Mountainous Region saw an increase by an average of 150,000 hectares, while Highlands experienced a decrease by 400,000 hectares of natural forest by several reasons, such as: the use transformation of poor forest into cultivation land for rubber trees, industrial and fruit trees (accounting for 110,000 hectares), construction purposes of hydroelectric plants, transports, public facilitation (accounting for 37,800 hectares); deforestation and illegal forest transgress for cultivation lands (accounting for 123,000 hectares), adjustments in statistic survey and inventories (transferring under-qualified land into non-forest

area according to Circular No. 34/2009/TT-BNNPTNT, accounting for 50,600 hectares); and others (frontier adjustments, erosion, statistic error accounting for 98,000 hectares) (MARD, 2017).

Overall, Vietnam's forests have improved in terms of quantity and quality, representing a great effort in the forestry sector. Nevertheless, compared to land use planning during the 2011-2015 period (Resolution No. 17/2011/QH13 dated November 22, 2011), total area has not met with the state's requirements, in which protected forests are in a shortage of 1.3 million hectares, production forest of 1.2 million hectares and special-use forest of 114,000 hectares. In 2015, forest coverage was under the targeted level of 42 - 43%, defined by Vietnam's socio-economic development planning (Resolution No. 10/2011/QH13 dated November 8, 2011). Although some indexes indicate current achievements are below requirements, achievements can claimed to state that Vietnam will be on track to enhance both quantity and quality of forest for national environmental security towards 2020.

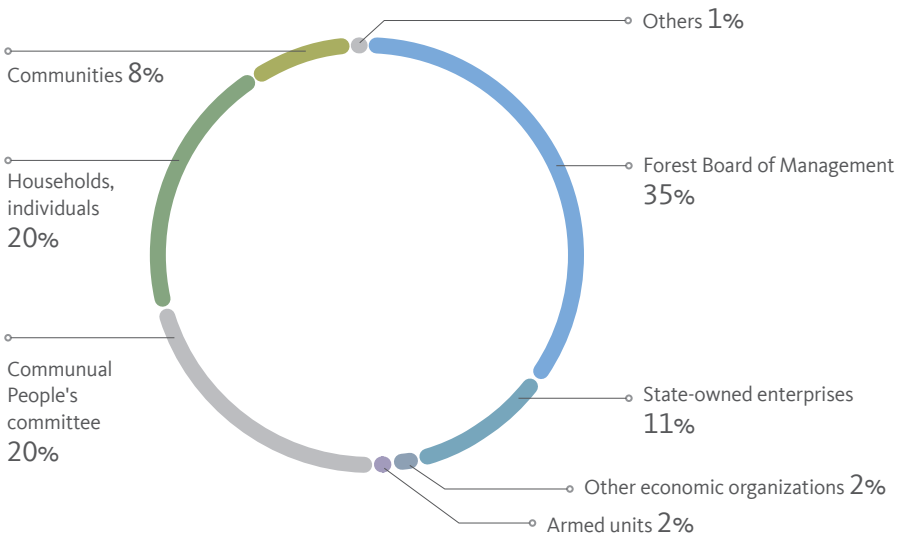
Forest management activities have become more and more intensive and highly effective

Forest protection management and development has been implemented effectively by the participation of many economic players, especially non-state ones, while the state government remains in charge of land and forest allocation, empowering organizations and individuals with responsibilities of forest protection.

With respect to allocation of forest land, according to data in 2016 (Decision No. 1819/QĐ-BNN-TCLN dated May 16, 2017), about 1/3 of the total area was used and controlled by non-state economic players, including 3.1 million hectares by households and 1.7 million hectares by other players (communities and other private agencies) 2/3 total area was utilized by state agencies, including 1.5 million hectares by state enterprises, 4.9 million hectares by forest management boards (mostly of protection and special-use forests), and 2.7 million hectares by all levels of local people's committees. State enterprises managed over 70% of the total natural forests and 48% of planted forests nationwide.

↘ Figure 8-3

Proportion of forest area allocated to stakeholders in 2016

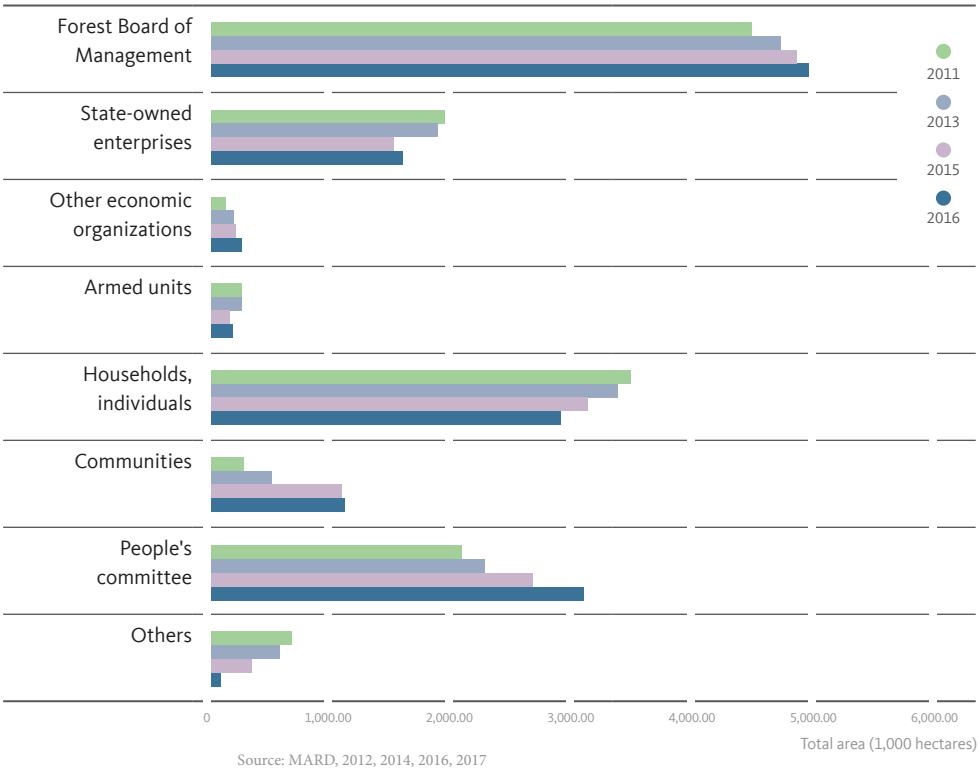


Source: MARD, 2017

During the 2011-2015 period, there were no significant changes among state and non-state managing agencies. However, within state and non-state actors, there was a remarkable transformation. In the state sector, the total area controlled by state enterprises and armed units tended to decline, especially the area controlled by state enterprises which dropped by an average of 100,000 hectares annually, while only that of boards of management showed an upward tendency with an annual increase of slightly over 400,000 hectares. In the non-state sector, only the forests controlled by communities increased by about 800,000 hectares while others suffered a slight decrease (households by 314,000 hectares and others by 261,000 hectares).

↘ Figure 8-4

Changes in structure of forest management in Vietnam



Source: MARD, 2012, 2014, 2016, 2017

To sum up, after 15 years of allocating and leasing forestry lands to organizations and individuals for stable and long-term use, households, and collective groups rank second after state enterprise in terms of managing units allocated with forestry land. As of December 31, 2015, the total forest land allocated to individuals and households amounted to 4.8 million hectares, which increased nearly by 0.2 million hectares compared to 2011 and by 1.2 million hectares compared to 2001. The results show that policies on land and forest allocation to households have improved the efficiency of forest utilization by shortening exploitation cycle and improved forest productivity. More specifically, in Northeast region, cycle lasts for 5 - 7 years with average productivity of about 17 m^3/hectare/year (increased about 2 m^3 /hectare/year compared to that in 2013, equal to 13%); in North and South Central regions, cycle lasts for 5 - 8 years with average productivity of 25 m^3/hectare/year (increased 3 m^3/hectare/year compared to that in 2013, equal to 14%) which contributed to the increasing value of the forestry sector: average growth rate of 6.57%/year during 2013 - 2016 compared to 5.03%/year during 2010 - 2012; during the first 6 months in

2017, the growth rate was 5.29% and estimated 6.6% for the year 2017 (MARD, 2017). Many households allocated forests have played an active role and started investing in afforestation, gaining more income while contributed to forest coverage.

Enhancement in wood exploitation in natural forests is aimed strictly at managing timber utilisation in natural forests, limiting illegal activities and protecting existing natural forests, while actively contributing to climate change response and environmental protection (Decision No. 2242/QĐ-TTg dated December 11 2014). Among these, priority must be to stop the exploitation of timber and to support forest owners financially with the average rate of 200,000 VND/ha/year from central budget to minimize economic loss due to suspense of forest exploitation (Circular No. 330/2016/TT-BTC dated December 26, 2016).

General forest investigation and inventory is undertaken annually, at different management levels in order to construct an effective database of forest planning, allocation, payment for environmental services, exploitation and use, forest certification and conversion of use purposes. The Ministry of Agriculture and Rural Development has approved the Scheme for Alternative Afforestation for the conversion to other purposes during different periods. The Scheme was applied to 13,410 hectares in 2014, 31,510 hectares in 2015 and 28,570 hectares in 2016 (MARD, 2014).

Innovative arrangements and development of forestry enterprises have achieved the rearrangement of afforestation yards from 256 to 148 forestry enterprises and 3 joint-stock companies, establishment of 91 new boards of management for forest protection, and closure of 14 afforestation yards, due to inefficient or unnecessary performances. Before this rearrangement, the land area of these forestry enterprises totalled 4,091,000 hectares, but was reduced to 2,222,330 hectares after rearrangement, from which 1,350,625 hectares were given to the 91 new boards of management for protected forests and 415,125 hectares were given to local authorities. The average forestry land area for each forestry enterprises decreased from 15,980 hectares (2005) to 15,015 hectares (2012) (MARD, 2015).

In recent years, in terms of access to indigenous communities and socialization in forest management, the concept of cooperative management has received more attention in Vietnam as an effort to search for a more sustainable approach to forest management. Especially, the development of livelihoods models for local communities based on potential of indigenous knowledge is considered to be essential solution to attract local participation in the activities of forest management, protection and development. The evaluation report on implementation of Vietnamese National Assembly's resolution on forest has emphasized that "the project for newly-planted 5 million hectares of forest has created more jobs and increased income, contributed to the elimination of hunger and reduction of poverty for a significant amount of locals in rural mountainous areas. There are 470,874 households assigned to protect 2,268,249 hectares of planted forest, and 1,321,999 hectares of newly-planted forest. Each household gains about 5.55 million VND annually (Tô & Tran, 2014).

Generally, synchronized and systematic forest management activities are initially effective in contribution towards forestry's sustainable development and gradual international integration as well as enforcement of international commitments.

Several models of forest management and protection in parallel with locals' sustainable livelihoods have been implemented

Afforestation for production model: In recent years, there were several effective models contributing to the establishment of commercial tree planting areas providing for timber processing, for instance of some models in production forests in which (i) forest owners conduct self-production; (ii) forest owners link with households; (iii) joint-venture afforestation yards link with households, or (iv) private enterprises and forestry farms links with households for production and consumption. It can be seen that joint-ventures and affiliated firms have partially solved difficulties in land accumulation for commercial tree planting areas and local labor constraints, and have contributed to the improvement of stable livelihoods for locals (Võ, 2005; MARD, 2017).

Communal forest management model: Community's forestry is a form of forest management, protection, use and development executed by local communities over both forests of locals and other economic players, to ensure local participation in forest protection management and development. Its efficiency had been highlighted in the National Conference on Communal Forest Management in Vietnam by means of (i) limiting forest loss and degradation, and increasing forest recovery and development, especially in remoted areas where ethnic minority people live; and (ii) contribution to local income improvement, poverty alleviation, and satisfying the demand for forest products for public construction of communities and households.

Community forests have contributed to water resource protection and met partial timber demands for daily use, exploited non-timber products and preserved traditional handicrafts, while improving income for locals living in and near forests (Tran & Nguyen, 2012).

Encouraging the poor to participate in forest protection and development: Locals have applied many effectively models for forest protection and development, especially with priorities given to improving the production and living standards of the poor. Some locals have defined afforestation as the key development direction in recent years. One example for instance, is Quang Ninh Province: The Department of Agriculture and Rural Development has applied many forms of communications and visual training relating to the construction of pilot afforestation models for locals, undertaking measures which allowed the poor to participate in afforestation such as subsidies for forest owners, financial support of 1-2 million VND/ hectare for afforestation, favourable credit and others to improve the livelihoods of locals (Tran & Nguyen, 2012); or supplementary policies for forestry production development (support for large timber planting and business): Producers are supported up to 2 times during the whole cycle with the maximum amount of subsidy of 15 million VND/hectare in specially poor and near-border localities which contributes to increase the forest coverage rate from 46.2% in 2010 to 54% in 2016, at the same time improve income and relieve the poor sustainably (Quang Ninh, 2016, 2017).

Ecotourism model is being implemented at a different levels and scales, depending on the location and biodiversity, especially by focusing on specific promotion plans and servicess and tourism facilities.

Indeed, the missions of sustainable forest management and communal livelihoods development are strategic and inseparable, with an interactive relationship - in other words, they influence each other. Forest protection and development will support people in maintaining livelihoods and vice versa, ensuring communal development, since enhanced livelihoods tend to reduce negative impacts on forest management and improve management efficiency.

The issuance of forest certificates has increased remarkably

Forest certification is considered to be a soft tool to ensure sustainable management of production forest. In order to secure sustainable forest system, Vietnam has gradually approached and mainstreamed standards of sustainable forest management into implementation plans for forest protection, moving towards international certification. In recent years, achievements in sustainable forest management have been the foundation for international organizations to evaluate and certify Vietnamese forest owners. Forest certificate is considered to be an Eco-label for Vietnamese timber products that will facilitate their access to the global market.

The first certified forest owner was Quy Nhon Afforestation Enterprises in 2006 with a total of 9,762.61 hectares of planted forests with main varieties such as Urophylla Eucalyptus. Up to October 2015, the total area that has received the FSC certification in Vietnam was 169,704.31 hectares (consisted of 50% of natural forest and 40% of planted forest) for 14 owners (consisted of 13 state owners and 1 non-state enterprise, Quang Tri collective household). 88.3% of forest was certificated with FM/COC from Swiss, German, South African, British, and American organizations. In addition, as of November 2014, Vietnam had 384 COC/FSC certificates for timber processing and exporting enterprises, ranking highest among ASEAN nations (increased by 6.7% compared to 2013) (MARD, 2015).

↘ Table 8-3

Total forest area having FSC certificate in Vietnam as of October 2015

Total certificated area (hectare)	FM/COC certificate	149,958.71
	CW/FM certificate	19,745.60
Where	Natural forest	84,697.86
	Protection forest	174.50
	Planted forest	67,280.35

Source: Affair of Production Management in Forestry, Administration of Forestry

Hence, in spite of limitations in forest certification, there is a positive development in the awareness of forest owners of the importance of sustainable forest management and forest certificate to forest products.

Several challenges in sustainable forest management

Legal frameworks

Lack of synchronisation: Legal documents form a clear framework, while specific issues are settled by guiding papers. Consequently, sub-law documents account for a large proportion in the legal system. This has created an overlap, with contradictions and obstacles, leading to ineffictive forest management. Regulations on the code of sustainable forest management, forest certification have not yet been approved, making it difficult to manage production forest.

Lack of practicality: Some policies are not practical and fall short of motivating organizations and individuals to manage and invest in the forest business. For example, take policies on forest and land allocation have administrative procedure that are too complicated for forest owners, especially for ethnic minorities with limited education. Land and forest empowerment, and forest land use planning have not been attached to forest protection and development, so it is difficult management. On the other hand, the regime for beneficiaries is not clear and reasonable. For example, it is difficult to calculate rate of product benefited and added value because there are no specific criteria to classify main and secondary forest products; when the forest land is allocated for households, it is only based on criteria of forest area, other criteria (reserves, quality, status, type of forest) are vague; and the forest area allocated for locals is mostly unfavorable forest while regime for beneficiaries depends on long-term forest growth. In fact, share of income from forestry source for a household

only accounts for 25% of total income (valued 10 - 30 million VND/ hectare/year while total allocated area less than 3 hectare/household) while the regime for beneficiaries depends on long-term forest growth. This is the main cause resulting in the lack of motivations for people to manage, protect and develop forests (MARD, 2012, 2015).

Management system

The nation's forestry organizational system is unstable and stagnant, and fails to meet new requirements. More specifically, the relationship between forest management units at provincial level remains unspecific in the work of forest protection and development, resulting in low collaborative effectiveness (there are two different units at the same management level, namely Branch of Forestry and Branch of Forest Protection). On the other hand, workforce allocation for policy advisory at district level is still unreasonable: there are only 2 specialized cadres in the Division of Agriculture and Rural development in charge of proposing policies while 10 officials in the Division of Forest Protection are not utilized (Tô, 2014).

There is overlap in planning and poor capacity in both human and financial resources, leading to poorly managed forest areas, which create obstacles for forest management and conflicts among forest owners, due to differences and/or overlap between maps and fields.

Changes in decentralization policies in forestry management have created positive impacts in forest management. They have granted democratic rights from the administrative perspective to lower levels, while at the same time empowering local levels with active participation in the execution of state government's decrees. However, these changes failed to achieve its ultimate goal; for example: In Son La Province, superior management agencies still directly guide inferior ones on forest management activities; those inferior authorities (district and commune levels) have not yet been given autonomy over local areas of forest. Additionally, the budget for forest and land allocation is operated by provincial authorities while the actual land and forest allocation are conducted by communal officials. This has created difficulties for authorities to implement decrees and issue certifications to people.

With poor sectoral coordination policies in forest protection and management; links with provincial to communal authorities remain ineffective and unsynchronized, due to the lack of legal basis, especially coordination with local authorities in settlement of forest violations. Agencies are blaming each other, leading to increasingly serious and disguised exploitation and illegal mobility of forest products. With the current management and protection system, there are still several gaps to preventing illegal exploitation.

Socio-economic development associated with sustainable forest management and local livelihoods

Vietnam has formed eight sub-regions[3)] with forest product processing industries, with an annual volume of 4.0426 million m³ in 2010 and 8.6716 million m³ in 2015 (GSO, 2016). This is the input for the paper industry, artificial plywood and wood chips for export. However, Vietnamese timber's quantity and quality are limited and

3. Namely: Northeast sub-region, Northwest sub-region, Red River Delta sub-region, North Central sub-region, South Central Coastal sub-region, Central Highland sub-region, Southeast sub-region and Mekong River Delta sub-region.

fails to meet the demand. Moreover, the volume of wood with sustainable forest certificate is not enough to meet the criteria for export processing. At the moment, Vietnam still has to import about 80% of material woods and final products[4] with a total value of USD 2.5 billion. (MARD, 2015). This has shown that there is a significant shortfall in the domestic timber processing industry. Besides, exploitation and processing of forest products are low effective (about 2-2.5 m^3 logs/ m^3 product) since most production is manual products and in lack of specialization in material design. Non-timber products exploited fails to guarantee reprocessing because it does not receive appropriated investment while its demand is rising, especially in the context of banning natural forest exploitation. And, labor productivity is low: according to VIFORES, Vietnam's labor productivity only equals to 50% of the Philippines, 40% of China and 20% of European nations (Vietnam Chamber of Commerce and Industry, 2014). There is also a lack of systems for determining the categories needed for main products for processing, for material imports and for technological lines for processing at low costs with high quality.

Marketing in forestry faces many shortcomings and lacks determination for stable domestic and international markets, lacks preparation and initiative for market approachs to comply with ASEAN Free Trade Area (AFTA) commitments and other global commitments. Enterprises are experiencing low competitiveness, in lack of production linkage, especially connection in closed chain from supply of varieties - afforestation - exploitation - harvesting - processing - trade which results in the waste of resources in investment, limited specialization and loss of market opportunities (Nam Anh, 2017). New enterprises, such as households and farms, have not been established yet due to lack of appropriate support policies. Forestry extension actions are insufficient and fail to meet social demand for forestry development.

Additionally, social issues in the current context have significant impacts on forest management, especially increasing pressures from a rapid population growth and demands for forest land and products; from forest plants with long growth cycle and low yields, higher risks and low competitiveness' compared to other species; increasing demands and various preferences for forest products and timber, to increasing demands for construction of facilities such as hydroelectricity, and transportation which also create pressures on forest protection and development in association with ensuring livelihoods for locals.

Sadly, people's awareness of the importance of natural forest reserves to livelihoods and the nation's sustainable development is still negligible, resulting in passive participation in natural resource exploitation and protection actions. Livelihood dependent on the forests are still a particular feature of almost all communities. Natural resource exploitation creates high income with negligible investment and appropriate effort until the forest resource becomes exhausted, locals transform their production into agricultural cultivation or expect from government support. Therefore, for a certain number of people with limited awareness, illegal exploitation is the main source of income and extra money, enabling a relatively easy solution to solve their economic problems especially for the poor.

4. According to statistical data from the Vietnam Association of Timer and Forest Products, annually Vietnam has to import about 1 mil. m^3 of artificial plywood (MDF accounts for 60 %). The total import volume of artificial plywood accounts for 25 % of the total imported material wood.

3. Recommendations for sustainable forest management in Vietnam

Sustainable Forest Management is not only a national goal but also an effective tool for forestry management and development in Vietnam. With this approach, Vietnamese forestry has made a remarkably encouraging progress, form enhanced forest's total area and quality to strengthening the role of forest in the economy, in environmental security and for society. In the near future, in order to prove these achievements and gradually overcome obstacles and challenges, forestry is in need for comprehensive, break-through and sustainable strategies and solutions, in which much importance will be attached to the critical issues listed below:

First, establish related legal framework and policies to encourage and attract all social stakeholders to participate in sustainable forest management, with particular focus on the following areas:

- Completion of legal framework in order to establish national forest area for long-term sustainable forest management, with clearly demarcated landmarks on fields.
- Need for strong policies to ensure food security, forest-based benefits and appropriate investments compatible with the local ability and farming habits.
- Strong need to implement and supplement forest land allocation, in which much importance is attached to (i) empowering forest owners with long-term ownership, especially households and individual owners; (ii) focusing on post-allocation policies, especially to construct support policies in terms of finance, technology, market compatibility with specific forestry occupations and local management capacity, and (iii) prioritizing forest land accumulation by considering increased technology alongside natural factors, to create concentrated commercial plantation areas.
- Promotion of policies on forest management associated with local sustainable livelihoods.

Second, enhance management capacity and mechanism: It is important to promote the decentralization and coordination mechanisms in forest management; implement decentralization in all aspects from administrative to financial dimensions; and encourage forms of joint participation in forest protection and management. Additionally, it is crucial to provide alternative livelihoods, which are considered to be the most effective management form that relieves the pressure on forest resource. Forest management must follow strictly the annual and periodic forestry planning for development, investigation, evaluation, and supervision for each type of forests by defining concrete sectoral and national policies as well as goals.

Third, promote socio-economic solutions:

- Promotion of medium and long-term credit investments compatible with forestry development conditions. It is important to construct mechanisms that ensure equality and justice for all economic stakeholders participating in forestry production to have access to credit and loans in accordance with the stages of forestry

development. There is need for research on risk insurance mechanisms in afforestation, so that forest owners are able to feel secure about forest investments. It is also crucial to promote and implement economic policy mechanisms to guarantee the returns of environment service values in order to reduce the pressure on central budget, increase income for forest owners towards the target that forestry sector will pay for forest management and protection activities by itself. According to annual reports, revenue from environmental services reaches 1,200 - 1,300 billion VND, pay for over 5.0 million hectares of forest. Within the first 6 months in the year 2017, total revenue was 608.8 billion VND which is equal to 132.8 % compared to the previous period, accounts for 37% of the plan and is estimated to reach 1,650 billion VND this year (MARD, 2017).

- Support in infrastructural development, forestry trade and policies for certificated forest areas, which can contribute to raising the value of forest products for exports.
- Replication of forestry management models attached with socioeconomic development, such as a model linking afforestation, forest protection and forest product processing; a model combining agriculture and forestry; or a model of sustainable ecotourism development.
- Educational campaigns and training to raise the awareness of forest's economic and ecological values, to encourage locals to actively participate in forest management and development.
- Enhancement of communities' forest management capacity.

Fourth, promote research and transfer of scientific and technological knowledge into forest protection management and developments, by attaching special importance to:

- Technologies for highly productive forests, with research on environmental impact.
- The combination of technologies for forest management to processing, to increase the efficiency of timber production and value added.
- Investment in wood processing facilities, in order to diversify products to create secure markets for sustainable afforestation.
- Completion of technical process and standards, and enhance economic and technical norms as a basis for planning, production management, and product quality control.

Last, but not least, to reinforce integration and international cooperation in the fields of forest protection management and development.

4. Conclusion

Forestry is a specific economic and technical sector which plays an essential role in the development process of the economy, the social welfare, and the ecological environment. So far, forestry sector has managed 16.24 million ha forest and forestry land, accounting for about 1/2 of total nationwide area and directly relating to the income source of 25 million people. Therefore, comprehensive forest protection management and development towards sustainability remains an objective and priority for the Vietnamese government.

The results from the analysis of forest protection management and development have shown that although there are efforts and achievements, the task remains difficult and challenging due to many fcators; for instance, livelihoods depending on the forest continue to face many difficulties, and where some socio-economics solutions are incompatible with local circumstances. Consequently, while the total area of forest may expand, its quality has not met the requirements; especially when locals are not benefiting much from the forest products and still consider livelihoods depending on the forest resources as a secondary occupation, resulting in a situation where deforestation continues and is remains complicated and difficult to control.

In order to solve the problems, especially to secure sustainable livelihoods for locals, it is important to concentrate and utilize social strengths, to have appropriate organizational measures, to have flexible and suitable policies, under national and international circumstances aiming to encourage and attract all social stakeholders to participate in forest protection management and development. Correspondingly, that is the only way for forestry to fulfill all its goals and assignments.

References

General Statistics Office, 2016. Statistical year book of Vietnam 2015. Statistical press, Hanoi, Vietnam.

Minister of Agriculture and Rural Development, 2012. Decision No. 2089/QĐ-BNN-TCLN dated August 30 2012 on proclaiming forest current situation 2011. Hanoi, Vietnam.

Minister of Agriculture and Rural Development, 2013. Decision No. 1739/QĐ-BNN-TCLN dated July 31 2013 on proclaiming forest current situation 2012. Hanoi, Vietnam.

Minister of Agriculture and Rural Development, 2014. Decision No. 3322/QĐ-BNN-TCLN dated July 28 2014 on proclaiming forest current situation 2013. Hanoi, Vietnam.

Minister of Agriculture and Rural Development, 2015. Decision No. 3135/QĐ-BNN-TCLN dated August 6 2015 on proclaiming forest current situation 2014. Hanoi, Vietnam.

Minister of Agriculture and Rural Development, 2016. Decision No. 3158/QĐ-BNN-TCLN dated July 27 2016 on proclaiming forest current situation 2015. Hanoi, Vietnam.

Minister of Agriculture and Rural Development, 2017. Decision No. 1819/QĐ-BNN-TCLN dated May 16 2017 on proclaiming forest current situation 2016. Hanoi, Vietnam.

Ministry of Agriculture and Rural Development, 2014. Circular No. 38/2014/TT-BNNPTNT dated November 3 2014, Guidance on plan for sustainable forest management of the Ministry of Agriculture and Rural Development. Hanoi, Vietnam.

Ministry of Agriculture and Rural Development, 2015. Report on forestry development in 2014. Hanoi, Vietnam.

Ministry of Agriculture and Rural Development, 2017. Report on the implementation of sustainable forestry development program during 2016 - 2020 and assessment of 4 years executing National forest survey and inventory project. Hanoi, Vietnam.

Ministry of Agriculture and Rural Development, 2012. Report on results of reviewing mechanisms and policies relating to the implementation of plans for forest protection and development during 2012 – 2020. Hanoi, Vietnam.

Ministry of Agriculture and Rural Development, 2017. Final report on National forest survey and inventory project during period 2013 - 2016. Hanoi, Vietnam.

Ministry of Finance, 2016. Circular No. 330/2016/TT-BTC, dated December 26 2016 on implementing Decision No. 2242/QĐ-TTG, dated December 11 2014 of Prime Minister. Hanoi, Vietnam.

Nam A., 2017. Linking is the best development direction. Go Viet magazine, No. 88, 4/2017. Hanoi, Vietnam.

Prime Minister, 2006. Decision No. 186/2006/QĐ-TTg dated August 14 2006 on the Regulation of Forest Managenment in Vietnam. Hanoi, Vietnam.

Prime Minister, 2007. Decision No. 18/2007/QĐ-TTg dated February 5 2007 on approval of development strategy for Vietnamese forestry sector during the period of 2006 – 2020. Hanoi, Vietnam

Prime Minister, 2012. Decision No. 07/2012/QĐ-TTg dated February 8 2012 on promulgation of some policies for the enhancement of forest protection. Hanoi, Vietnam.

Prime Minister, 2014. Decision No. 2242/2014/QĐ-TTg dated December 11 2014 on approval of the scheme for strengthening timber harvesting in natural forests 2014 - 2020. Hanoi, Vietnam.

Prime Minister, 2017. Decision No. 28/2017/QĐ-TTg dated July 3 2017 regulating on functions, tasks, rights and organizational structure of General Directorate of Forestry under the Ministry of Agriculture and Rural Development. Hanoi, Vietnam.

Quang Ninh Department of Agriculture and Rural Development, 2017. Report No. 2479/BC-SNN&PTNT date July 31 2017 on result evaluation of implementing policies on encouragement of agriculture and forestry development in Quang Ninh province. Quang Ninh, Vietnam.

Quang Ninh People's Council, 2016. Resolution No. 45/2016/NQ-HĐND, dated December 7 2016 on Promulgation of encouraging policies on developing specialized agricultural products in Quang Ninh province during the period 2017 – 2020. Quang Ninh, Vietnam.

Tô, Đ.M, 2014. System of forestry sector management. Newsletter of resource policy – environment – sustainable development, No. 15/2014, ISSN 0866-7810. Hanoi, Vietnam.

Tô, X. P., & Trần, H. N. 2014. Report on land and forest allocation in the context of restructuring forestry sector: The opportunity for forest development and improvement of livelihood in upland. Tropenbos International Viet Nam

Trần, Đ., Nguyễn, V., & Mai, V. 2005. Decentralization in management of forest resource and local livelihoods. Nong nghiep press, Hanoi, Vietnam.

Trần, T. T., & Nguyễn, X. H. (2012). Basic solutions to protect and develop forest and natural reserves in association with local livelihoods (Code: CT11-20-05). Institute of Human Geography, Hanoi, Vietnam

Trần, V. C., Nguyễn, H. S., Phan, M. S., Nguyễn, H. Q., Chu, Đ. Q., & Lê, M. T., (2006). Forestry handbook: Sustainable forest management. MARD, Vietnam.

Vietnam Administration of Forestry, 2014. Decision No. 829/QĐ-BNN-TCLN, dated April 23 2014 on approval of replacement planting scheme when transferring purposes of forest use for other purposes. Hanoi, Vietnam.

Vietnam Administration of Forestry, 2015. Decision No. 2810/QĐ-BNN-TCLN dated July 16 2015 on approval of action plan for sustainable forest management and forest certificate 2015 - 2020 period. Hanoi, Vietnam.

Vietnam Chamber of Commerce and Industry, 2014. Report on support for the implementation of strategy on timber processing development. Hanoi, Vietnam.

Vietnam Governement, 2014. Decree No. 118/2014/NĐ – CP dated December 17 2014 on arrangement, innovation and development, enhancement of agricultural and forestry enterprises. Hanoi, Vietnam.

Vietnam Government, 2017. Decree No. 15/2017/NĐ-CP dated February 15 2017 regulating on functions, tasks, rights and organizational structure of the Ministry of Agriculture and Rural Development. Hanoi, Vietnam.

Vietnam National Assembly, 2004. Law No. 29/2004/QH11 dated December 3 2004 on forest protection and development. Hanoi, Vietnam.

Vietnam National Assembly, 2011. Resolution No. 17/2011/QH13 dated November 22 2011 on planning for land use towards 2020 and Plan for land use in 5-year period during the period of 2011 – 2015. Hanoi, Vietnam

Vietnam National Assembly, 2011. Resolution No. 10/2011/QH13 dated November 8 2011 on plan for socio-economic development in 5-year period during the period of 2011 - 2015. Hanoi, Vietnam.

Võ, Đ. H. 2005. Study on models for afforestation of production forests in the Northern mountainous areas. Journal of Agriculture and Rural Development, 51-54

9

Do Nam Thang [1)]

Global Environment Facility's Support for Biodiversity Conservation in Vietnam

Despite being a country with one of the richest biodiversity in Southeast Asia, Vietnam has experienced serious biodiversity losses over the last century, due to wartime activities and recent developments carried out without proper consideration to biodiversity conservation. Being aware of this problem, the government of Vietnam has developed various policies to prevent further biodiversity losses and to help restore ecosystems. In this process, Vietnam has received helpful assistance from the international community. Most notably is the support from the Global Environment Facility (GEF), of which Vietnam has been a member recipient country since the GEF's establishment in 1994. With the GEF's support, Vietnam has effectively fulfilled its commitment to international obligations in the area of biodiversity conservation. This paper highlights the GEF's support for Vietnam's biodiversity conservation in three important areas: policy and strategy development, wildlife conservation and protected area promotion.

1. Overview of GEF's support for biodiversity conservation

Since the establishment of the GEF in 1994, Vietnam has actively participated in GEF's activities and received support to address environmental issues through 55 national projects, with a total funding of USD 150.66 million (Global Environment Facility, 2017). Among these projects, 23 projects on biodiversity account for up to 44 percent or USD 66.13 million (Table 9-1). More importantly, the GEF funding has leveraged an additional USD 529.62 million co-financing for biodiversity conservation from other sources, including the national and local governments and other international organizations such as the World Bank, the United Nations Development Program and the Japan International Cooperation Agency. These projects provide support in developing policy and strategy, raising public awareness, addressing conflicts between development and conservation and facilitating the implementation of the Convention on Biodiversity and the Nagoya Protocol on Benefit Sharing.

The areas that GEF has provided support to biodiversity conservation include:

- Improving the sustainability of protected area systems
- Mainstreaming biodiversity conservation and sustainable use into production
- Landscapes/seascapes
- Building capacity to implement the Cartagena Protocol on Biosafety (CPB)
- Building capacity on access to genetic resources and benefit-sharing
- Integrating the Convention on Biological Diversity (CBD) obligations into national planning processes through enabling activities

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List of GEF national projects on biodiversity in Vietnam

↘ Table 9-1

	Project name	GEF Grant (USD)	Co-financing (USD)
1	Integrated Approaches for Sustainable Cities in Vietnam	8,256,881	148,472,900
2	Mainstreaming Natural Resource Management and Biodiversity Conservation Objectives into Socio-economic Development Planning and Management of Biosphere Reserve in Vietnam	6,660,000	30,000,000
3	Capacity Building for the Implementation of the Nagoya Protocol on Access and Benefit Sharing	2,000,000	9,850,000
4	Integrating Biodiversity Conservation, Climate Resilience and Sustainable Forest Management in Trung Truong Son Landscapes	3,794,954	30,750,000
5	Developing National Biodiversity Strategy and Action Plan and Mainstreaming Biodiversity Conservation into Provincial Planning	909,091	4,550,000
6	Conservation of Critical Wetland PAs and Linked Landscapes	3,180,287	14,891,600
7	LME-EA: Coastal Resources for Sustainable Development: Mainstreaming the Application of Marine Spatial Planning Strategies, Biodiversity Conservation and Sustainable Use	6,500,000	117,900,000
8	Wildlife Consumption: Reforming Policies and Practices to Strengthen Biodiversity Conservation	1,000,000	1,790,000
9	SFM: Sustainable Forest Land Management - under the Country Program Framework for Sustainable Forest Land Management	4,195,000	50,000,000
10	SFM: Promotion of Sustainable Forest and Land Management in the Vietnam Uplands	654,545	4,989,500
11	Removing Barriers Hindering PA Management Effectiveness in Vietnam	3,536,360	18,541,043
12	Implementation of the National Biosafety Framework	997,800	637,000
13	Integrating Watershed and Biodiversity Management in Chu Yang Sin National Park	973,000	19,979,000
14	Conservation of Pu Luong-Cuc Phuong Limestone Landscape	724,885	556,321
15	Forest Sector Development Project	9,000,000	65,590,000
16	In-situ Conservation of Native Landraces and their Wild Relatives in Vietnam	904,000	2,999,430
17	The Green Corridor	998,634	1,062,731
18	Biodiversity Conservation and Sustainable Use of the Marine Resources at Con Dao National Park	970,450	877,850
19	Making the Link: The Connection and Sustainable Management of Kon Ka Kinh and Kon Cha Rang Nature Reserves	875,000	2,652,000
20	Enabling Activity for the Clearing House Mechanism of the Convention on Biological Diversity	12,000	0
21	Conservation Training and Biodiversity Action Plan	2,999,959	77,515
22	Vietnam PARC - Creating Protected Areas for Resources Conservation (PARC) in Vietnam Using a Landscape Ecology Approach	6,011,840	2,304,778
23	Hon Mun Marine Protected Area Pilot Project	972,447	1,148,627
	Total	66,127,133	529,620,295

Source: Global Environment Facility, 2017

2. Critical project overview

Among these projects, the most recently completed ones that represent important areas of GEF support are Developing National Biodiversity Strategy and Action Plan and Mainstreaming Biodiversity Conservation into Provincial Planning, Wildlife Consumption: Reforming Policies and Practices to Strengthen Biodiversity Conservation and Removing Barriers Hindering PA Management Effectiveness in Vietnam.

Project "Developing National Biodiversity Strategy and Action Plan and Mainstreaming Biodiversity Conservation into Provincial Planning"

As in any area, policy and strategy formulation are critical steps for development interventions. In this vein, GEF projects in Vietnam have incorporated policy and strategy development as a key component. While other projects have policy and strategy development as one component, the project "Developing National Biodiversity Strategy and Action Plan and Mainstreaming Biodiversity Conservation into Provincial Planning" solely focuses on this critical area. More specifically, it helps develop the second National Biodiversity Strategy and Action Plan (NBSAP) to facilitate continued commitment to CBD, especially through the implementation of the national Law on Biodiversity, promulgated in 2008 (the first NBSAP was developed in 1995 to provide a roadmap for the implementation of the CBD after Vietnam joined the Convention). Importantly, the project supports enhancing provincial capacity in implementing the NBSAP. It was implemented by the Ministry of Natural Resources and Environment (MONRE), Provincial People's Committees of Lang Son and Son La, UNDP and JICA.

Project objectives

- To promote biodiversity conservation through the updating of the country's NBSAP;
- To provide important background for the development of the Master Plan on Biodiversity Conservation;
- To enhance government capacity for the implementation of the new NBSAP, including monitoring and reporting biodiversity status to the CBD and the National Assembly;
- To mainstream biodiversity priorities into provincial land-use plans;
- To assist the government to fulfil its commitments to associated international conventions it has ratified, especially the CBD in which the Project supports mainstreaming the Aichi targets into the NBSAP.

Project results and impacts

The NBSAP was developed in compliance with CBD guidelines and the Biodiversity Law, to strengthen biodiversity conservation in Vietnam by increasing the supply of policy relevance. Through institutional and human resource capacity building activities, NBSAP Project supported strengthening biodiversity conservation in Vietnam by the articulation of nationally agreed targets and action plan for national and provincial level implementation to fulfil its obligation under the CBD. Biodiversity status, trends and actions were communicated nationally and internationally (MONRE/UNDP/GEF, 2015).

The NBSAP Project contributed to the implementation of goals and tasks identified in the Five-year Socio-Economic Development Plan. In addition, biodiversity conservation was mainstreamed into provincial land use planning. The Project helped build capacity for integrating biodiversity conservation into development and land use planning of line provincial departments for 36 cities and provinces, especially for the two pilot provinces of Lang Son and Son La.

An outstanding impact of the NBSAP Project is that the capacity for biodiversity conservation has been strengthened at both central and local levels. Policy makers have gained better understanding of the importance of mainstreaming biodiversity into land-use planning. Legal documents on biodiversity conservation and on mainstreaming biodiversity into land-use planning, have been issued and promulgated. Some project recommendations have been incorporated in drafting guidelines for implementation of the Land Law 2013. In particular, the stipulated specification of surface and location of land for biodiversity conservation in land statistics, land inventory and land-use planning at provincial levels have contributed to effective land use and in meeting the requirements of biodiversity conservation in the Land Law 2013 and the Biodiversity Law 2008.

In addition, the project has helped create an overarching policy framework for biodiversity conservation and improve overall coordination for conservation. By doing so, it contributed to the overall institutional and policy framework for natural resources management and socio-economic and sectoral development. Notably, it helped strengthen the linkages between national planning and local implementation.

Project "Wildlife Consumption in Vietnam: Reforming Policies and Practices to Strengthen Biodiversity Conservation"

With the funding of USD 1 million from the GEF, the project was implemented from 2011 to 2015 by MONRE, Ministry of Health (MOH), Ministry of Justice (MOJ), Ministry of Public Security (MPS) and WB.

Project objectives

According to the National Strategy on Environment Protection to 2020 and the National Biodiversity Strategy to 2020, wildlife trade is one of the key drivers of biodiversity loss in Vietnam. The Project addressed this issue by focusing on reducing the consumption of wildlife and contributed to the national efforts on reducing the illegal trade of wildlife. By doing so, it supports Vietnam in meeting its obligations under the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) and the CBD.

Project results and impacts

The project's components were designed to address three main drivers of illegal wildlife consumption in Vietnam: a weak crime prevention legal framework, low enforcement capacity, and high demand for wildlife for traditional Chinese medicine (MONRE/WB/GEF, 2015).

Component 1 includes activities assessing weaknesses in the current policy and legal framework for wildlife trade and then strengthening specific areas within the legal framework. After rigorous consultations,

the assessment results have been incorporated into the new National Strategy on Biodiversity for Vietnam and other regulations on forest management, biodiversity conservation and environmental protection.

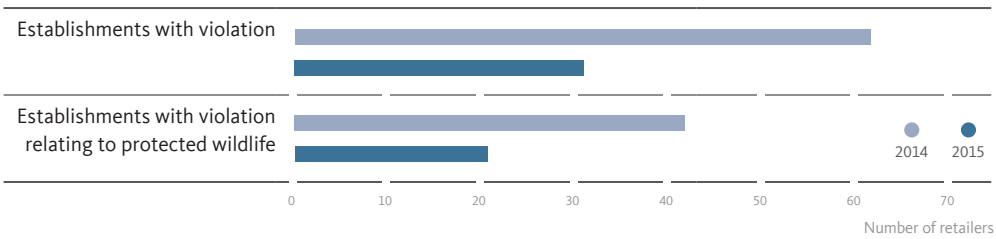
In addition, the project has helped develop an Action Plan on Wildlife Trade Control (2010-2020). In particular, with the support of the project, the Prime Minister's Directive on strengthening the direction and implementation measures to control and protect endangered wildlife, was issued in 2014. This Directive is an important instrument that enhances coordinated efforts among government agencies in managing illegal wildlife trade. Another crucial legal document is Decree 160 which was developed by MONRE and issued in 2013 to support the protection of endangered species. The Decree provides detailed guidance on criteria for determining and managing endangered species in Vietnam.

Component 2 of the Project focuses on the monitoring and enforcement of consumption controls. Through a series of monitoring and enforcement campaigns, the project has helped reduce the number of retailers engaging in wildlife sale and trade violations by 40-60%. A web-based wildlife database and reporting system has been developed to facilitate information sharing and intelligence-led enforcement campaigns as well as monitoring the wildlife crime situation in Hanoi. Over 700 enforcement and management officials have been trained to improve awareness communication skills for the community.

Component 3 of the project helped build awareness to change behaviours. A reduction in the number of illegal wildlife trade cases between 2014 and 2015 has been observed as a result of the project activities on changing attitudes (Figure 9-1).

↘ Figure 9-1

Comparison of the number of retailers with violations within project areas in 2014 and 2015



Source: MONRE/WB/GEF, 2015. Implementation Completion Memorandum.

The project has created a significant impact by establishing partnership among the government, non-government stakeholders and international organizations. Given the complexity of the issues, the cooperation and coordination among involved stakeholders are essential for the success of wildlife conservation activities.

Project "Removing barriers hindering Protected Area management effectiveness in Vietnam"

The project was implemented between 2010 and 2015, with the GEF's grant of USD 3.54 million. Co-financing from the government, UNDP and IUCN brought the total project cost to USD 22.12 million.

Project objectives

The project's objectives were to provide support to overcome barriers for the effective management of protected areas. The barriers include an

incomplete legal framework that fails to enable sustainable finance of protected areas, decentralized protected area system with limited coordination among the responsible agencies, and weak individual and organizational capacities to develop and implement business plans designed to generate and administer revenue for protected areas.

Project results and impacts

The project produced four key outcomes: a harmonized legal framework, clear institutional mandates, field demonstrations of financial management, and generation of alternative revenue and improved information on biodiversity for management and public awareness and support.

Under the project framework, national and provincial legal instruments have been issued. At the national level, the Inter-ministerial Circular No. 160/2014/TTLT/BTC-BTNMT between MONRE and the Ministry of Finance, was enacted to guide the use of state budget for biodiversity conservation. At the provincial level, instruments authorizing three protected areas, participating as pilot sites of the project, to implement measures to 1) increase revenue through leasing aquaculture concessions to local producers, 2) charge payments for watershed protection services from a hydropower generation company and 3) to adjusting entrance fees were issued. In addition, officials from protected areas across the country, benefited from the training materials and capacity building activities.

The project has created impacts on expenditure for protected areas and on public servants' mindsets. Public funding for protected areas, both from national and international sources has been maintained steadily. Public officials' awareness of protected areas has increased as they have changed their mindsets of seeing protected area conservation as a burden to development (Antonio et al. 2016).

Difficulties in implementing the GEF projects

Similar to other GEF projects, the three above mentioned projects have encountered several difficulties. Firstly, an average time for preparing and processing the GEF projects, both at international and national levels, often ranges from three to four years. On the one hand, this gives sufficient time for a thorough preparation and approval process. On the other hand, the lengthy preparation process prevents timely responses to tackle problems and some proposed activities during the preparation can be outdated by the time the projects start. For example, the preparation of the Project "Removing barriers hindering Protected Area management effectiveness in Vietnam" started in 2007 and did not take into account the fact that the Law on Biodiversity took its effect in 2009. Therefore, the project activities were not designed to fully address critical issues of effective cooperation among the agencies involved in managing protected areas as stipulated in the Law.

Secondly, as the GEF funded projects are subject to GEF procedures, GEF implementing agencies' policies as well as the government's regulations, the required paperwork sometimes seems to be add

burdens to project implementation. For example, in addition to audits by an international auditing service provider hired by GEF implementing agencies, the GEF projects also are subject to audits and inspections by various related government agencies such as Ministry of Finance, State Audit as well as internal inspection teams. Although this complex policy and regulation system enhances the transparency, it may divert the efforts on implementing project activities.

Thirdly, as often raised in GEF constituency's meetings, a limited role of GEF operational focal points (OFP) in recipient countries prevents adequate supervision of project implementation to ensure the consistency of the activities proposed in a preparation process and implemented activities at a later stage. Technically, GEF OFP should be informed of projects activities in all stages. However, practically, they seem to have sufficient information only at the stage of a proposal endorsement. Once a project is approved and implemented, the GEF OFP plays a side role and often lacks information on project implementation. Consequently, it is difficult for them to ensure that original project objectives are met.

3. Conclusions

GEF so far has been the most significant financial support mechanism for biodiversity conservation in Vietnam. Through GEF projects, Vietnam has effectively fulfilled its obligations arising from international conventions on biodiversity. The support has focused on policy and strategy formulation, capacity building, public awareness raising, partnership establishment and financial facilitation for various areas of mainstreaming biodiversity into socioeconomic development, wildlife conservation and protected area promotion. Although GEF projects face difficulties of lengthy preparation and approval processes, complex policy and regulation systems of various stakeholders and limited supervision for project objective consistency, they have proven to be an essential funding scheme for addressing biodiversity issues. In general, GEF's support has not only helped Vietnam address its biodiversity issues but also enabled the nation to contribute to the global cause of environmental protection towards sustainable development for humankind.

References

Global Environment Facility, 2017. "Country Profile, Vietnam at a glance", https://www.thegef.org/country/vietnam, (12/7/2017).

MONRE/UNDP/GEF, 2015. Termination Report-Project: Developing the National Biodiversity Strategy and Action plan and Mainstreaming Biodiversity Conservation into Provincial Planning, Hanoi, Vietnam September 2015.

MONRE/WB/GEF, 2015. Implementation Completion Memorandum For Wildlife Consumption in Vietnam: Reforming Policies and Practices to Strengthen Biodiversity Conservation, Hanoi, Vietnam, January 2015.

Antonio,J., Buján, C. and Thanh, L.H, 2016. Terminal Evaluation Report of Project Removing barriers hindering PA management effectiveness in Vietnam, Hanoi, Vietnam January 2016.

V

Life Below Water

10.

Ensuring Sustainable Exploitation and Utilization of Marine Resources and Environment Protection in Vietnam: Current Situation, Opportunities and Challenges for Achieving the SDGs

10

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Ensuring Sustainable Exploitation and Utilization of Marine Resources and Environmental Protection in Vietnam: Current Situation, Opportunities and Challenges for Achieving the SDGs

Introduction

In order to fulfill the commitments to the 2030 Agenda for Sustainable Development with 17 Goals and 169 targets (GSDG), the Prime Minister of Vietnam has issued the National Action Plan to implement the 2030 Agenda for Sustainable Development in Decision No. 622/QD-TTg dated 10/5/2017 (Prime Minister, 2017). Based on Agenda 2030, the Action Plan outlines 17 sustainable development goals for Vietnam and integrates 169 targets into 115 targets for the country. In particular, the goal of VSDG 14 is to "ensure the conservation and sustainable use of oceans, seas and marine resources for sustainable development (United Nations, 2015).

Vietnam is a coastal nation with a vast sea area (3 times the land area), a long coastline (over 3,260 km), an exclusive economic zone of up to 1,000,000 km², and more than 3,000 large and small islands. This territorial distinction has endowed the country with a diversity of natural landscapes, rich in natural, as well as biological resources - a precondition for development. The potential of marine and coastal resources in our country is very important for = national development, especially with oil and gas reserves of about 3-4 billion tons of oil equivalent, and other valuable minerals such as coal, iron, titanium, glass sand and others. Seafood has a total reserve of about 3-4 million tons. Along the coast, there are more than 100 locations suitable for construction of ports, including international transshipment ports. Many islands have high economic potential and finally, more than 125 large and small beaches with beautiful scenery having good conditions to open resorts and offer high-class tourism services for domestic and international tourists (Vietnam Agenda 21 Office, 2016). Based on the strategic position of the sea in the socio-economic development of the country, as well as the assessment of the status of conservation and sustainable use of the sea, six targets of VSDG 14 are identified from within the 10 targets of GSDG 14 to ensure compatibility with Vietnam's development conditions.

This article aims to review and assess Vietnam's current situation on three issues mentioned in VSDG 14, namely marine pollution control, marine and coastal ecosystem management and protection, and fisheries

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exploitation and development. The results of the review help identify the opportunities and challenges in achieving the targets set out in the VSDG 14, based on which suitable solutions for Vietnam will be suggested.

1. Policies of conservation and sustainable use of the oceans, seas and marine resources in Vietnam

Review of relevant policies

Vietnam actively participates in multilateral environmental treaties, including treaties related to the conservation and sustainable use of marine and island resources. Multilateral Environmental Agreements address both global and local environmental issues, through implementation at the regional and national level. Some important treaties to which Vietnam has acceded, includes the United Nations Convention on the Law of the Sea (UNCLOS) (1982), the International Convention for the Prevention of Pollution from Ships (MARPOL) (1973/1978), and the Convention on Biological Diversity (CBD) (1992).

In order to effectively implement Vietnam's commitments in multilateral environment agreements, stemming from its own domestic needs, Vietnam has promulgated and implemented many orienting documents, policies and measures for the conservation and sustainable use of marine and island resources, including: (i) Party's orienting documents (e.g. Resolution No. 09-NQ/TW dated February 2, 2007 by the Xth Party Central Committee on "Vietnam's Marine Strategy to 2020" (Party Central Committee, 2007); Resolution No. 41-NQ/TW dated November 15, 2004 of the Politburo on environmental protection in the period of accelerated industrialization and modernization of the country (Politburo, 2004); Resolution No. 24- NQ/TW dated June 3, 2013 of the XIth Party Central Committee on actively responding to climate change, enhancing natural resource management and environmental protection (Party Central Committee, 2013)); (ii) Strategic documents (National Strategy for Environmental Protection (Prime Minister, 2012), Strategy for Integrated Coastal Zone Management of Vietnam (Prime Minister, 2014), National Strategy on Biodiversity (Prime Minister, 2013), Vietnam Fisheries Development Strategy (Prime Minister, 2010)); (iii) Laws and guidelines such as the Law of Environmental Protection 2014, the Vietnam Marine Law 2012, the Law on Marine and Island Natural Resources and Environment 2015, the Law on Biodiversity 2008, the Law on Fisheries 2003, the Law on Forest Protection and Development 2004, along with a series of documents guiding their detailed implementation.

In general, the legal system of Vietnam on environmental protection, including conservation and sustainable use of natural resources and environment of the sea and islands, and on the exploitation, development and protection of fishery resources is relatively comprehensive and is continuously being strengthened. There have been further specific guidelines on pollution control, waste management, environmental management of the sea and islands, and biodiversity conservation. The national environmental standards were also reviewed, revised and promulgated to meet the actual situation in the country.

Many documents related to fisheries exploitation and development and fishery biodiversity conservation have also been issued. These set an important legal basis for the implementation of marine pollution control, management and protection of marine and coastal ecosystems and the exploitation, development and protection of fishery resources in practice.

However, there are still shortcomings and gaps in the legal framework, as well as in implementation. There is still a lack of specific legislation that systematically regulates the management and control of marine waste. Meanwhile, there are too many rules and policies currently in place (at least four laws: the Law on Biodiversity, the Law on Environmental Protection, the Law on Forest Protection and Development, and the Fishery Law) which are overlapping and often have contradictory regulations on biodiversity management.

Furthermore, in the current legal documents, Vietnam has not addressed the issue of mitigating and addressing the effects of ocean acidification even though it is one of the targets set in VSDG 14.

In addition, at the central level, coordination among agencies and units within the Ministry of Natural Resources and Environment (MONRE) (including the Vietnam Administration of Seas and Islands and the Vietnam Environment Administration) and at the local level within the Department of Natural Resources and Environment (including the Environment Protection Agency and the Seas and Islands Agency and other specialized agencies related to marine pollution control, management and protection of marine and coastal ecosystems in ministries, sectors and localities, and in particular the authorities for marine law enforcement forces and for marine environmental protection) have not been clearly defined.

Objectives/targets of conservation and sustainable use of the oceans, seas and marine resources in Vietnam's current policies

General and specific objectives for conservation and sustainable use of the oceans, seas and marine resources are summarized in the table below:

↘ Table 10-1

Summary of objectives/ targets set out in the relevant policy to VSDG 14 (excluding Targets No. 14.3 and 14.6)

No	VSDG Targets	Policies	Objectives/Targets in Policies (2020)
1	14.1. By 2030, significantly prevent, reduce and control marine pollution, especially from land-based activities, with an emphasis on solid wastes, wastewater and organic pollutants.	Strategy for sustainable exploitation and use of natural resources and protection of the marine environment up to 2020 with a vision to 2030	- Mitigate the degradation and depletion of resources and control the rate of increase of environmental pollution in coastal zones, inshore waters and on islands. - To 2030: Prevent and revert the trend of increasing environmental pollution, degradation and depletion of resources and reduction of marine biodiversity to ensure a stable marine ecological balance.
		National Strategy for Environmental Protection to 2020 with a vision to 2030	- Substantially reduce the sources of environmental pollution
		Vietnam Sustainable Development Strategy for the period 2011-2020	- Prevent, control and remedy environmental pollution and degradation and improve environmental quality
		Strategy for Agriculture and Rural Development for the period 2011-2020	- Overcome pollution in agricultural production

		National Strategy for Integrated Management of Solid Waste to 2025, with a vision to 2050	- 90% of municipal solid waste generated is collected and treated in an environmentally sound manner, 85% of which is recycled, reused, or recovered for energy or organic fertilizer production. - 80% of total construction waste generated in urban areas is collected and treated, of which 50% is recovered for reuse or recycling. - 50% of septic tank sludge of urban centers of grade II or higher and 30% of the remaining urban centers is collected and treated in an environmentally sound manner. - Reduce plastic bags used in supermarkets and trade centers by 65% compared to 2010. - 80% of urban centers with solid waste recycling facilities sort waste in households. - 90% of the total non-hazardous industrial solid waste generated is collected and treated in an environmentally sound manner, of which 75% is recovered for reuse and recycling. - 70% of the total amount of hazardous waste generated in industrial parks is treated in an environmentally sound manner. - 100% of the non-hazardous and hazardous solid waste generated at medical establishments and hospitals is collected and treated in an environmentally sound manner. - 70% of solid waste generated in rural residential areas and 80% of soild waste generated in craft villages are collected and treated in an environmentally sound manner. - To 2025: - 100% of urban centers with solid waste recycling facilities sort household waste. - 100% of municipal solid waste generated is collected and is treated in an environmentally sound manner, 90% of which is recycled, reused, or recovered for energy or organic fertilizer production. - 90% of total construction waste generated in urban areas is collected and treated, of which 60% is recovered for reuse or recycling. - 100% of septic tank sludge of urban centers of grade II or higher and 50% of the remaining urban centers is collected and treated in an environmentally sound manner. - Reduce plastic bags used in supermarkets and trade centers by 85% compared to 2010. - 100% of the total non-hazardous industrial solid waste generated is collected and treated in an environmentally sound manner. - 90% of solid waste generated in rural residential areas and 100% of solid waste generated in craft villages are collected and treated in an environmentally sound manner.
2	14.2. By 2030, strengthen the management and protection of marine, coastal and island ecosystems to avoid negative impacts and enhance the health and resilience of the ocean.	Strategy for sustainable exploitation and use of natural resources and protection of the marine environment up to 2020 with a vision to 2030	- Improve adaptability to climate change and maintain the ecological functioning and biological productivity of marine ecosystems to protect marine biodiversity and marine resources. - To 2030: Prevent and revert the trend of increasing environmental pollution, degradation and depletion of resources and reduction of marine biodiversity to ensure a stable marine ecological balance.
		National Strategy for Environmental Protection to 2020 with a vision to 2030	- Mitigate degradation and depletion of natural resources; Curb the rate of decline in biodiversity

		Vietnam Sustainable Development Strategy for the period 2011 - 2020	- Protect and develop forests, and conserve biodiversity.
		National Strategy on Biodiversity to 2020 with a vision to 2030	- Improve the quality and increase the area of protected natural ecosystems, ensuring the area of marine protected areas reaches 0.24% of the sea area; Forest cover reaches 45%; Primary forest is kept at 0.57 million hectares and has effective protection plans; The areas with mangroves, seagrasses and coral reefs are maintained at current levels; 15% of the degraded important natural ecosystems is restored; The number of internationally recognized protected areas in Vietnam: 10 Ramsar sites, 10 Biosphere Reserves and 10 ASEAN Heritage Gardens; - Improve the population size and quality of endangered, precious and rare species, which are prioritized for protection, ensuring: No increase in the number of extinct species, significantly improve the status of some endangered, precious and rare species and species threatened with extinction; - Build inventory, preserve and conserve the indigenous, endangered, precious and rare genetic resources (livestock, plants and microorganisms), to ensure that the indigenous and valuable genetic resources are not degraded or eroded.
		Vietnam Integrated Coastal Zone Management Strategy to 2020 with a vision to 2030	- Reasonable exploitation and use of natural resources in the coastal zone; Ensure the harmony between socio-economic development and environmental protection interests; Protect, preserve and restore the habitats, ecosystems, natural resources, natural, cultural and historical benefits and values of the coastal zone; Prevent and minimize the negative impacts caused by human, nature and climate change on coastal resources and environment.
		Strategy for Agriculture and Rural Development for the period 2011-2020	- Increases the forest coverage to 43-45% and protect biodiversity
3	14.4. By 2020, achieve effective management of fishery, and terminate overfishing, illegal fishing, unreported or unregulated fishing, and destructive fishing; Implement scientific management plans to restore fish stocks in the shortest possible time, at the minimum to achieve maximum sustainable yields according to their biological characteristics.	Vietnam Strategy for Fishery Development until 2020	- The fishery industry is substantially industrialized and modernized and continues to develop in a sustainable manner, into a large commodity production sector with a rational and efficient structure and form of production, possessing productivity, quality, efficiency, reputable brand, high competitiveness and firm integration into the global economy. At the same time, gradually raise the fishermen's intellectual level, and material and spiritual life, in conjunction with the protection of the ecological environment and national defense and security of the sea and islands of the country.
		Vietnam Sustainable Development Strategy for the period 2011-2020	- Reasonably exploit and efficiently use natural resources and resources, especially non-renewable resources.
		Strategy for Agriculture and Rural Development for the period 2011-2020 (2009)	- Ensure the inland and coastal fisheries are within renewable and developmental capacity
4	14.5. By 2030, the area of marine and coastal protected areas will reach 3-5% of the natural area, based on science and in accordance with national and international law.	Decision No. 742/QD-TTg dated 26/5/2010 of the Prime Minister approving the planning of Vietnam's system of marine protected areas up to 2020	- Research and propose the planning for expansion and development of the marine protected area system. - Investigate, survey, set up and put into operation some new MPAs.

Source: Compiled by the authors, 2017

2. Progress by 2016

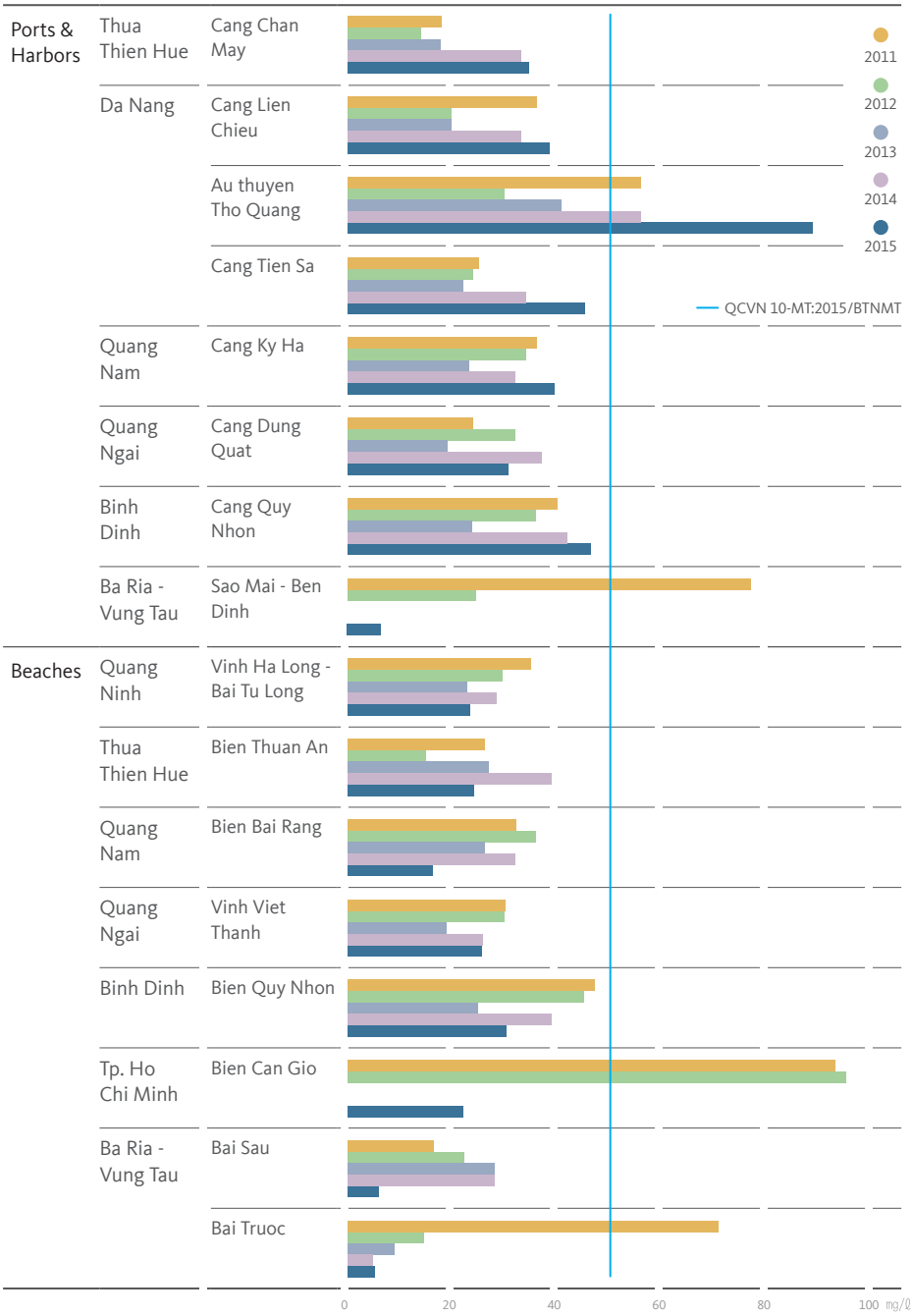
Marine pollution reduction

Coastal and offshore pollution

The quality of coastal seawater in Vietnam is acceptable, with most of the parameters of sea water quality within the limits of the Vietnamese national technical regulation defined in QCVN 10-MT:2015/BTNMT (MONRE, 2015b). However, due to the effects of estuaries and discharge of waste generated from coastal economic development activities, some waters have high levels of total suspended solid (TSS). In addition, the increase in organic matter and oil & grease levels are also issues of concern to the quality of the Vietnamese inshore waters in recent years. (MONRE, 2015a)

↘ Figure 10-1

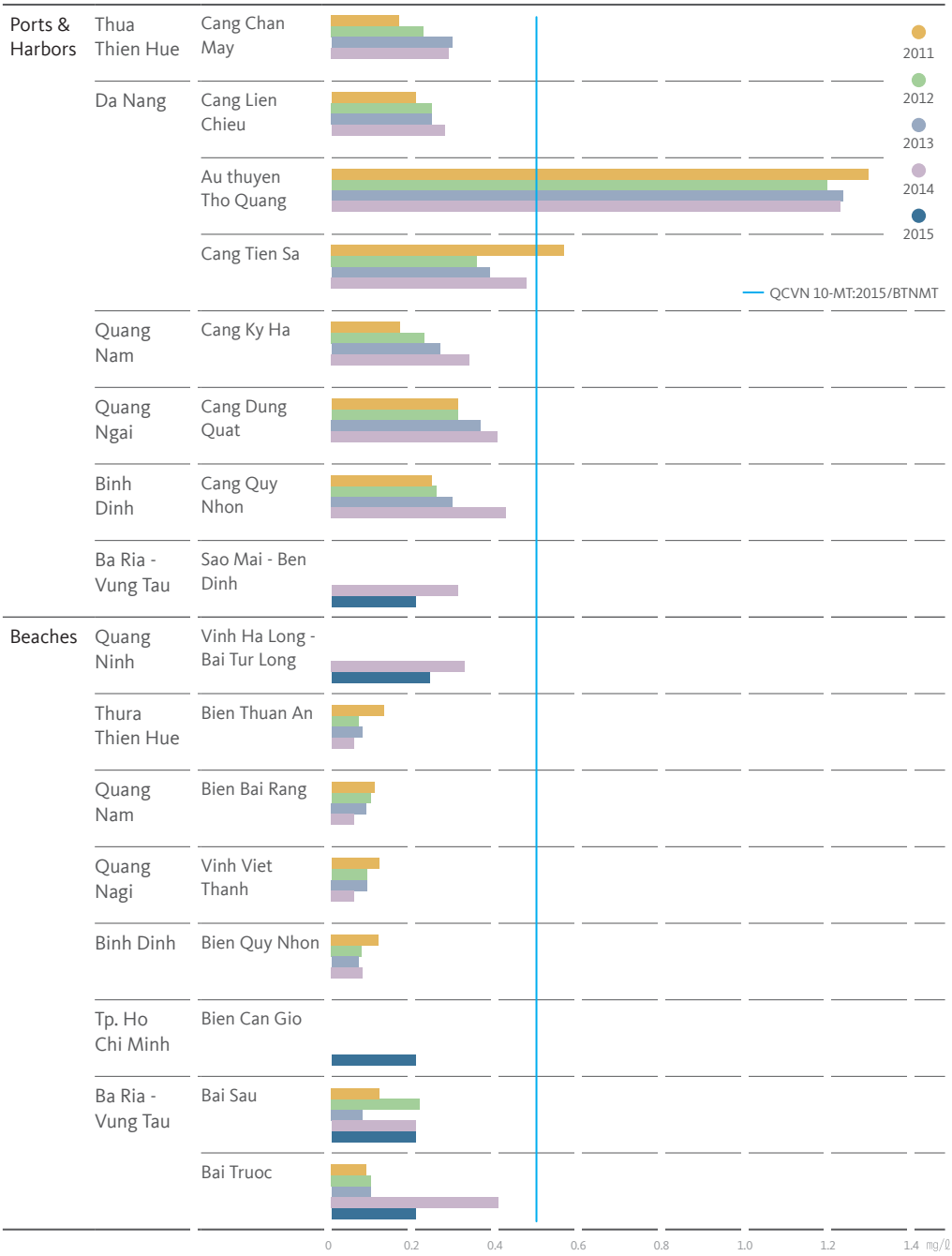
Yearly average TSS concentration in inshore water of some coastal regions between 2011-2015



MONRE. (2015a). National State of the Environment for the period 2011-2015.

↘ Figure 10-2

Yearly average oil & grease concentration in inshore water of some coastal regions between 2011-2015



MONRE. (2015a). National State of the Environment for the period 2011-2015.

Between 70% and 80% of the nation's marine waste is generated by factories, coastal and urban industrial zones and from residential areas, that discharged unprocessed wastewater and solid waste into rivers and canals in coastal areas or directly into the sea.

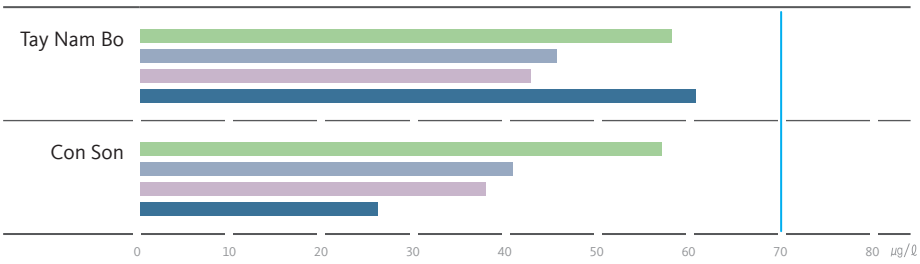
Environmental pollution due to toxic industrial waste has occurred. A notable example is the marine pollution incident in four central provinces which occurred in April 2016 (MONRE, 2016).

Offshore water quality in Vietnam is assessed as good, as most of the parameters of offshore water quality meet QCVN 10-MT:2015/BTNMT (MONRE, 2015b). However, in some areas the content of phosphate

in water was recorded higher than the limit of QCVN 10-MT:2015/BTNMT. The offshore oil & grease content is still within the permissible level of QCVN 10-MT:2015/BTNMT and there has been no significant fluctuation over the years. (MONRE, 2015a)

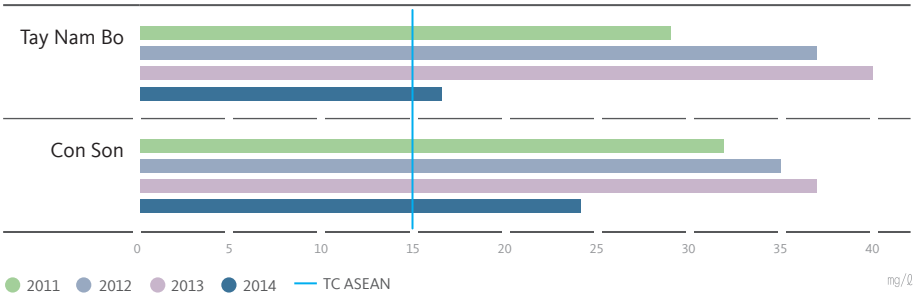
↘ Figure 10-3

Yearly average NH_4^+ concentration in offshore waters between 2010-2013



↘ Figure 10-4

Yearly average concentration of oil & grease in offshore waters between 2010-2013



MONRE. (2015a). National State of the Environment for the period 2011-2015.

The current state of marine solid waste management

According to the Ocean Conservancy (2015), Vietnam is one of the five Asian countries, along with China, Indonesia, the Philippines and Thailand, accountable for more than 50% of plastic waste found in the world's seas. The reason is that rapid economic growth has spurred demand for consumer goods while infrastructure for proper waste management has not kept pace.

So far, there has been relatively little scientific research that directly studies and assesses the issue of marine litter in Vietnam, but for a few individual studies conducted by the ministry related to marine waste. Therefore, Vietnam does not have any statistics or calculations on the volume of waste currently concentrated on the seafloor, on the beaches or on the surface, nor on the annual volume of garbage entering the marine environment.

Maritime waste management and control, despite the attention, is still very limited. According to the surveys of floating waste collection in Quang Ninh - Hai Phong, Da Nang - Quang Nam and Ba Ria Vung Tau - Ho Chi Minh City, by the Department of Marine Natural Resource and Environment Investigation and Control, inshore waters in these areas have many types of floating marine waste, including municipal waste, household waste, waste generated from agricultural activities, hospitals, fishing and aquaculture and maritime transportation, alongside toxic algae and live organisms from eutrophic marine areas. Among these are products that are difficult to decompose, such as plastic bags and rubber, that cause pollution and degradation

of the marine environment and affect human health and beauty of the environment. It is most alarming that floating waste is also found in estuaries, boat docks, residential areas and tourism development sites. At some beaches near the residential areas such as Bai Chay, Tra Co and Do Son, heavy accumulation of waste is polluting the environment. One of the reasons is the lack of awareness of both visitors and home businesses. Sadly, almost no waste floating on the sea is collected or controlled. Only one Management Board, in Ha Long Bay, has implemented a project to collect waste floating in Ha Long Bay over the past two years, with very limited budget, so collection efficiency was not high.

Current situation on management and protection of marine and coastal ecosystems

The waters of Vietnam have rich and diverse natural resources. Each type of marine resources or ecosystems is unique and plays a critical role in the sustainable development and protection of the marine environment.

Seagrass ecosystem

The seagrass ecosystems in Vietnam range from north to south and along the islands, at a depth of 0-20m with a total area of over 5,583 ha, with about 100,000 ha of lagoons and bays and 290,000 ha of tidal flats. In these waters, about 11,000 marine species have been discovered in different biodiversity regions, including over 2,000 species of marine fish (including 130 species of high economic value), 225 species of shrimps and more than 100 mangrove forest plant species, 15 seagrass species, 151 species of seaweed and more than 6,000 species of invertebrates. These marine ecosystems are also important habitat for five species of sea turtles, 15 species of sea snakes, 25 species of marine mammals and 43 species of seabirds. With ongoing surveys, marine species in Vietnam are being discovered. The survey and research on marine and coastal biodiversity has not however been carried out periodically, especially for small islands. (MONRE, 2015a)

At present, seagrass ecosystems are at risk of degradation, such as reduction and loss of the number of species, reduction of area, increased pollution and habitat degradation, leading to biodiversity loss and loss of economic resources from rare species.

By 2015, about 100 species of marine organisms in Vietnam are threatened or rare, and are included in the Red Book of Vietnam and the IUCN Red List, which require protection measures. Of the species listed in the Red Book, 37 are species of marine fish, 6 corals, 5 echinoderms, 4 species of dragon shrimps, 1 species of horseshoe crabs, 21 species of snails, 6 species of bivalves, and 3 species of squids. (MONRE, 2015a)

Threats mainly come from human activities such as the operation of marine vessels, fishing, tourism, aquaculture and land reclamation. Port operations have also caused great pressure on seagrass beds due to the operation of vessels and maritime traffic which increases turbidity and nutrients that pollute the water environment. Coastal urbanization causes soil dumping and shore erosion is a major problem for inshore waters, affecting seagrass beds and other ecosystems.

Coral ecosystem

The coral reefs of Vietnam are widely distributed from north to south covering an area of about 1.222 km² concentrated in the South-Central seas and Paracel and Spratly Islands, which have very high biodiversity, high primary productivity and interesting landscape

Coral reefs offer refuge, as well as breeding and rearing sites for many marine species. Corals of Vietnam are highly diverse, as Vo Si Tuan (2014) shows the coral reef diversity in Vietnam is much higher than previously recognized by international scholars: 454 species compared to 350 (Latypov 2005) and 397 species (Veron et al. 2009). Among them, the numbers of coral reefs in each sea are 176 in the West of Tonkin Gulf, 252 in Central Vietnam, 201 in the Paracel Islands, 406 in Southern Vietnam, 333 in the Spratly Islands and 251 in the Southwest; in addition to the 3,000 marine species associated with coral reefs. Of these, there are about 2,000 benthic species, 500 species of fish and many economically valuable species such as Panulirus, Haliotis diversicolor, Pteria martensi and Holothuria which are dependent on the corals. (MONRE, 2015a)

In the span of 15 years (2000-2015), about 15-20% of the coral reefs were lost, mostly in populated areas. Coverage of coral reefs is declining over time, with more than 30% coverage loss in some areas. According to a study by the Nha Trang Institute of Oceanography, from 1994 to 2007, numerous coral reefs declined by between 2.8% and 29.7% (average 10.6% for all coral reefs), especially in the sea of Con Dao, the coastal Ninh Hai-Ninh Thuan and Nha Trang Bay. The Co To-Quang Ninh coral reef is considered to be very well developed, with a coverage of 60-80%, where coverage is nearly 100%. In 2007, coral reef monitoring, carried out by the Institute of Marine Environment and Resources, showed that the coral reefs here suffer massive loss, in some instances 90% of island coral coverage is dead. The cause of most coral deaths around the Co To archipelago may be partly due to fishing activities in these coral reefs by fishermen. (Pham Anh Cuong, 2015)

Although research on plantation and restoration of corals in the wild has produced successful results, the area restored is still small.

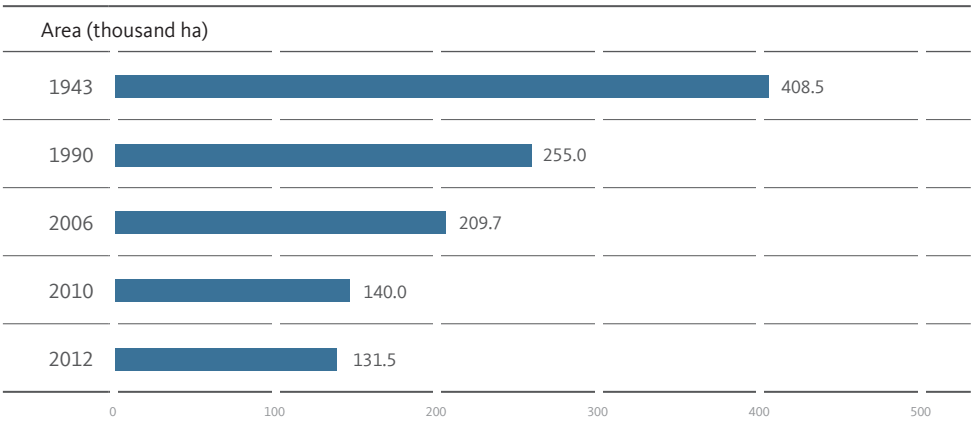
Mangrove ecosystem

Mangrove forests are habitats and nesting sites for many species of birds, aquatic animals and rare animals such as brackish water crocodiles, water birds and long-tailed macaques. Mangrove forests are also the stopping place for many migratory birds from the North, creating bird sanctuaries with many rare species such as spoonbill, pelican and painted storks. Mangrove forests nourish aquatic species, especially shrimp species of high commercial values, mainly for export. Vietnam has coastal mangroves stretching from Quang Ninh to Ha Tien, however, they are now severely degraded. This degradation is best demonstrated by the rapid decline in the area and quality of mangroves.

Vietnam has lost 67% of the area of mangrove forests compared to 1943. In the period 1943-1990, the average mangrove loss was 3,266 ha/year, until the period 1990-2012, when it rolse to 5,613 ha/year. In the last 22 years (1990-2012) the rate of mangrove loss increased by 1.7 times over that of the previous 47 years (1943-1990). (MONRE, 2015a).

↘ Figure 10-5

Area of mangrove forests overtime



Source: MONRE. (2015a). National State of the Environment for the period 2011-2015.

According to statistics in 2012, 56% of the total area of mangrove forests, across the country is newly planted, has single species, and is of poor quality in terms of size, height and species diversity. The primary mangrove forests are almost gone.

Removal of mangroves for aquaculture has altered the natural landscape in many areas, and has severely affecting the natural ecosystemand food web. Mangrove forest loss also causes the destruction of nearby ecosystems such as seaweed and seagrass beds.

Establishment and management of marine conservation areas

Marine ecosystems of high biodiversity values have been planned by the Prime Minister as 16 MPAs under Decision No. 742/QD-TTg dated 26 May 2010. The implementation of planning and management of the marine protected areas system in Vietnam has been assigned by the Prime Minister to the Ministry of Agriculture and Rural Development (MARD) in coordination with relevant ministries, sectors and localities. On that basis, the Ministry of Agriculture and Rural Development has assigned the Fishery Administration to be in charge of MPA implementation. Currently, a network of 9 out of 16 planned marine protected areas in Vietnam has been established, including: Cat Ba, Bach Long Vy, Con Co, Cu Lao Cham, Nha Trang Bay, Nui Chua, Hon Cau, Con Dao and Phu Quoc (Directorate of Fisheries, 2016b).

A system of documenting the management of MPAs has been issued, but some of the provisions in the documents are inconsistent, yet the documents remain in effect, causing some difficulties in the implementation of the MPA. Such obstacles in management of marine protected areas are also common problems in the state management of biodiversity at present.

The scope of state management of biodiversity is currently being adjusted and regulated by at least 4 laws: the Law on Forest Protection and Development 2004, the Fisheries Law 2003 (by Ministry of Agriculture and

Rural Development), the Law on Environmental Protection 2014 and the Biodiversity Law 2008 (led by MONRE). Being governed by many different laws, therefore, understanding and practicing the required unified state management of biodiversity is a challenge, as there are too many rules and policies currently in place, often overlapping one another. This situation makes it difficult for concerned parties to comply with law enforcement, especially in conservation areas, when they are faced with shortcomings in capacity, personels and advisory/guidance. (Pham Anh Cuong, 2015).

Harvesting, overfishing, and illegal, unreported, unregulated and destructive fishing

Marine fishstocks in Vietnam's inshore waters are estimated at about 5.0 million tons, with sustainable harvesting capacity of over 2.3 million tons/year. Small pelagic fishes account for about 51%, large pelagic fishes account for 21%, benthic fishes with other benthic species account for 27% of the total stock. In addition, up to now, 15 important fishing grounds have been identified, of which 12 are located in the coastal zone and 3 are located in offshore mounds, as well as important shrimp environments in coastal zones in the Gulf of Tonkin and in the Southwest. The fishery sector in Vietnam is a "multi-species fishery" and is small scale fishery closely linked to the livelihoods of coastal and island people. Such potential of marine resources has provided an important premise contributing to our country's prospect for strong aquaculture development. In 2011, marine aquaculture reached over 2.0 million tons, which together with brackish water and Pangasius aquaculture contributed to the country's fishery export turnover of over $ 6.0 billion (Central Propaganda Committee, 2013).

Overall, the development of the fisheries sector has brought many encouraging benefits. The contribution of the fisheries sector to the GDP is growing every year. In 2016, all fishery output was estimated at 3,124.3 thousand tons, up 2.9% against 2015, including 2,266.5 thousand tons of fish, up 2.9%, and 174.7 thousand ton of shrimp, up 3.3%. All marine products was estimated at 2,930.8 thousand tons, up 3.2%, of which 2,131.3 thousand tons are fish, up 3.2%, and 161.3 thousand tons are shrimp, up 3.7% (General Statistic Office of Vietnam, 2016). However, a marine pollution incident occurred at the end of April 2016 in the waters of Ha Tinh, Quang Binh, Quang Tri and Thua Thien Hue, causing mass fish deaths that affected fishing operations in the central coastal provinces as well as the whole country.

In Vietnam, more than 80% of the vessels operate mainly in inshore waters, while this area accounts for only 11% of its EEZ (Directorate of Fisheries, 2016a). This indicates that as the inshore waters have been the traditional fishing area of Vietnam, they have been over-exploited and there is an ever-increasing pressure on this area. The situation has been detrimental to the coastal fish stocks because inshore waters are the spawning and maturing grounds for many species.

The development of marine fisheries in Vietnam is spontaneous and has been unregulated for a long time. According to the Department of Fisheries Resources and Exploitation, as of 2011, the number of vessels

in the country is over 124.6 thousand units, with a total capacity reached about 4.4 million CV. The number of boats is up 70%, and capacity is up 175% against 2001. In particular, the group of vessels with a capacity of <20 CV increased on average 9.1%/year, seriously affecting the already diminishing coastal resources. The group of ships with a capacity from 20 CV to <90 CV increased on average 1.8%/ year. The group of vessels with a capacity of 90 CV or more increased on average 13%/ year - the highest growth rate, showing offshore development trend is in line with the policy of offshore development of the Party and the State. However, this development is not entirely grounded on a scientific basis, and the high concentration of boats, unregulated small-scale fishing, and the uncontrolled increase in the number of vessels have resulted in an imbalance between fishing capacity and resource regeneration. The economic efficiency of fishing operations is declining. Although the total production of marine fishing increased continuously from 2,226.6 thousand tons (2010) to 3,124.3 thousand tons (2016), average productivity (tons/ year) is showing a downward trend.

Many studies have also pointed out that almost all coastal areas are over-exploited (Joint Report of Development Partners at Consultative Group Meeting for Vietnam, 2010). While resources decline, the number of fishing vessels is remains large, resulting in lower exploitation efficiency and a decline in the profitability of each vessel. To meet the cost, the fishing boats are forced to intensify exploitation, such as increasing the number of catchments per day, increasing the number of working days, reducing the mesh size and increasing the output of fishing light attractor. In recent years, many offshore fishing vessels have been relying on near-shore fishing, especially in the Gulf of Tonkin, causing competition between different fishing practices in the same fishing grounds. Such uncontrolled fisheries development not only causes a general decline in fisheries resources, but also critically leads to the extinction of many important marine species at risk.

In addition, due to the low educational level of the fishermen, the economic efficiency of offshore fishing boats is low. Currently, about 31.5% of offshore fishing vessels suffer from losses and unpaid bank loans. Among the fishermen, 68% have not completed primary school, over 20% have graduated from primary school, nearly 10% have attended junior high school and 0.65% has earned a diploma in vocational school or university. Many fishermen are confused and not able to achieve good economic efficiency in offshore fishing; their acquisition of modern fishing knowledge and techniques is also limited. Therefore, when developing off-shore fishery, they encounter many difficulties for example, not firmly grasping the fishing grounds in offshore areas; the size of fishing vessels is small, not able to withstand bad weather; not yet aware of offshore fishing techniques (Directorate of Fisheries, 2016a). In addition, harmful fishing gear and methods continue to be used, causing habitat destruction and depletion of fish stocks. This decline is reflected in the change in the quality of catches, such as the increased ratio of mixed species/single species catchments and the decline in ratio of valuable fishes.

3. Targets to 2030 and challenges and opportunities

Targets under VSDG 14

As mentioned above, the National Action Plan for implementing the 2030 Agenda for Sustainable Development promulgated in Decision No. 622/QĐ-TTg dated 10/5/2017, issued 17 goals (VSDG) and 115 targets, of which VSDG 14 has six targets, which are implemented by the MONRE and the Ministry of Agriculture and Rural Development. Details are as follows:

Specific targets of VSDG 14

↘ Table 10-2

No	Specific targets of VSDG 14	Main responsible agency
1	14.1. By 2030, significantly prevent, reduce and control marine pollution, especially from land-based activities, with an emphasis on solid wastes, wastewater and organic pollutants.	MONRE
2	14.2. By 2030, strengthen the management and protection of marine, coastal and island ecosystems to avoid negative impacts, enhance health and resilience of the ocean.	Ministry of Agriculture and Rural Development
3	14.3. Reduce and relieve the effects of ocean acidification, prioritize the strengthening of scientific cooperation at all levels in the context of climate change.	MONRE
4	14.4. By 2020, achieve effective management of fishery, termination of overfishing, illegal fishing, unreported or unregulated fishing, and destructive fishing; Implement scientific management plans to restore fish stocks in the shortest possible time, at the minimum to achieve maximum sustainable yields according to their biological characteristics.	Ministry of Agriculture and Rural Development
5	14.5. By 2030, the area of marine and coastal protected areas will reach 3-5% of the natural area, based on science and in accordance with national and international law.	Ministry of Agriculture and Rural Development
6	14.6. By 2030, certain types of fishery subsidies that lead to overfishing or illegal, unreported and unregulated (IUU) fishing are prohibited, to facilitate the negotiation of fishery subsidies by the World Trade Organization.	Ministry of Agriculture and Rural Development

Source: Decision No. 622/QĐ-TTg on May 10, 2017 promulgating the National Action Plan to implement the 2030 Agenda for Sustainable Development

Tasks to be completed

The action plan has proposed specific tasks to achieve VSDG 14:

Specific tasks for implementation of VSDG 14 (excluding Targets 14.3 and 14.6)

↘ Table 10-3

STT	Specific targets of VSDG 14	Specific tasks to achieve VSDG 14
1	By 2030, strengthen the management and protection of marine, coastal and island ecosystems to avoid negative impacts, enhance health and resilience of the ocean.	- Strictly control direct sources of pollution and degradation of coastal sea areas. Regularly monitor the impact of land-based marine pollution sources, particularly from river basins, from coastal agricultural areas using chemicals and pesticides of chemical origin. - Strictly implement the regulations on environmental impact assessment, closely control the projects of dykes, sea encroachment, dumping of rock, sand, gravel and construction materials into the sea; Completely control and prevent the dumping of hazardous wastes into the sea in all forms. - Plan the treatment of polluting establishments in coastal areas; Improve the quality of water sources in river basins, coastal estuaries and coastal areas, which have been polluted and degraded. - Rapid and effective response capacity building against oil pollution and environmental incidents in the seas and coastal estuaries; Closely inspect and supervise the requirements on conditions and capability for the prevention and response of incidents of ships and boats carrying oil or chemicals operating on the sea or passing through the sea areas of our country as well as the storages of petroleum, chemicals and pesticides in the coastal zones and on the islands. - Develop a mechanism to encourage people and communities to participate in the monitoring and management of marine pollution. - Survey and assess the environmental carrying capacity of sea areas and islands in high or very high risk areas; Announce the sea areas or islands no longer capable of receiving waste.
2	By 2030, strengthen the management and protection of marine, coastal and island ecosystems to avoid negative impacts and enhance the health and resilience of the ocean.	- Investigate and assess the current status and distribution of marine ecosystems; Assess the vulnerability of marine ecosystems and the level of threat of extinction of valuable marine species. Assess the overall health of coastal, marine and island ecosystems. - Formulate plans on protection of existing mangroves, restore and regenerate natural mangroves in the coastal areas and develop forests in key areas in order to form a solid coastal greenbelt from Mong Cai to Ha Tien. - Develop and implement conservation programs for priority protected species. - Implement comprehensive measures to prevent the decline of fishery resources in the sea areas and step by step restore and enrich the fishery resources of inshore waters. - Develop and implement co-management models for marine resources and ecosystems. - Improve and restore the environment of polluted and degraded marine and marine ecosystems. - Fully implement the international rules provided in the United Nations Convention on the Law of the Sea (UNCLOS) for the conservation and sustainable use of oceans and marine resources (GSDG 14.c).
3	By 2020, achieve effective management of fishery, termination of overfishing, illegal, unreported, unregulated and destructive fishing; Implement scientific management plans to restore fish stocks in the shortest possible time, at the minimum to achieve maximum sustainable yields according to their biological characteristics.	- Concentrate on researching resources, forecasting fishing grounds and assessing stock and exploitation limit. - Modernize the management of fisheries at sea. Establish appropriate management mechanisms to guide the exploitation, conservation and development of marine resources in a sustainable manner. Build and renovate fisheries cooperatives and alliances in the direction of providing actual benefit for the fishermen, protection of the ecological environment, sustainable development of the community and development and social stability of the sea areasand islands. Form a number of large enterprises and groups strong enough to engage in offshore fishing activities and cooperate in exploiting the oceans with other countries in the region. - Research and transfer of science and technology in fishing. Release quality aquatic species into the sea and seasonal inland waters to restore, regenerate and develop fish stocks. Develop and implement programs and projects to protect and restore biological productivity and the ability to provide nutrients, breeding and nursing grounds for aquatic resources of marine ecosystems to restore natural fish stocks near shore.

		- Formulate and set up mechanisms and policies for management of inland exploitation from surveying aquatic resources in river basins, streams and lakes to management of exploitation in association with the protection of fish stocks and environmental protection. Prohibit illegal and destructive fishing. Strictly forbid the use of destructive fishing gear. - Develop high-quality human resources for research and exploitation of marine fishery resources. - Consolidate and develop the fishing vessel buildings and repair mechanics sectors, develop supporting industries and invest in the upgrading and modernization of fishing ports, fishing wharves and anchorage areas, coastal and island supporting service areas. - Manage the fishing capacity in line with the renewing capacity of marine resources. Employ market mechanisms and tools, and apply appropriate administrative and regulatory measures to regulate the exploitation of marine resources within the renewable limits.
4	By 2030, the area of marine and coastal protected areas will reach 3-5% of the natural area, based on science and in accordance with national and international law.	- Study and evaluate the uniqueness and representativeness of marine and coastal ecosystems, habitats and natural or seasonal habitats of marine species under the protected species list; Review and consider the level of satisfaction of criteria for the establishment of national parks, nature reserves, species-habitat or landscape protection zones according to the provisions of the Biodiversity Law and related laws. - Review, study and expand the planning of the system of marine and coastal conservation zones. - Enhance the capacity of marine technology research and transfer in accordance with the Guidelines and Standards of the Intergovernmental Oceanographic Commission on Oceanographic Technology Transfer, to improve ocean health and enhance the contribution of marine biodiversity to the development of the country (GSDG 14.a). - Strengthen international cooperation in the field of marine conservation. - Strengthen the investment mechanism and capacity for the operation of marine protected areas. - Strengthen mechanisms and policies to support people living in marine conservation areas. - Raise awareness of local people and localities in conservation areas.

Source: Decision No. 622/QĐ-TTg on May 10, 2017 promulgating the National Action Plan to implement the 2030 Agenda for Sustainable Development

Challenges and opportunities

Based on the 2030 Global Agenda for Sustainable Development and by considering the domestic context, Vietnam has published the National Plan of Action to Implement the 2030 Agenda with 17 goals (VSDGs) and 115 targets suitable to Vietnam's conditions. It is an ambitious agenda, and to successfully implement these VSDGs, especially VSDG 14, Vietnam has to face many significant challenges.

Challenges

First, population growth, along with rapid urbanization, is exerting increasing pressure on natural resources and the marine environment. In order to meet the consumers' growing demand for fishery products, it is necessary to increase the fishing activities, while at the same time the fishery resources shows a decrease in stock, yield and size of fish caught. The amount of domestic waste (wastewater, solid waste) continues to rise, which means that untreated domestic waste continues to be a major source of pollution, which destroys the marine environment. This

also poses threats to biodiversity such as death, reduced population sizes and habitat destructions.

Second, in the context of worsening global climate change, Vietnam is considered one of the most severely affected countries, as the Mekong Delta is one of the world's three river deltas most vulnerable to sea level rise. This poses major challenges for the reduction and control of marine environmental pollution, as well as the effective conservation of marine biodiversity, in order to mitigate and adapt to climate change.

Third, Vietnam's marine resources and the environment continue to deteriorate. The quality of coastal water is worsening, due to the increase of organic matters, foil, grease and total suspended solid (TSS). Waste floating on the sea is not collected or controlled, while the seagrass ecosystem is polluted and narrowed. Coral reef coverage is declining with many threatened and rare marine species being included in the Vietnam's Red Data Book and the IUCN Red List, calling for safeguards. The area of mangroves in the country has been severely reduced, and the fishery sector continues to have problems and remains unsustainable. Meanwhile, fishery resources in Vietnam's exclusive economic zone have been over-exploited and has witnessed decrease in stock, yield and size of fish caught. The level of exploitation in the EEZ may be close to or even higher than the level of sustainable yield allowed.

Fourth, management institutions have many inadequacies, including professional capacity, the lack qualifications and experience of environmental management staff , poor equipment, technology and tools to support the management. State management is dispersed, and responsibilities are not clearly divided, where delegation and hierarchy is often inappropriate, where coordination among central and local agencies remains poor. While the technical infrastructure for marine pollution control, conservation and sustainable use of marine environmental resources is weak, the resources of the State and enterprises are also limited. The government current budget's expenditures for environmental protection activities are still small and fail to meet the actual requirements. Expenditure for environmental management in Vietnam has only reached 1% of the total budget since 2006 and has stayed at this rate to date. However, compared to GDP, the share of the state budget spent on the environment in 2010 was only approximately 0.4% of GDP. (Pham Anh Cuong, 2015)

In addition, the issue of mitigating and addressing the effects of ocean acidification has not been addressed in Vietnamese legal documents despite being one of the targets set out in VSDG 14. Achieving this target is a significant challenge for Vietnam.

Opportunities

In the course of implementing VSDG 14 in the face of many challenges, Vietnam may also find practical opportunities, as follows:

First, the sea serves a significanct role for Vietnam to develop and expand international exchange. The potential of marine and coastal resources is very important for national development. By affirming that Vietnam must become a strong country on the sea, enriched by the sea, on the basis of bringing into play all potentials from the sea, comprehensively developing

marine industries with a modern and diverse composition and achieving fast, sustainable and highly efficient development, with a long-term vision, the Party and State have set out important guidelines and measures for the management, protection and sustainable exploitation of marine resources and the environment. This provides the legal basis for the successful implementation of the targets of VSDG 14.

Second, Vietnam's achievements in social and economic development, after more than three decades of Doi Moi, including successful implementation of many Millenium Development Goals, provides a solid foundation for the fulfillment of the SDGs. According to the Country Report: 15 years after setting the Vietnam Millennium Development Goals (MDGs), Vietnam completed many, including: (i) eradication of extreme poverty; (ii) universal primary education; (iii) promotion of gender equality and progress in health indicators such as reducing maternal mortality and child mortality. However, until now the implementation of MDG 7, which is "Ensure environmental sustainability", in Vietnam has not been as successful as expected. The lessons of failure in the implementation of the MDG 7 are valuable experiences for Vietnam in successfully implementing the targets of VSDG in general, and VSDG 14 in particular.

Third, the 2030 Agenda, with 17 sustainable development goals and 169 targets for the benefit of all people and generations, is receiving lots of interests from countries and international organizations for its implementation including Vietnam. Specifically, issues of marine environmental pollution and marine biodiversity are of particular interest to the international community. Marine pollution has a widespread impact not limited to the waters of just one country. As marine biodiversity in particular and biodiversity in general is a pillar for the functioning of ecosystems that provide services to human society, further loss of biodiversity could affect human wellbeing now and in the future. Therefore, Vietnam is promoting more opportunities to receive support and cooperation in finance, technology and human resources from developed countries and international organizations, in order to fully realize the country's potentials and strengths, effectively exploit natural resources, protect the marine and island environment, and bring forth the sustainable development of the sea and islands, towards the successful implementation of its 2030 agenda, including VSDG 14.

4. Recommendation

On the basis of the policy review and assessment of the actual situation of marine pollution control, the protection and management of marine and coastal ecosystems, and the development of fisheries in Vietnam, and based on our assessment of challenges and opportunities in implementing VSDG 14, the authors propose the following solutions to help Vietnam achieve these targets:

First, Vietnam must quickly review, improve and unify legal documents on the protection of marine resources and the environment, by taking into account the international conventions on the protection of marine resources and the environment and assign clear responsibilities to ministries to avoid overlapping functions. At the same time, Vietnam

needs to intensify supervision to improve the effectiveness of law enforcement. This can be supported by the developing and completing data collection mechanisms for monitoring and evaluating the implementation of VSDG 14.

Second, raise awareness and action of the overall society, on sustainable development goals and the conservation and sustainable use of oceans, seas and marine resources. Train, build capacity and develop human resource for management officers and scientists, studying the seas as well as management and protection of marine environmental resources.

Third, enhance scientific research and application of technologies in investigation, exploitation and use of natural resources and the protection of the marine environment. Promote scientific and technological research to support more efficient and sustainable fishing. Develop technologies and programs to promote fishery using environmentally friendly fishing gear and techniques to improve fishing efficiency, while avoiding overfishing and protecting resources in the future.

Fourth, mobilize social resources, especially financial resources from the private sector; Mobilize and efficiently utilize international resources to invest in facilities to support the management and implementation of key and urgent tasks, and undertake basic investigations and capacity building for staff working in environmental management in general and marine environmental protection in particular.

Lastly, strengthen international cooperation, sharing, learning experience and capacity building to achieve VSDG 14. This is a win-win situation for the exploitation and use of space, water, natural resources and the protection of the marine environment.

5. Conclusion

The paper has reviewed legal policies, as well as the status of marine pollution control, the management and protection of marine and coastal ecosystems, and the development of fisheries, based on which opportunities and challenges were identified and recommendations were made to improve the efficiency of these activities.

Vietnam has been carrying out marine pollution control, management and protection of marine and coastal ecosystems, and fisheries exploitation and development in accordance with the objectives/targets set out in the government strategy and policy documents. These goals are quite well-aligned with the goals of global sustainability. However, the results are very limited:

The quality of coastal and offshore seawater in Vietnam is still quite good but in recent years there has been an increase in organic matters and grease in inshore waters. Solid waste management is inadequate, and floating waste is not collected and controlled. Seagrass ecosystems are at risk of degradation, coral reef coverage is declining over time, severe lost of mangrove forest area is witnessed, and primary mangrove forests are almost completely lost. The establishment of MPAs has been slower than planned, so far only nine MPAs have been established compared with the objective of "establishing and operating 16 MPAs in the period 2010-2015". Inshore water is overexploited yet the pressure of exploitation in this area is

increasing day by day. The development of marine fisheries in Vietnam is spontaneous.

The above results show that the marine resources and environment management mechanisms, policies and institutions are still inadequate; The infrastructure is underdeveloped and investment resources of the State and private enterprises remain limited. This poses a major challenge for Vietnam in achieving VSDG 14. However, Vietnam also has significant opportunities for achieving the objective of VSDG 14, is a matter of concern for the Vietnam Communist Party, the Vietnamese government and the international community.

The article proposes a number of measures for improving the institutions and policies, raising awareness and capacity, strengthening science research, mobilizing social resources and enhancing international cooperation to improve the effectiveness of marine pollution control, protection of the environment, marine and coastal ecosystems and fishery development. The completion and unification of legal documents on the protection of marine resources and environment will avoid the overlapping of functions and tasks among ministries, thereby enhancing the ministries's responsibilities and effectiveness of management. And it is also necessary to strengthen supervision for improving effectiveness of the legal documents enforcement.

The sea has a very important position, significantly influencing the socio-economic development, national defense, security and environmental protection of Vietnam. Therefore, the successful implementation of VSDG 14 is of great significance to the achievement of Vietnam's strategic goal of becoming a strong country in the sea.

References

Central Propaganda Committee. (2013). 100 questions and answers about the sea and islands for Vietnamese youth. Information and Communication Publishing House

Directorate of Fisheries. (2016a). Report of Implementation Results of the 2016 Plan, major tasks and solutions for implementation of the 2017 Plan.

Directorate of Fisheries. (2016b). Report of Assessment of fisheries biodiversity management in the period 2011-2016 and the Plan for the period 2017-2020.

General Statistic Office of Viet Nam. (2016). Socio-Economic Situation in 2016. Retrieved from http://www.gso.gov.vn/default.aspx?tabid=621&ItemID=16174.

Joint Report of Development Partners at Consultative Group Meeting for Vietnam. (2010).

MONRE. (2015a). National State of Environment period 2011-2015.

MONRE. (2015b). QCVN 10-MT:2015/BTNMT-National technical regulation on marine water quality.

MONRE. (2017). International Environment Law: Multilateral Environmental Agreements

National Assembly. (2015). Law on Marine and Island Natural Resources and Environment. National Assembly. (2014). Law of Environmental Protection.

National Assembly. (2012). Vietnam Marine Law.

National Assembly. (2008). Law on Biodiversity.

National Assembly. (2004). Law on Forest Protection and Development.

National Assembly. (2003). Law on Fisheries.

Ocean Conservancy. (2015). Stemming the Tide: Land-based strategies for a plastic-free ocean.

Party Central Committee. (2007). Resolution 09-NQ/TW on Viet Nam's Marine Strategy to 2020.

Party Central Committee. (2013). Resolution No. 24-NQ/TW on on actively responding to climate change, enhancing natural resource management and environmental protection.

Pham Anh Cuong. (2015). Biodiversity Status and Priority Issues in Biodiversity Management in Viet Nam.

Politburo. (2004). Resolution No. 41-NQ/TW on environmental protection in the period of accelerated industrialization and modernization of the country.

Prime Minister. (2010). Decision No. 1690/QD-TTg on Viet Nam Fisheries Development Strategy until 2020.

Prime Minister. (2012). Decision 1216/QD-TTg on National Strategy for Environmental Protection until 2020 and vision towards 2030.

Prime Minister. (2013). Decision No. 1250/QD-TTg on National Strategy on Biodiversity until 2020 and vision towards 2030.

Prime Minister. (2014). Decision No. 2295/QD-TTg on Strategy for Integrated Coastal Zone Management of Viet Nam until 2020 and vision towards 2030.

Prime Minister. (2017). Decision No. 622/QD-TTg on National Action Plan to implement the 2030 Agenda for Sustainable Development.

United Nations. (2015). Transforming our world: the 2030 Agenda forSustainable Development.

Viet Nam Agenda 21 Office, UNDP. (2016). Report "Study and review of 17 Goals and 169 Targets of the United Nations Agenda 2030 for Sustainable Development aiming to assessment of current situation and determination of suitable and feasible targets with Viet Nam's conditions as the basis for the nationalization of global sustainable development goals.

Vietnam Association of Seafood Exporters and Producers. (2017). Overview of Vietnam's Fisheries. Retrieved from http://vasep.com.vn/1192/OneContent/tong-quan-nganh.htm

Vo Si Tuan. (2014). Coral reefs in Vietnam. Proceedings of the 2nd National Conference on Marine Biology and Sustainable Development. Natural Science and Technology Publishing House.

VI

Clean Water and Sanitation

11.

Review on the Targets of Ensuring Accessing to Safe and Affordable Drinking Water and Wastewater Treatment in Vietnam

11

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Review on the Targets of Ensuring Access to Safe and Affordable Drinking Water and Wastewater Treatment in Vietnam

Introduction

Considered as a country with impressive economic growth among the ASEAN nations, yet Vietnam's environment continues to be strongly affected by the socio-economic development. The process of urbanization and expansion of urban administrative boundaries has been continuing, with the urban population growing rapidly. Along with that, due to economic development, the life of people in rural areas has also improved, resulting in an increase of the demand for consumption. All these issues, in addition to contributing to the economy, also bring large amounts of waste into the environment, causing negative impacts on the environment and human health, especially important are the issues of clean water and public hygiene. According to a report by the Vietnam Environment Administration (MONRE, 2016), in the four years from 2011-2015, Vietnam has 6 million cases of diseases related to shortage of clean water, estimated direct costs for treatment of Cholera, typhoid, dysentery and malaria are about 400 billion VND. Water pollution from the industrial waste discharge into the watersheds is a major cause of damage to the fisheries sector. In addition, pollution of surface water such as rivers, lakes and canals - the main source of water for irrigation in agriculture –lead to considerable losses in agricultural production.

To solve the problem, Vietnam has implemented many solutions including those on institutions and policies. The National Action Plan to implement the 2030 Agenda for Sustainable Development of Vietnam (VSDGs) is one of the new policies promulgated by the Government of Vietnam to concretize sustainable development goals (SDGs), including the 6th Sustainable Development Goal (SDG6) on "Ensure access to water and sanitation for all".

In order to provide an overview of the implementation of SDG 6 in Vietnam, namely access to safe and affordable drinking water and wastewater treatment in Vietnam, in this report we will review the policies and statuses related to two global sustainable development objectives SDG 6.1 and SDG 6.3 that have been concretized by Vietnam into VSDG 6.1 and VSDG 6.3 (Annex 1) to identify opportunities and challenges and make recommendations.

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1. Policies and programs on access to drinking water and wastewater treatment in Vietnam

Within the framework of reviewing policies on ensuring access to safe drinking water and safe and appropriate wastewater treatment in Vietnam; the policies to be reviewed include those that have been or are being implemented in Vietnam, and that are related to the two sustainable development targets specified by the government of Vietnam from the two corresponding global development targets, SDG 6.1 and SDG 6.3.

With the goal of improving the quality of life, protecting the environment and pursuing sustainable development, Vietnam has issued and implemented many policies related to ensuring access to drinking water and wastewater treatment: (i) orienting documents of the Party such as the Resolution of the XII National Congress; Resolution 24-NQ/TW of Central Committee on Resolution 24-NQ/TW: Actively Responding to Climate Change, and Strengthening Natural Resources Management and Environmental Protection; Socio-Economic Development Strategy for 2011-2020. (ii) Plans, strategies, and programs issued by the National Assembly and the government, such as the Five-Year Socio-Economic Development Plan for the period of 2016-2020; National Strategy for Environmental Protection to 2020 with a vision to 2030, National Program for Safe Water Supply for the period of 2016-2025; National Program for Rural Clean Water and Environmental Sanitation for the period of 2012 - 2015; and National Target Program on New Rural Construction.

Since some policies cover both clean water and wastewater treatment, policies in any of these two areas will be approached in chronological order:

Orienting documents of the Party

On January 28, 2016, the XII National Congress of the Communist Party of Vietnam adopted the resolution which set important targets on the environment: by 2020, 95% of the urban population and 90% of the rural population will have access to clean and hygienic water and 85% of hazardous waste and95-100% of medical waste will be treated; and forest coverage rate will reach 42%.

Similarly precise environmental targets to 2020 are also specified in Resolution No. 24-NQ/TW by the Party's XI Central Committee on Actively Responding to Climate Change, and Strengthening Natural Resources Management and Environmental Protection such as "Stop generating and focus on treating seriously polluting establishments; Treat 70% of wastewater discharged into watersheds; Treat and eliminate 85% of hazardous wastes and 100% of medical wastes; Reuse or recycle over 65% of household waste; Strive to ensure access to clean and hygienic water for 95% of the urban population and 90% of the rural population" and the Socio-Economic Development Strategy for the period of 2011-2020: "New production and business establishments must apply clean technologies or install equipment for pollution reduction and waste treatment and over 80% of existing production facilities will meet environmental standards. Grade-4

urban centers and above, all industrial clusters, industrial parks and export processing zones will have centralized wastewater treatment systems. 95% of ordinary solid waste, 85% of hazardous waste and 100% of medical wastes will be treated according to legal standards. Improve and restore the environment of heavily polluted areas." In addition, as part of the vision for socio-economic development, the Strategy also identified the development of a clean water supply and sanitation system for urban areas, industrial parks and rural populations, addressing the issue of basic drainage and wastewater treatment in urban areas and creating equal opportunities to access development resources and enjoy basic services and social benefits.

Plans, strategies, and programs issued by the National Assembly and the government

On April 12, 2016, the 13th National Assembly adopted Resolution No. 142/2016/QH13 on the Five-Year Socio-Economic Development Plan for the period of 2016-2020 with important environmental indicators: By 2020, 95% of urban population and 90% of rural population will have access to clean water; the rate of hazardous waste treated will reach 85% by 2020; the rate of medical waste treated will reach 95-100% by 2020; and forest coverage rate will reach 42% by 2020. And the major solutions are related to providing minimum social basic services such as education, health, housing, clean water and information.

The National Environmental Protection Strategy to 2020 with a vision to 2030approved by the Prime Minister with Decision No. 1216/QD-TTg on September 5, 2012, sets out the vision, contents and a set of measures for environmental protection in which many of the issues related to clean water use and wastewater treatment were addressed. In addition, the strategy also sets targets for monitoring and evaluating the environmental protection results for the period up to 2020, including: the proportion of urban centers of grade IV or higher with centralized wastewater treatment system (2015: 30%; 2020: 70%); the rate of industrial parks and export processing zones with centralized wastewater treatment systems meeting legal requirements (2015: 75%, 2020: 95%); and the Proportion of urban population provided with clean water (2015: 95%; 2020: 100%).

On August 9, 2016, the Prime Minister signed Decision No. 1566/QD-TTg on the approval of the National Program for Safe Water Supply for the period of 2016-2025 with some specific objectives for each period as follows:

- By 2020,90-95% of the population will be supplied with clean water; the rate of water supply systems set up in urban areas and plans to provide safe water implemented will reach 45%; the rate of water supply systems set up in urban areas and plans to provide safe water implemented will reach 35%; reduce the percentage of untreated urban domestic wastewater being discharged into the environment to 80-85%; reduce diarrhea associated with drinking water by 20%; and 100% of provinces and cities will set up provincial Steering Committees for Safe Water Supply.
- By 2025, 95%-100% of the population will be provided with clean and hygienic water; 75% of urban areas will have water supply systems set up and establish plans to provide safe water; 50% of rural areas will

have water supply systems set up and establish plans to provide safe water; reduce the percentage of untreated domestic wastewater being discharged into the environment to 70%; and reduce 30% of diarrhea associated with drinking water.

Previously in 2012, the Prime Minister signed Decision No. 366/QD-TTg on the approval of the National Target Program for Rural Clean Water and Environmental Sanitation for the period of 2012-2015 which set key objectives to be achieved by the end of 2015 which envisioned that 85% of the rural population will have access to hygienic water, of which 45% will use water with QCVN 02-BYT of at least 60 liters/person/day; 100% of nursery schools and primary schools, commune health stations in rural areas will have sufficient clean water; 65% of households in rural areas will have hygienic latrines; 45% of farmer households will have hygienic facilities; and 100% of nursery schools and primary schools, commune health stations in rural areas will have hygienic latrines.

On August 16, 2016, the Prime Minister signed Decision No. 1600/QD-TTg approving the National Target Program on New Rural Construction in the period of 2016-2020. Of the 11 items of this program, two are related to VSDG 6 including: (i) Development of socio-economic infrastructure, including the completion of constructions to ensure water supply for people. By 2020, 95% of the rural population will have access to clean water, of which 60% will use clean water that meets MOH standards; and 100% of schools and commune health stations will have clean water supply and hygienic latrines. (ii) Rural environmental sanitation, pollution remediation and environmental improvement in craft villages, including: effective implementation of the National Strategy for Rural Clean Water Supply and Environmental Sanitation up to 2020, and collecting and disposal of waste and wastewater according to regulations.

Immediately after the issuance of the national target program on new rural construction for the period 2016-2020 on October 17, 2016, the Prime Minister signed Decision No. 1980/QD-TTg promulgating the national set of criteria on new rural communes in the period of 2016-2020. Among the 19 criteria defined in the Decision that are related to the environment and food safety, the two criteria related to VSDG 6 were: percentage of households using hygienic water (quota: ≥95%) and clean water according to regulations (quota ≥ 60%); solid waste and wastewater in concentrated residential areas and production and business establishments will be collected and disposed according to regulations.

After reviewing the policies related to safe drinking water access and safe wastewater treatment in Vietnam, the authors have the following comments:

- Vietnam has enacted many policies related to access to drinking water and wastewater treatment in an effort to control the discharge of untreated waste into the environment as well as creating and strengthening opportunities for and capacities of the people to access clean water.

- By reviewing the policies, the authors have found that the targets laid down in these policies are primarily directed towards 2020, with some policies targeting longer periods by 2025. There are no policies that set targets to be achieved by 2030 as laid out in SDG 6 and VSDG 6.
- Most of these policies were issued before the United Nations Summit on Sustainable Development during which the 2030 Sustainable Development Agenda was adopted, but the policies have directions and targets consistent with the objectives mentioned in SDG 6.1, SDG 6.3, VSDG 6.1 and VSDG 6.3.
- Vietnam has issued a national action plan to implement the 2030 Sustainable Development Agenda. This action plan has specified the global Sustainable Development Goals by tailoring them to Vietnam's conditions. Compared with the global SDGs, the objective of sustainable development of Vietnam to 2030 has fewer targets (115 targets compared with 169) and is accompanied by specific tasks for implementing each target. SDG 6 is globally available with eight targets (SDG 6.1-6.6 and SDG 6.4a, SDG 6.b), but VSDG 6 only has six objectives (VSDG 6.1-6.6), of which VSDG 6.2 covers the contents of global SDG 6.b.

VSDG 6.1 and VSDG 6.3 specify targets which are basically the same as the global SDG targets, but the objectives of VSDG 6.3 are more specific, defining that by 2030, 100% of toxic wastewater will be treated, and the proportion of untreated urban wastewater will be halved.

2. Current status of implementation of VSDG 6

Targets of ensuring access to safe water: Achievements related to the implementation of MDG

Over the fifteen years of having implemented the Millennium Declaration and up to now, Vietnam has made the task of fulfilling the Development Goals by 2015 as one of the country's top priorities and made strong progress despite many challenges and hardships. The Country Report on 15 years of having implemented the Millennium Development Goals (MDGs) (Prime Minister, 2015) states that Vietnam has made great strides in implementing the Millennium Development Goals and has accomplished several key objectives, including the targets on ensuring access to clean water and sanitation. The 7th MDG on environmental sustainability, water and sanitation reads as follows "integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources" and "halve the proportion of the population without sustainable access to safe drinking water and basic sanitation".

Vietnam has, to some extent, been able to make achievements in integrating basic sustainable development principles into socio-economic development programs, strategies and related policies. Especially in Vietnam's Comprehensive Poverty Reduction and Growth Strategy (CPRGS) adopted in 2002 (Minister, 2015), Vietnam had developed specific development goals (commonly called the Vietnam Development Goals, VDG) with objectives related to water and sanitation as the second objective of "providing essential infrastructure services for extremely

difficult communes and the poor in urban areas" which specified the target "by 2005, 80% of the urban population and 60% of the rural population will have access to clean water. By 2010, 85% of the rural population will have access to hygienic water". These targets have, more or less, been incorporated into the goals of most of the country's major economic development programs and policies. Based on these policies, issues related to using safe water in Vietnam have been addressed. Particularly in the rural areas, the National Target Program on New Rural Construction has helped rural households get low interest loans for investment in new construction or renovation and upgrading of clean water supply and sanitation facilities. Each household is entitled to a maximum of a VND six million (equivalent to USD 300) five-year loan for building a clean water or sanitation facility. After more than 15 years of implementation, this program has been deployed in all 63 provinces and cities with a total of nearly VND25.057 trillion loaned with nearly 2.6 million customers, through which more than nine million water and sanitation facilities have been built and put into use to benefit nearly 4.4 million households across the country (Government of Vietnam, 2015). As a result, indicators monitored by the General Statistic Office of Vietnam have shown significant achievements (Table 11-1). Accordingly, by the end of 2014, the percentage of households in Vietnam using hygienic water source was 93%, an increase from 78% in 2000.

↘ Table 11-1

Percentage of households using hygienic water source[4] inurban, rural and different regions of Vietnam forthe period of 2008-2014

Region	2000	2008	2010	2012	2014
Nationwide	78.1	92.1	90.5	91.0	93.0
Urban	92.2	97.6	97.7	98.1	98.3
Rural	73.6	89.9	87.4	87.9	90.6
The Red river delta	-	99.2	98.6	99.5	99.2
The Northern middle mountainous	-	89.3	80.2	67.0	81.3
Northern Central and Central Coast	-	93.4	91.0	93.3	93.8
Highlands	-	85.8	82.8	92.0	85.5
Southeast	-	98.2	98.1	99.8	99.0
Mekong Delta	-	80.6	81.6	85.5	89.1

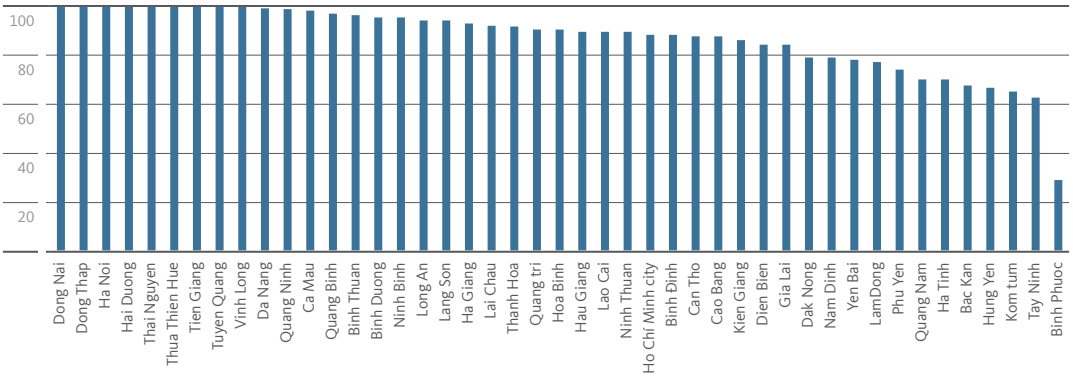
Source:Vietnam National Statistic 2014

Recent research by the Institute of Policy and Strategy on Natural Resources and Environment (ISPONRE, 2017) which assessed the ability and efforts of implementing the environmental targets of provincial governments in Vietnam, also pointed out the achievements at provincial level. Based on the ranking points calculated for environmental indicators (Figure 11-1 and 11-2), the situation of provinces were illustrated that almost all provinces are close to meeting the national targets at the level of 60 to 100 ranking points. Particularly in rural areas, there are 29-45 provinces reaching the target of providing hygienic water to 85% of population.

4. Hygienic water sources including: Tap water, water from drilling wells, pumped water and rainwater

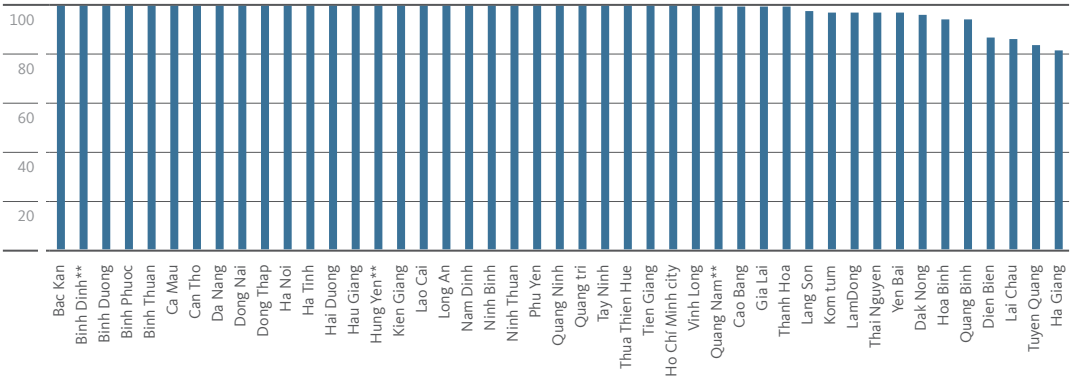
↘ Figure 11-1

Provincial ranking index on the percentage of urban population providing clean water* (follow the national target of 95%)



↘ Figure 11-2

Provincial ranking index on the percentage of rural population providing hygenic water*(follow the national target of 85%)



Source: ISPONRE, 2017

However, the substantial gap between urban, rural and between different regions is still a challenge. The proportion of rural households using hygienic water source are consistently between 10% and 30%, which is lower than the proportion of households in urban areas in the same regions. Among the regions, Northern Central and Central Highlands had the lowest percentages of people using clean water (73% and 77%, respectively) (Table 11-1). Additionally, there is a concern relating to the difference between the terms “clean water” and “hygienic water”. As can be seen in Figures 11-1 and 11-2, while “clean water” standardized by the national standard QCVN 01:2009/BYT is considered as an objective that must be provided for 65% of urban population (Prime Minister, 2009), the definition associated with “hygienic water” which was set as a target for rural areas is relatively unclear due to the lack of a specific standard regulating what constitutes “hygienic” (Government of Vietnam, 2015). In fact, in the rural areas, although the proportion using "hygienic water" as of 2013 was 82%, only 38.7% of rural population using the water source met the requirements of Vietnam standard of 02/2009/BYT (MARD, 2014). This disparity also exists between the rich and poor, while 95% of rich urban residents in Vietnam are provided with tap water in each household, only 35% of the poor enjoys this service (United Nations, 2016). Obviously, Vietnam must make more efforts to fulfill the targets of “safe water” and “sufficient and equitable access for all”. According to a report of the World Bank and the Water and Sanitation Program (Varughese, 2016), in Vietnam, the capital cost paid in 2015 to use basic water was USD 63.7 per person in urban areas and USD 42.5

per person in rural areas. To use high-quality water, the cost increases significantly to USD 267.4 and USD 158.6 per person in urban and rural areas, respectively. If Vietnam, thus, wants to raise the target from "hygienic water" to "advanced water", it will need to make a huge investment in the field. However, the ongoing privatization of services and infrastructure provision with respect to water and sanitation poses important challenges in terms of monitoring the equity and enforcement of quality standards (United Nations, 2015).

Targets related to wastewater treatment in Vietnam: A significant challenge

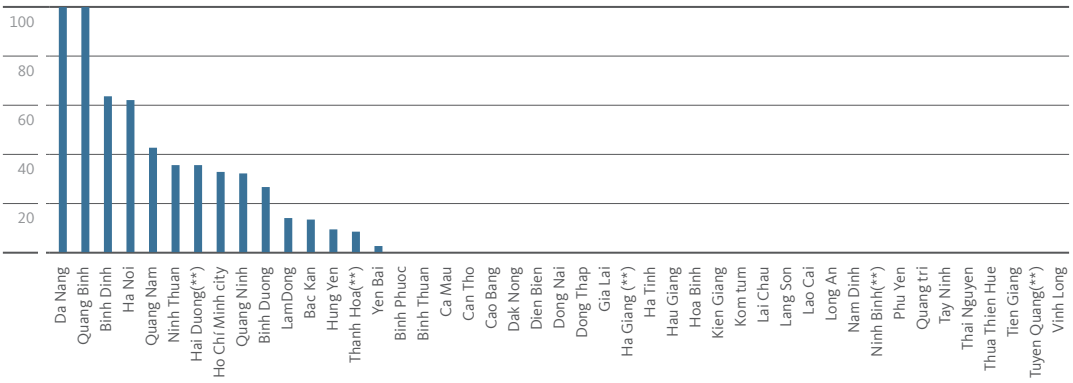
In Vietnam, concomitant with rapid economic growth and urbanization, wastewater is now generated on a large scale in most regions throughout the country (MONRE, 2017) (MONRE, 2012). In fact, domestic effluents account for more than 30% of total direct emissions to lakes and rivers. The National Report on State of the Environment in 2016: Urban Environment (MONRE, 2017) indicated that, Vietnam now has 788 cities and municipal areas but only 40 urban centers have wastewater treatment facilities which have prescribed standards with a total treatment capacity of 800,000m³/ day and night. Thus, the rate of treated sewage is estimated to be 10-11% of total urban wastewater volume, an increase of about 4-5% compared to 2010. The remaining volume is preliminarily treated through household septic tanks, then goes through sewers and discharged directly into the environment. Obviously, the infrastructure of wastewater treatment of Vietnam is still weak, backward and has not kept pace with the rapid urbanization process of Vietnam particularly in major cities. According to a report of the World Bank on waste management in Vietnam (World Bank, 2012), in order to meet the target of urban wastewater treatment, Vietnam requires over USD 8.3 billion to provide drainage services for nearly 36 million urban residents by 2025. There is no effective incentive in place to attract resources from businesses interested in investing in the field of waste management. For instance, the agencies responsible for drainage and wastewater treatment have very limited autonomy in operating, management and system development. In addition, Vietnam's wastewater collection tariff is now at a rate of 10% of clean water tariff, which means that the ability to recover the cost of construction investment, and the costs of operation and maintenance is generally low.

With regard to industrial wastewater management, Vietnam is in the process of accelerating national industrialization and modernization, and many branches, industrial clusters and craft villages have formed and expanded in scale, resulting in the increase of wastewater. According to the National Report on State of the Environment in the Period of 2011-2015 (MONRE, 2016), by the end of 2015, Vietnam had 283 industrial zones (IZ), 878 industrial clusters (IC) and more than 5,000 craft villages in operation. Of the 283 operating IZs, 212 or 74.9% had built centralized wastewater treatment systems. However, due to the level of investment and backward technology, these systems only treat about 60% of wastewater generated. Although the emission levels of industrial clusters are not inferior to those of IZs with an average of 15-20 m³ of wastewater per day per

IC, the rate of centralized wastewater treatment systems is estimated to be only 3-5%. The remaining is self-disposed or discharged directly into the environment. Additionally, the system of craft villages is assessed in a haphazard manner, creating a constant threat to the ecological environment and health of the rural population (MONRE, 2016). These situations demonstrate that the awareness of industrial businesses of their responsibility in wastewater treatment is very low. Meanwhile, the incentives offered to enforce implementation of regulations on wastewater treatment are not strong enough (MONRE, 2016) and this, therefore, led to the current status of wastewater management as outlined above. At the local level, the research of ISPONRE (ISPONRE, 2017) has considered two indicators of the percentage of urban wastewater being treated (based on the national target of 45%) and the percentage of urban wastewater being treated (based on the national target of 100%) (Figure 11-3). The study results show that only 15 of 45 municipalities have sewage treatment systems in which only two provinces meet the national target of treating 45% of municipal wastewater. Obviously, in the near future, there is a significant challenge for almost all provinces in Vietnam in meeting the national target for municipal wastewater management.

↘ Figure 11-3

Provincial ranking index on the percentage of urban wastewater being treated (follow the national target of 45%)

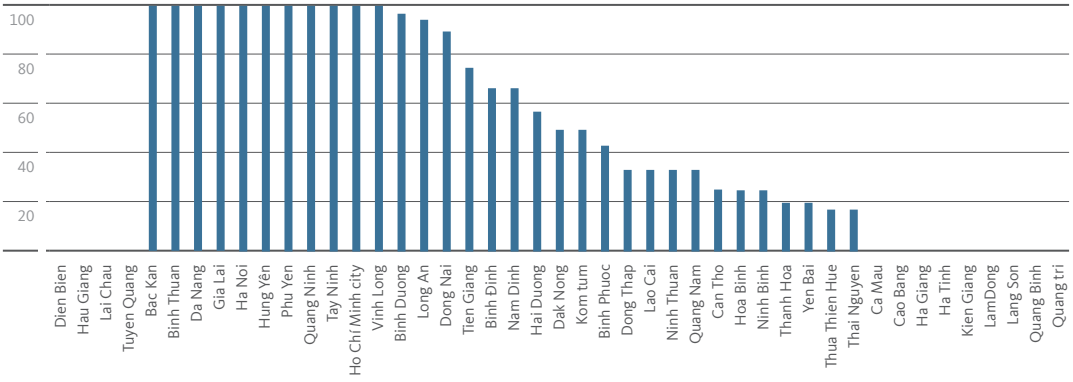


Source: ISPONRE, 2017

The indicator used in assessing industrial wastewater treatment among provinces is described in Figure 11-4. Accordingly, of the 41 provinces having industrial zones, only 11 provinces equivalent to about 27% of provinces met the national target of 100% of industrial zones having standard centralized sewage treatment systems. Nine provinces (22%) still have no standard centralized sewage treatment system for their industrial zones.

↘ Figure 11-4

Provincial Ranking index on the percentage of industrial zones having standard concentrated sewage treatment system (follow the national target of 100%)



Source: ISPONRE, 2017

3. Opportunities and challenges to achieve VSDG 6

Opportunities

The National Action Plan (NAP) to implement the 2030 Agenda in Vietnam has defined specific objectives and targets with detailed actions and institutional arrangement for achieving the 17 sustainable development goals by 2030 (VSDGs) including target 6.1 (By 2030, achieve universal and equitable access to safe and affordable drinking water for all) and target 6.3 (By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally). This can be considered as an initial advantage to start the implementation process in general and related targets in particular. In addition, it is seen that the actions has been developed properly and addressed the difficulties in the current situation of Vietnam.

The second advantage of Vietnam origins from the current policies and programs. In fact, the target of VMDG on "integrating the principles of sustainable development into country policies and programs" has been met by the performance of a number of important strategies, policies, specific programs and plans related to clean water supply and wastewater treatment. In particular, the specific targets which has been detailed for each period between 2020 and 2025 and monitoring indicators such as "Ratio of urban wastewater being treated", "Ratio of municipal wastewater being collected and treated according to standards" and "Proportion of urban types, industrial zones and craft villages having centralized wastewater treatment system" have helped the Vietnamese government improve awareness, monitor, pursue the targets and make achievements in implementing its targets including VMDGs. Learning from the lessons of existing policies and programs is crucial for Vietnam to successfully develop and implement the targets in the future. The two national target programs of "Rural Water Supply and Environmental Sanitation" and the program "New Rural Construction", for example, have effectively initially created a favorable environment and a clear legal corridor for the private sector to invest in the field of water supply and water treatment. This is also considered as one of the actions identified in the NAP (Annex 3).

From the assessment on the current situations, Vietnam can also take advantage of the achievements made in the course of implementing related targets. In the first target of ensuring water access, Vietnam has made significant achievements with the percentage of households using hygienic water sources in the country having reached 93% by the end of 2014. Undoubtedly, in comparison with SDG target 6.1 "by 2030, achieve universal and equitable access to safe and affordable drinking water for all", Vietnam is now very close to the 2030 target (from 93% to 100%). This is an opportunity for Vietnam to concentrate on the targets related to "safe water" and "universal and equitable for all". In regards to wastewater treatment, despite significant challenges, the most fundamental advantage related to this issue is that the attention of the Party and

the government of Vietnam was fully reflected by keeping in mind the lessons learnt from the reality. For instance, the 2016 Revised Vision for the development of urban drainage and industrial zones in Vietnam to 2025 with a vision to 2050 (Prime Minister, 2016) have been reduced significantly its targets on the percentage of wastewater being treated in comparison with those in the previous Vision issued in 2009 (Prime Minister, 2009).

Challenges

Despite the success and advantages mentioned above, significant challenges still need to be addressed. The first challenge is related to the NAP. Although actions and institutional arrangements are set forth in the NAP, they are very general without being detailed by programs or roadmaps to implement over time. The two targets in the NAP also do not have timetables or monitoring indicators. Another shortcoming of the NAP is a lack of actions to promote the cooperation between related management agencies at both central and local levels. While most of the SDGs are expressed as a combination of targets, this is not reflected in the arrangement between responsible agencies. For the target 6.1, for example, the NAP has assigned MOC and MARD as the responsible authorities with the former overseeing urban areas and the latter in charge of rural areas. If both have their own sectoral action plan, this may lead to overlaps due to the variation of development and urbanization and also hinder the proper use available resources. In addition, the NAP also failed to involve local governments and civil societies including women, youth and indigenous communities which play an important role in mobilizing and distributing resources particularly the resources from private sectors (Gero, 2014), (United Nations, 2016).

Challenges are in the way of each target. For the target of ensuring water access, Vietnam is having difficulties addressing the disparities in access to safe and affordable drinking water which still directly represent broader inequalities, notably between rural and urban areas, as well as between the poorer and richer segments of the society. The other challenge is a lack of investment in developing infrastructure. Based on these challenges, the NAP defined actions on developing "the priority mechanisms to support poor areas, the poor, areas with special difficulties or frequent droughts, and coastal and islands to ensure access to water services" and "Promoting socialization" to invest to the field. However, finding a way to strike the balance between "the inequality" and "private investment" is a challenge that must be addressed by the Vietnamese government (United Nations, 2016). Regarding target 6.3 related to wastewater management, there is still a big gap between the current practice and the expected target and also the large disparities among regions throughout the country and between urban and rural areas. Based on the fact that only 10-11% of urban wastewater is being treated in Vietnam, 75% of industrial zones have a centralized wastewater treatment system which meets the requirements but only 60% of wastewater is being treated, especially in rural areas where only 3-5% of wastewater discharged from the village is being treated before released into the environment, Vietnam needs to make a strong effort to induce invest in this field. The main difficulty identified in urban wastewater treatment is attraction of investment resources and an efficient management of

these resources. In comparison, in the case of industrial wastewater management, the problem arises due to irresponsible companies discharging wastewater and also a lack of strong incentives to enforce the regulations on wastewater treatment. Furthermore, the significant disparities between localities also constitute a big challenge.

Besides the difficulties arising from internal problems, challenges also come from external pressures and issues. One of the most important challenges emerges from the increasing demand for water for production and households due to growing population and changing lifestyles, as well as for the purpose of producing electricity for economic development. In addition, the pressure of water scarcity can grow in the future due to the adverse impact of climate change (United Nations, 2016) and transboundary water resource management. According to a report of UNDP (UNDP, 2015), Vietnam receives 60 percent of its water from upstream countries in the Mekong Basin, and mostly from China, making it vulnerable (both in terms of water quantity and quality) to development. This poses a serious threat, seasonally and in the long-term, for economic activities in general and in the water sector in particular.

Conclusion

As a rapidly growing Southeast Asian country, Vietnam is putting a lot of pressure on the environment with its economic, demographic and social development. Therefore, the commitment to participate in and implement the Agenda 2030 as well as the development of an effective action plan to achieve the objectives is one of the top priorities of the government of Vietnam. During the implementation of the Millennium Development Goals, Vietnam has made a number of achievements in terms of access to clean water. However, the issue of wastewater treatment and management remains is unresolved and challenging. In the Agenda 2030 Action plan of Vietnam, specific actions and responsibility arrangement have been set for relevant ministries. However, many challenges remain with regard to sector-specific action plans, the coordination among relevant agencies as well as at the local level and also from the current situation of the issues in Vietnam. Based on the situation, this document suggests a number of solutions as follows:

- To complete the NAP to implement the Agenda 2030 in Vietnam, it is important to develop specific sectoral action plans with detailed action programs, roadmaps and monitoring indicators. The NAP also needs to be supplemented with an integrated action plan which considers the integration and role between related agencies both at central and local levels.
- In terms of policy formulation, it is important to review and revise the targets in the forthcoming vision documents to make them appropriate for the period of 2015-2030 and the actual practice and ensure consistency among documents.
- It is necessary to continue to allow and take advantage of the existing programs and policies such as the Rural Water Supply and Sanitation and the New Rural Construction Program.

- Special considerations should be given to the development of a comprehensive mechanism for the mobilization of social resources for the development of water supply and wastewater treatment infrastructure in both urban and rural areas.
- To properly implement the targets, in addition to considering the internal factors, Vietnam need to consider the external factors that have a strong influence on Vietnam such as changing situation of the society, the impact of climate change and the issues of transboundary water resource management.

References

Gero, A. a. (2014). 'Incentives for enterprise engagement in Vietnam', Private and social enterprise engagement in water and sanitation for the poor – Working Paper 2b. Sydney.: Institute for Sustainable Futures, University of Technology,.

Government of Vietnam. (2015). Report of the Government: Assessment results in implementation national target programs in period of 2011-2015 and visionto develop national target program in period of 2016-2020. https://www.google.com.vn/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&uact=8&ved=0ahUKEwjcpNDHzJbVAhXMmZQKHTAHDvAQFggvMAI&url =http%3A%2F%2Fquochoi.vn%2Fcontent%2Fvankien%2FLists%2FDanhSachVanKien%2FAttachments%2F3071%2FB03.01_bc%2520507dgia%2520kqua%.

ISPONRE. (2017). Thematic report project "Investigating, assessing and piloting environmental ranking for provinces". Hanoi: ISPONRE.

MARD (2014). Report number 1377/BC-BNN-TCTL dated 28/4/2014 on Result of Implementation of national target program on rural water and sanitation in 2013. Retrieved from https://thuvienphapluat.vn/van-ban/Tai-nguyen-Moi-truong/Bao-cao-1377-BC-BNN-TCTL-2014-Chuong-trinh-quoc-gia-nuoc-sach-ve-sinh-moi-truong-nong-thon-2013-236713.aspx.

Prime Minister. (2015). Country report: 15 years achieving the Vietnam Millennium Development Goals. Available at http://www.vn.undp.org/content/vietnam/vi/home/library/mdg/country-report-mdg-2015.html

MONRE. (2012). National environmental report: Surface water environment. Retrieved from http://cem.gov.vn/Portals/0/Bao%20cao/Chuong%202.pdf.

MONRE. (2016). National report on state of the environment in the period 2011-2015. Retreived from http://cem.gov.vn/Portals/0/2016/TinBai/Phan%20dau.pdf.

MONRE. (2017). Vietnam national report on state of environment in 2016: Urban Environment (pp.3-9). Hanoi: Geography Publish.

Prime Minister. (2009). Decision No 1930/QD-TTg dated on 20/11/2009 about "Approving the visionfor the development of urban drainage and industrial zones in Vietnam to 2025 with avision to 2050. Vietnam: available at http://udc.com.vn/vi/van-ban/quyet-dinh/quyet-dinh-so-1930qd-ttg/4ozPc9RK-6kCsNXrROHoxRw.

Prime Minister. (2016). Decision of the Prime Minister number 2502/QĐ-TTg dated on 22/12/2016 about "Revised visionfor the development of urban drainage and industrial zones in Vietnam to 2025 with avision to 2050". Retrieved from http://vanban.chinhphu.vn/portal/page/portal/chinhphu.

United Nations, (2015). Common Country Assessment for Vietnam in 2015. Retrieved from http://www.un.org.vn/vi/publications/doc_details/517-bao-cao-danh-gia-chung-ca-lien-hp-quc-v-vit-nam-nam-2015.html.

United Nations, (2016). Common Country Assessment for Vietnam in 2015. Retrieved from http://www.un.org.vn/vi/publications/doc_details/517-bao-cao-danh-gia-chung-ca-lien-hp-quc-v-vit-nam-nam-2015.html.

UNDP, C. V.-C. (2015). The Vietnam Governance and Public Administration Performance Index (PAPI) 2014: Measuring Citizens' Experiences. Ha Noi: Retrieved from http://papi.org.vn/eng/wp-content/uploads/2014/12/PAPI2014_FinalReport_SmallSize_ENG.pdf.

Varughese, G. H. (2016). The cost of meeting the 2030 Sustainable Development Goal Targets on Drinking Water, Sanitation, and Hygiene. https://openknowledge.worldbank.org/bitstream/handle/10986/23681/K8543.pdf?sequence=1&isAllowed=y.

World Bank. (2012). Vietnam: Urban Wastewater Review. Retrieved from http://www.worldbank.org/en/country/vietnam/publication/vietnam-urban-wastewater-review

Annex 1 : Global and Vietnam Sustainable Development Targets 6.1 & 6.3

STT	SDGs	VSDGs
1	6.1. By 2030, achieve universal and equitable access to safe and affordable drinking water for all	6.1. By 2030, achieve universal and equitable access to safe and affordable water for all citizens
2	6.3. By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	6.3. By 2030, improve water quality by successfully controlling sources of pollution; ending the use of hazardous chemicals in industrial, agricultural and aquacultural production that pollute water sources and degrade biodiversity; treating 100% of hazardous wastewater; halving untreated urban wastewater; and increasing safe reuse of water

Annex 2: Summary of objectives set out in the policies relevant with VSDG 6.1 and VSDG 6.3

No	Policy	VSDGs		
		2020	2025	2030
1	Socio-Economic Development Strategy period 2011-2020	- Most of the urban and rural population will have access to clean water. - Urban centers of grade 4 or higher and all industrial clusters, zones and export processing zones will have centralized wastewater treatment systems.	N/A	N/A
2	National Environmental Protection Strategy to2020 with avision to 2030	- The rate of urban centers of grade IV or higher with a centralized wastewater treatment system satisfying the requirements will reach 70% - The rate of industrial zones, industrial clusters and export processing zones with centralized wastewater treatment systems will reach 95% - The rate of urban population supplied with clean water will reach 100%	N/A	No goals defined, only provides a general vision up to 2030
3	Resolution 24-NQ/TW: Actively Responding to Climate Change, and Strengthening Natural Resources Management and Environmental Protection	- 70% of the wastewater discharged into the rivers will be treated - Strive to ensure access to clean and hygienic water for 95% of the urban population and 90% of the rural population.	N/A	N/A
4	Resolution of the XII National Congress of the Communist Party of Vietnam	- 95% of urban population and 90% of rural population will have access to clean and hygienic water - 85% of hazardous waste and 95-100% of medical wastes will be treated	N/A	N/A
5	Resolution on the Five-Year Socio-Economic Development Plan 2016-2020	- 95% of urban population and 90% of rural population will have access to clean and hygienic water. - 85% of hazardous waste and 95-100% of medical wastes will be treated.	N/A	N/A

6	National Program for Safe Water Supply for the period of 2016-2025	- The percentage of population having access to clean and hygienic water will reach 90%-95%; - Minimize the percentage of urban wastewater untreated before being discharged into the environment to 80-85%.	- The percentage of population having access to clean and hygienic water will reach 95- 100%. - Reduce the percentage of domestic wastewater untreated before being discharged into the environment to 70%;	N/A
7	National Target Program on New Rural Construction	95% of the rural population will have access to hygienic water, of which 60% use clean water that meets MOH standards;	N/A	N/A
8	Vision for the development of urban drainage and industrial zones in Vietnam to 2025 with a vision to 2050(Minister, 2009)	Specific targets to be achieved by 2015 - Build daily-life sewers and wastewater treatment stations for urban centers of grade III or higher in order to collect and treat 40-50% of municipal wastewater to meet the required standards. - All industrial zones in operation will have separate sewage drainage system and wastewater will be treated to meet the regulation standards. - In urban centers of grade IV, grade V and craft villages, 30% of wastewater will be treated to meet the required standards. Specific targets to be achieved by 2020 - Cities with grade III and above will have centralized collection and treatment facilities; Increase the rate of domestic wastewater collected and treated according to regulation standards to 60%. In urban areas of graded IV and V and craft villages, 40% of wastewater will be treated according to regulation standards.	Urban centers with grade IV or above will have centralized collection and treatment facilities; The percentage of domestic wastewater collected and treated will reach 70-80%, with the treated wastewater satisfying required standards. In cities with grade V, 50% of wastewater will be treated according to the regulation standards. - Craft villages will have centralized or dispersed treatment stations which operate regularly and the quality of wastewater discharged into the environment will meet the required standards. - Reuse 20 - 30% of wastewater for irrigation, road cleaning and other needs in urban areas and industrial zones.	NA
9	Revised vision for the development of urban drainage and industrial zones in Vietnam to 2025 with a vision to 2050 (Prime Minister, 2016)	- Collect and treat 15-20% of the total wastewater volume in urban centers in accordance with standards and technical regulations before being discharged into the environment. - 100% of wastewater generated in hospitals and industrial parks will be treated in accordance with standards and technical regulations before being discharged into urban drainage systems or discharged into the environment. - 30% to 50% of wastewater of craft villages will be collected and treated in accordance with standards and technical regulations before being discharged into urban water drainage systems or into the environment.	- 50% of total wastewater in urban centers of grade II or higher and 20% of urban centers of grade V or higher will be collected and treated according to standards and technical regulations before being discharged into the environment. - 80% of wastewater in craft villages will be collected and treated according to standards and technical regulations before being discharged into urban drainage and sewerage systems or into the environment. - 20-30% of wastewater after treatment will meet standards and technical regulations and are reused in watering trees, washing urban roads and other needs.	NA

Annex 3: The actions and institutional arrangementsfor the implementation of VSDGs

Main obligation	Focal agency
Target 6.1 "By 2030, achieve universal and equitable access to safe and affordable drinking water for all"	
- Promulgating regulations on price, and economic and technical standards on water production and supply in urban and industrial areas; regulations on capability conditions for investing in, operating and managing water supply facilities in urban areas and industrial zones; Regulations on economic and technical standards for setting the standard management and operation costs of urban water supply facilities and industrial parks. - Researching and transferring technologies for water and salt water treatment. - Surveying, reviewing and listing important water supply sources for effective protection, exploitation and use. - Strengthening communication to raise awareness of the protection and rational use of clean water. - Promoting the socialization of water supply and sanitation services in urban areas and industrial parks. Improving policies and environment to encourage investment in production and supply of clean water in urban and industrial zones.	Ministry of Construction (MOC)
b.	
- Developing policies and mechanisms on Rural Water Supply to ensure all people can have sufficient and fair access to safe water and drinking water. - Promulgating regulations on unit prices and economic and technical standards on production and supply of clean water in rural areas; Regulations on capability conditions for investing, operating and managing rural water supply facilities; Regulations on economic and technical standards to set the standard costs for the management and operation of rural water supply facilities. - Researching and transferring technologies for water and salt water treatment. - Promoting the socialization of water supply and rural water supply services for proper management and development. Investing in production and supply of clean water in rural areas". - Developing priority mechanisms to support poor areas, the poor, and areas with special difficulties or frequent droughts, and coastal and islands to ensure access to water services.	Ministry of Agriculture and Rural Development (MARD)
c.	
- Promulgating pricing policies for clean water and appropriate tax policies for water resources, ensuring affordability for all.	Ministry of Finance
d.	
- Promulgating regulations on unit prices, economic and technical standards in the field of water resources.	Ministry of Natural Resources and Environment
Target 6.3 "By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally".	
a.	
- Effectively implementing Revised Vision for the development of urban drainage and industrial zones in Vietnam to 2025 with a vision to 2050. - Elaborating and promulgating regulations, technical guidelines and standards and technical regulations for water drainage and wastewater treatment. - Designating site for wastewater treatment facilities in land use planning of all levels, the planning on development of urban centers, residential centers, industrial parks and export processing zones. - Planning, building and operating centralized wastewater collection and treatment systems in urban centers of grade IV or higher. Integrating plans of urban reform, upgrading and completing wastewater and rain water drainage systems, building centralized wastewater treatment systems with plans, programs and projects to renovate and restore the lakes, ponds, canals, river sections in urban centers and residential areas. - Supplementing specialized water drainage planning and the water drainage planning in urban planning for climate change adaptation; Develop and manage urban flood maps according to climate change scenarios, forecast maps of flooded areas, landslides and flash floods in provinces and cities under central authority, and coastal and mountainous areas.	

- Developing a roadmap and regulations on setting water drainage service prices in line with socio-economic conditions, ensuring payment for the maintenance of the operation and proceeding to cover the drainage construction investment costs in accordance with the stages and completion of drainage system.	
b.	
- Actively inspect, supervise and prevent sources of environmental pollution and applying strong sanctions to reduce violations. - Applying automatic monitoring, continuous monitoring and strict monitoring of wastewater from industrial zones, industrial clusters, export processing zones and hospitals. - Socialization of investment in the implementation of programs and projects to renovate and restore lakes, ponds, canals and river sections in urban centers and residential areas, especially those under the National Target Program Work on remediation and environmental improvement. - Strengthen international cooperation on capacity building in water and sanitation related sectors and programs, including water exploitation, desalination, improved water use, wastewater treatment, recycling technology and reuse	MONRE
c.	
- Amending and raising the environmental protection charge for domestic wastewater and industrial wastewater according to the degree of environmental pollution so as to step by step offset the expenses for treatment of domestic wastewater and promote socialization. Investment in wastewater treatment.	MOF

Source: (Prime Minister, 2017)

VII

Sustainable Cities and Communities

12.
Sustainable Cities and Communities in Vietnam
– Challenges and Opportunities

13.
Mainstreaming Green Growth into Urban Development for Achieving Sustainable Urban Development in Vietnam: Two Good Practices

12

Hoang Vinh Hung[1)]

Sustainable Cities and Communities in Vietnam – Challenges and Opportunities

Vietnam's success in the Millennium Development Goals (MDGs) is well-known. Poverty levels and maternal health figures early met the standards set by the MDGs, and the country has met several other goals within 2010-2015. However, the 2030 Agenda for Sustainable Development is much more different with its 17 Sustainable Development Goals (SDGs). Aiming at transforming the world, the agenda provides visions, implementation orientations, global partnerships and actions needed to drive sustainable development throughout the next 15 years. Governments, businesses and civil society worldwide together with the United Nations are starting to mobilize efforts to achieve the SDGs by 2030. In this context, it is necessary for Vietnam to shift its transitional way toward the universal, inclusive and indivisible goals to improve the lives of people, particular urban residents as the country is in the process of rapid urbanization. Building 'sustainable cities and communities' in Vietnam toward the SDGs is a new context. This article reviews the existing situation and problem of Vietnam's urbanization. It examines the impacts of climate change on the country's urban areas as well as identifies challenges and opportunities for the cities and communities toward sustainable development.

1. Overview of urbanization, basic infrastructure and environment

As a result of economic growth in the past three decades, Vietnam has experienced a rapid urbanization. This process has also come with increase of quality of life but mostly in some big cities. The important implication is how to manage the urbanization process toward inclusive and sustainable for economic development to occur. However, there have been several obstacles preventing the achievement of this implication.

Urbanization and Population Density

Vietnam has its own urban classification system. As of December 2015, Vietnam had 787 urban areas, among these only 110 were classified as cities and towns. The country's level of urbanization is still low, compared to other developing countries, with the population living in urban areas nationwide having reached 34.3 percent or 31 million[2)]. However, this urbanization process is unprecedented in the country's history and mainly driven by rural-urban migration.

1. Urban Development Agency, Ministry of Construction
2. About 50 percent of the total population is projected to live in urban areas by 2045

Urban population is mostly concentrated in 19 big cities which account for 51 percent of the country's urban population. The most concentration of urban population is in the two biggest cities. Hanoi and Ho Chi Minh City are home to 11.4 percent and 25.7 percent of the nation's urban population respectively. In 2015, Hanoi had an official urban population of 3.608 million and Ho Chi Minh City had 6.516 million. Urban population in the next three largest cities are Hai Phong with 0.917 million and Da Nang with 0.898 million, Can Tho with 0.833 million, (GSO, 2016). It is important to note that all cities and towns in Vietnam still have large rural populations within their boundaries.

Cities have expanded rapidly, but the expansion of urban areas was not proportional to the increase of urban population. Total urban land area in 2015 was 16,424.2 km², accounting for 4.96% of the nation's natural land area. The area of urban residential land in 2010 was almost twice that in 2000, reaching 1,340 km², some 20 percent higher than the target set by the National Assembly (1.110 km²). Between 2000 and 2015, Vietnam added 6,521.44 km² of urban land (annual increase of 8.1 percent), while its urban population increased by 10.2 million (annual increase of 3.5 percent) (WB and MPI, 2016). Particularly in 2015, urban population grew by 5.1%, but the urban land area increased by 9.5% (GSO, 2016). This makes the average urban population density of Vietnam quite low - only 1,889 people/km². Even in metropolitan areas of the Hanoi Capital Region and the Ho Chi Minh City Region the average urban population densities are 2,658 people /km² and 2,343 people/km² respectively. Featuring low-density development, Vietnam's urban areas do not function like economically and physically integrated metropolitan regions. If such patterns persist, the country's cities will be overwhelmed by traffic congestion and emissions.

↘ Table 12-1

Urbanization and population density between 1995 and 2010

Year	Total area of urban land (km²)	Urban percentage of total land area	Total urban population (millions)	Urban share of the population (percent)	Urban density (urban residents per km²)
1995	8,361.17	2.53	14.9	20.8	1,790
2000	9,902.76	2.99	18.7	24.1	1,890
2005	11,535.49	3.48	22.3	27.1	1,940
2010	13,720.38	4.14	25.4	29.6	1,860
2015	16,424.20	4.96	31.0	34.3	1,889

Source: Government Statistical Office, 2016 and data of Ministry of Natural Resources and Environment.

The increase of urban population, mainly led by migrants, has put immense pressure on the existing housing stock, infrastructure, services and social welfare, especially in Hanoi and Ho Chi Minh City where most economic development was concentrated in. These cities receive the major share of public and private investments; they make a large contribution to the country's GDP; they house a large share (37.1 percent) of the urban population; and they are the economic engines of the country. Given these imbalances, the government has decided

to spread urban economic growth beyond Hanoi in the North and Ho Chi Minh City in the South, and to foster development of other cities such as Hai Phong and Ha Long in the Northeastern, Da Nang in the center and Can Tho in the South.

Vietnam's urbanization process has come together with increase of quality of life and poverty reduction. The proportion of people living in extreme poverty has fallen from 49 percent in 1990 to 4 percent in 2014 (SRVN, 2015a: 35), which is lower than the average of Indonesia (8 percent). In urban areas the share of poor households is 3 percent, three times lower than that of the rural areas. In 2015, almost all households had access to water and electricity given the coverage was less than half in 1990.

In the Country Report on Achieving the Millennium Development Goals (SRVN, 2015a: 103-104), the government noted that urbanization and rural-urban migration have both positive and negative outcomes. If urban growth is well-managed, the urban economy can benefit from productivity increases and the urban population benefits from rising income and better access to services. The concentration of businesses and talent can fuel innovation and bolster economic growth. The expanding urban middle class with its growing spending power can spur demand for goods and services. However, without foresight, an accurate vision and proper planning, urbanization can also be a bane.

Basic Infrastructure

The surging urban population puts tremendous pressure on infrastructure and services in urban areas. This happens in the context of scarcity of financial resources for urban development. Thus, quality of urbanization in general is limited, especially in providing adequate urban basic infrastructure and services for all.

Transportation and public transport

There are more than 8,500 km of roads and streets within cities and towns. Most have been paved and have side-drains and sidewalks. The construction, extension and widening of roads are a constant activity in any city and town, as local governments try to improve traffic circulation in the face of a growing population and an increasing number of private cars and motorcycles. Traffic congestion is becoming a major problem, because the total urban land for transportation is far lower than standard. Transportation land area of cities and towns nationwide was 16 percent[3] of the total built area (in 2008), while this ratio in Hanoi and Ho Chi Minh City were about 7-8 percent[4] (in 2016), below the standard of 20-25 percent. In the sub-urban and peri-urban areas, the ratio is even lower.

With the exception for major real estate projects, it is common that main streets in wards with have widths of only 3-5 m, while internal streets have widths of less than 2.5 m and pathways of 1.0-1.5 m width are common for residential access. These residential areas usually have developed organically or informally in sub-urban and peri-urban areas. The widths make accessibility of residential areas by public transport difficult, but despite limited accessibility, peri-urban areas remain popular as a location for housing, because residents use motorcycles.

3. Estimated by the Urban Development Agency (UN-HABITAT, 2012: 124)

4. Data of Ministry of Transportation (MOT, 2017).

Vietnam has the highest per capita motorcycle ownership in the world. According to statistics of Ministry of Transportation in 2016, the country had 49 million motorcycles – 492 motorcycles per 1000 residents. The increasing rate during period of 2010-2016 is 7.2 percent. In 2015, Hanoi had 5 million and Ho Chi Minh City had 6.8 million motorcycles. They are popular, because the cities are still small enough to allow people to travel easily almost anywhere by motorcycle. Motorcycles increase mobility, but also cause traffic congestion, especially at roads connecting the city center with the peri-urban areas.

Growing prosperity is enabling a growing number of urban households to shift from a motorcycle to a car. In 2015, Hanoi had 370,000 cars while Ho Chi Minh City had 560,000 cars. The number of cars dramatically increased nearly 50 percent between 2014 and 2015 in both cities. If this shift accelerates and the car becomes an important mode of transport, cities will face more traffic congestion, longer travel times and more air pollution, as urban road networks are incompatible with the demand for road space by private cars. The authorities are trying to delay this transition to allow cities to develop their transit networks. Local governments of the two cities stress the need to increase the number of of passengers using buses and restrain private vehicle use, because the development of the urban road network cannot keep pace with the rising and unrestrained private vehicle use. Even a pilot plan to ban motorcycle by 2030 in Hanoi has been discussed. The governments are also addressing traffic congestion by expanding the road network[5], building flyovers and underpasses, reorganizing road intersections, enforcing traffic laws and applying traffic signals. They are also improving the operations of the public bus system which is the main public mode of transport, but has not been popular with travelers[6] due to its limited routes, timing, inconveniences and lack of sidewalks.

To this effect, bus companies in Hanoi have been reorganized and the quality of the services has improved: the schedule and the frequency of the buses are more responsive to consumer demand and a bus rapid transit (BRT) line has recently opened. In Ho Chi Minh City, the bus system is improving, but buses are still slower than motorcycles due to the heavy traffic. The most ambitious projects by far are the mass rapid transit networks in Hanoi and Ho Chi Minh City, which are at different stages of progress. Two mass rapid transit lines in Hanoi and one in Ho Chi Minh City are slowly being constructed. Four more lines have been planned in Hanoi, while the Urban Transport Master Plan for Ho Chi Minh City proposes six metro lines (MOC, 2016).

Road safety is another major issue. Vietnam has one of the highest traffic accident rates in the world. Statistics of Ministry of Transportation showed that in 2015, there were 22,827 cases in the country, killing 8,727 people, injuring 21,069 people. Many motorcyclists ignore even the most basic traffic regulations. The government has made efforts to improve road safety through crackdowns on vehicle registration, unlicensed drivers and poorly maintained vehicles. Helmets are now required and their use has increased, because the regulation is more rigorously enforced.

5. Transportation land in Hanoi is about 19.25 km² and in Ho Chi Minh city is 76.69 km² (MOT, 2017)

6. Bus system can meet 13.5 percent total demand in Hanoi and 9.8 percent in Ho Chi Minh City (MOT, 2017)

Solid waste management

The amount of waste in urban areas increases as residents' incomes improve. In the past, solid waste management was a matter of collection, transport and disposal. It was the responsibility of the Urban Public Work Department of the City People's Committee or the provincial Department of Natural Resources and Environment. Street cleaners collected the waste which was dumped at dumpsites. The industrial, agricultural, tourism and service sectors have expanded tremendously and are generating huge volumes of waste. The waste has increased not only in quantity, but also in complexity and toxicity (MOC, 2016). Today's solid waste management requires changes in policies, regulations, procedures, workforce and resources to protect public health and the environment.

The Ministry of Construction estimates that 12.8 million tons of solid waste is generated annually in urban and rural areas and that the cities and towns produce 7.2 million tons per year (or 54 percent). The amount may reach 22 million tons in 2020. Around 85 percent of the solid waste generated in urban area is currently collected. Of the waste collected, around 10 percent is recycled and 12 percent is treated. Small amounts of organic solid waste are separated and composted, but most urban solid waste is disposed in landfills. Only 15 percent of the landfills are considered sanitary; the others are unsanitary open dumping sites. Lack of treatment causes pollution of the surrounding land and ground water due to leakages (World Bank, 2012b: 3-4).

In Hanoi, Ho Chi Minh City, Hai Phong and Da Nang about 90 percent of the household waste is collected. The safe disposal of urban solid waste is becoming a major issue. In some cases, residents living near waste dumps in Hanoi, Ho Chi Minh City[7] and Hai Phong have blocked access to the dumps out of concern about their environmental impact. Small cities and towns increasingly face problems of solid waste management. As a growing share of the population turns to non-agricultural work and consumption levels rise, traditional recycling programs which took organic waste back for use in agriculture have become overloaded with waste that poses a risk to human health.

Since 2007, sorting at source and recycling have been mandatory, but in practice they occur infrequently. Collection usually involves small, often informal enterprises or private individuals who buy or gather recyclable waste from households and businesses. The recyclable waste is sold to companies that process and sell it as raw material. Although access to the landfill sites is controlled, families living near some sites make a living from recovering recyclables directly from the landfill site. Composting is sometimes seen as a feasible option, but it requires waste separation at source and the production of a marketable product. Composting may not be financially viable, because of a lack of demand for compost priced at the cost of production.

The Ministry of Natural Resources and the Environment is responsible for environmental protection including solid waste management, whereas the Ministry of Construction is in charge of issuing norms and standards on solid waste treatment in urban and rural residential areas. The fragmented responsibilities often lead to gaps in the implementation of solid waste management programs, particularly in urban areas.

7. The climax was thousands of residents in districts of 7, 8, Binh Chanh protesting for several months in 2016, calling for measures to address the severe air pollution in their neigborhoodcaused by the dumping site in Da Phuoc (Tuoi tre Newspaper, 29 August 2016).

The main policies for solid waste management are documented in the 1999 "Strategy for the Management of Solid Waste in Vietnamese Cities and Industrial Parks" and the 2003 "National Strategy for Environmental Protection". While there is no shortage of laws and regulations, responsibilities “on the ground” are often fragmented and overlapping, and laws and regulations are rarely enforced due to a lack of capacity. Inspections at industrial and commercial sites show that many firms violate environmental regulations. The lack of capacity to monitor practices allows manufacturers to operate their waste treatment plants during inspection and to shut them down once the inspectors have left (MOC, 2016).

Wastewater disposal

Since 1998, the government has introduced policies and made investments to improve urban sanitation. This has led to significant progress in development of the wastewater sector. As reported by the Ministry of Construction, by December 2016, 37 urban wastewater treatment plants had been constructed in cities and towns, with a total capacity of 890,000 m³ per day. The processing rate is around 12-13 percent of total volume of wastewater (Vietnam News Agency, 14 February 2017). Urban drainage systems are built through different periods of time. They are not complete and synchronous and many drainage lines are degraded so the drainage capacity is low. Wastewater is almost untreated and discharged directly into the receiving source. Many urban centers are currently constructing or no wastewater treatment plants, wastewater is pre-treated through septic tanks, and then drains and discharged directly into the environment. Many other wastewater treatment systems are in the design or construction phase, but more needs to be done, as the investments have focused on the construction of treatment facilities without concomitant investments in collection. Separation of domestic, industrial and untreated medical wastewater is also still inadequate. All wastewater is combined in drains-sewers and discharged in canals and rivers leading to severe water pollution.

Decentralized and on-site sanitation systems have had mixed results. On-site systems have been constructed as part of newly built hotels, hospitals and office buildings in order to treat wastewater effectively prior to discharge into a combined sewerage-drainage network. Most industrial zones have wastewater treatment facilities, but few operate effectively and there is little enforcement of the quality standards of the effluents that factories discharge into public drains-sewers. On-site treatments at hospitals have had a high rate of failure and many district-level hospitals lack wastewater treatment facilities and discharge untreated wastewater into the environment.

Development of industrial zones has resulted in a huge increase in wastewater. Surface water pollution from wastewater from industrial parks or craft villages in rivers, lakes and canals has been exacerbated. Typically it can be found in the Cau River, Nhue - Day and Dong Nai River basins, seriously affecting the water supply for many urban areas (MONRE, 2016a).

Access to drainage

Many cities in Vietnam are very flat, low-lying and located near river or on coastal areas. As more land is built upon, runoff of rainwater increases due to a lack of open land that can absorb it. It makes drainage an important service in urban areas. Monsoon rains drop huge volumes of rainwater which must be accommodated by a combination of natural rivers and ponds and urban drainage so the water can be discharged from inhabited areas and flooding can be prevented. As urban wetlands are increasingly being filled, the volume of water that can be retained is declining, causing increases in flooding.

Most cities have a combined sewerage-drainage system, separate sewerage systems have only been built in selected locations. The drainage system was designed to collect rainwater runoff and reduce flooding. As urban population densities increased, it became necessary to dispose of wastewater generated by households. The need was largely met by the existing drainage systems which began to function as a combined system, collecting rainwater runoff and sewage in the same drain. Where solid waste is not (regularly) collected, the drains are often also used for solid waste disposal, blocking the flow of rainwater and wastewater.

Today, cities are expanding into areas that are exposed to natural hazards. Many areas which had previously been barred from development due their exposure to hazards, notably floods, are now being urbanized under pressure from population growth, industrialization and real estate

Photo by Thanh Nien

development, ignoring any land use zoning regulation. This is the case of urban areas out of the Red River's dyke in Hanoi which is home of about 50,000 residents. In Da Nang, much of the expansion to the south of the city occurs in the low-lying floodplain of Cau Do River and Cai River where developers are filling and raising land by 2.5 m on average to protect the new urban development projects from flooding. The area faces large inflows of water from upstream, but infill limits drainage and eliminates floodwater retention, causing flooding. While all cities and towns in low-lying coastal areas are vulnerable to flooding, the poorer neighborhoods and the poorer households are generally most affected, because they tend to reside in disaster-prone areas. During flooding, the population of those areas does not have access to clean water and their income is jeopardized by the loss of work. In 2008, Hanoi suffered from flooding for more than a week, due to unexpectedly high rainfall of 500 mm per day for two days while the capacity of drainage system was only 170 mm of rainfall per day. The livelihood of hundreds of thousands of people was affected and the cost of the flooding was estimated at around VND 3,000 billion (Vnexpress, 15 November 2008).

In 2009, the government issued the "Orientations for Development of Water Drainage in Vietnamese Urban Centers and Industrial Parks up to 2025 and a Vision towards 2050". It adopted the polluter-pays principle and stressed the need to shift from a system subsidized by the government to a system of cost recovery. It set goals to eliminate flooding in cities and towns, to extend drainage services to more than 80 percent of the population, to invest in a system that ensures that 60 percent of domestic wastewater is collected and treated in cities and 40 percent in towns, and to prevent the pollution of drainage systems.

Environment

Air pollution

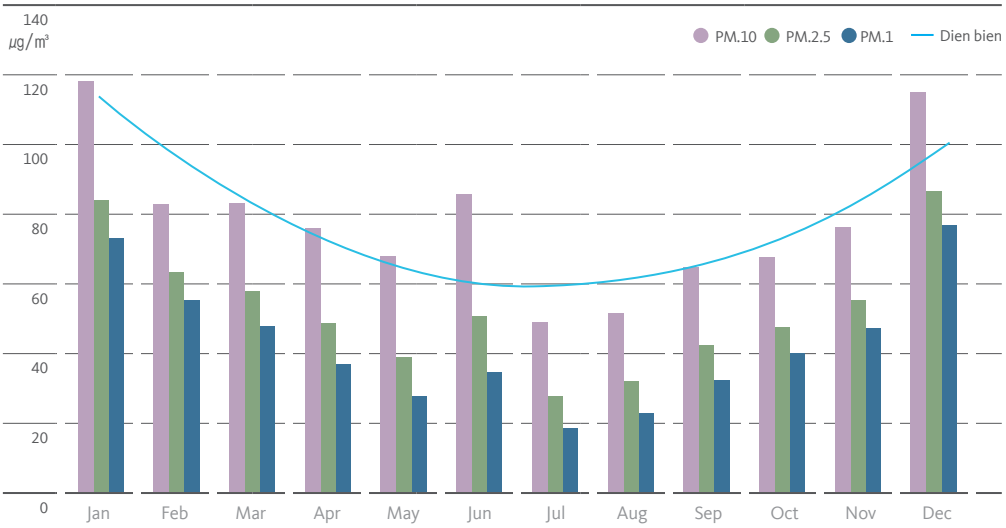
Urban air pollution and emissions also pose challenges for big and medium-sized cities, putting the city inhabitant's health at risk. In big cities, air is polluted by dust at sometimes at alarming levels: often up to three times of the official standards. The National Report on the Environment 2011-2015 shows the results of air quality assessment through air quality index (AQI). In major cities, the number of days at high level (AQI = 101-200) and hazardous level (AQI = 201-300) are quite high. In Hanoi and Ho Chi Minh City, 20 percent days in the year with AQI at high level; particular in Gia Lam (Hanoi), the number of days in 2014 at high level was more than 50 percent, and there are even days when AQI was at harmful level (AQI› 300) (MoNRE, 2016a).

An important source of dust in big cities is construction, as large numbers of houses, roads and bridges are being constructed. The digging up of soil, the demolition of old buildings and the loss of building materials during transport also cause serious dust pollution. Besides, the escalation of cars and motorbikes contribute to high level of noxious emissions. In medium cities, polluting factories may still be found in the middle of residential areas, exposing residents to noxious and toxic emissions. These situations cause pollution-related health problems as respiratory diseases have become more and more

prevalent with the highest rates in the whole country compared to other diseases. The data in 2015 showed that 3-4 percent of the country's urban inhabitants suffer from respiratory illnesses every year due to air quality. The rate of children in Hanoi with acute respiratory infections is very high, with each child suffers from the disease 5-7 times each year (Voice of Vietnam, 8 October 2016).

↘ Figure 12-1

Actual dust concentration in months of the year in Hanoi, 2011-2015



Source: MoNRE, 2016a

In 2010, Vietnam's greenhouse gas emissions accounted for about 0.5 percent of global emissions, and emissions per capita were as low as 2.84 tons of CO_2e (table 12-2; SRVN, 2015b:77). Emissions are, however, steadily increasing due to industrialization and economic growth, and total emissions are projected to more than double over the period 2000-2020. Emissions from the energy sector are expected to increase sharply due to growing energy consumption and power production. By 2010, the energy sector had replaced agriculture as the sector with the highest CO_2 emissions. Investments in low-carbon development are expected to have a major impact on the carbon intensity of the economy in the medium- to long-term.

Currently over 75 percent of the energy consumed in buildings is used for water heating and air conditioning; the remaining is for lighting and cooking. It is expected that green construction in the housing industry will have substantial environmental benefits. For this purpose, the Ministry of Construction issued its “National Technical Regulation on Energy Efficiency Buildings” in 2013. However, specific energy regulations as part of construction licensing do not exist yet and the energy efficiency of multi-storey and commercial buildings still need to be adequately addressed. In order to concretize tasks of the construction sector and achieve the goals set out in the National Growth Strategy, the Ministry of Construction has issued “Action Plan of the Construction Sector on Green Growth to 2020, Vision to 2030” in May 2017. However, in the context of limited state budget, the plan demands the Provincial Department of Construction and cities to take initiative in seeking other financial sources to perform a larger part of the assigned tasks.

↘ Table 12-2

Vietnam's total and per capita greenhouse gas emissions 1994-2030 (CO_2e)

	1994	2000	2005	2010	2020 (est.)	2030 (est.)
Total emissions (x1,000 tons)	103.84	150.90	175.47	246.83	300.40	515.80
Emissions per capita (tons)	1.47	1.94	2.20	2.84	3.12	5.00

Source: SRVN, 2015a: 77.

Open green space

The rapid urbanization has posed challenges for city authorities to ensure quality of life for the city inhabitant. Open green space - the physical environment and social space for people to relax and interact - has not really been developed. According to the 2016 data of Ministry of Construction, the open green space per capita for Vietnamese urban dweller ranges from 2 to 3 m², while the United Nations standard is 10 m² and the per capita of cities in developed countries ranges from 20 to 25 m². Hanoi and Ho Chi Minh City are two cities in the country having largest open green space. The planning, development and management of open green space in these two cities clearly reflects the situation of physical environment of Vietnamese cities.

Colonial-era urban planning left a good deal of open green space for central Hanoi and Ho Chi Minh City. In the period 1975- 2010, although open green space in both cities have been seriously lacking, development of open green space has not yet been seen as a priority. Increase of urban population and lack of government financial resources are reasons preventing the development of green space both in quantity and quality. Over the years, the two cities have concentrated their investment capital for technical infrastructure and housing, but development open green space system. Quantity of open could not meeting demand of the inhabitants. In Hanoi, the open green space per capita is 2.08 m² (Hien et al, 2015), in Ho Chi Minh City is only 1.0 m², which are too low compared to the target set in the 2008 Vietnam Building Code (7 m²).

The Government's Decree No.64/2010/ND-CP has opened mechanisms for attracting private investment in building and maintaining open green space. Only from mobilizing more social resources some new large parks have been built: in Hanoi are Hoa Binh Park - 20ha and Yen So Lake Park- 320ha; in Ho Chi Minh City are Gia Dinh Park - 21ha and September 23 Park -- 9ha. However, some of the park's spaces are utilized to build underground parking lots or other facilities. This reduces green area in the parks and area for large trees with good shading.

In urban development plans (e.g. master plan and zoning plan), the area devoted to parks and public gardens are planned. However, it is not often the case in reality. To attract private investors to new housing development projects, the city authorities even allowed conversion – sometimes up to 20 percent – of land for parks and public gardens into land for apartment and commercial buildings. On the ground, the compliance with the urban development plans has not been seriously implemented by investors. Some investors

modify the plans converting green area into housing. In addition, the land use planning for small parks and public gardens in residential areas often coupled with land for the construction of sports facilities (e.g. mini football fields, tennis courts, etc.) leads to the fact that investors trade on to build sport facilities for trading instead of park.

Difficulties not only happen to the process of planning and investing but also in maintaining open green space. Depend on its size, the operation and maintenance of open green space are carried out by Department of Construction or district authority using city budget. Due to constraints of financial resources, the annual budget for renovation and maintenance often decrease leading to the degradation in several parks, zoos and squares. Thus, the open green space is basically not being considered as amenity of urban life both from citizen and city government view point for long time.

In the context of severely lack of open green space, the recent decision of City People Committee to open 'weekend pedestrian zone' in two cities has made the urban residents very excited. In Hanoi, the statistic after 1 year opening the pedestrian zone around Hoan Kiem lake - an area of 10ha - shows an average of 20,000 - 25,000 visiting people per day. In Ho Chi Minh City, two pedestrian zones in Nguyen Hue street and Bui Vien street also receive about 8,000-10,000 people per day. These successes inspire other cities to do the same. In addition, a program of planting 1 million trees using private financial resources was launched in 2016 by the Chairman of Hanoi People's Committee. An additional 210,000 trees have been planted within a year, many of which are added to old parks (Kinh Te & Do Thi Newspaper, 15 March 2017). However, much of effort needs to be done to increase the quantity and quality of open green space in Hanoi, Ho Chi Minh City and other cities across the country so that the amenities of urban life should be better.

2. Housing

Urban housing demand in Vietnam is always high as most people prefer to own a home rather than rent. The country's urban population is projected to increase from 8.3 million households in 2015 to 10.1 million households in 2020. A projected urban population growth rate of 3.03 percent per annum and a decline in the urban household size of 1.1 percent per annum will drive this increase. To accommodate the additional households, an annual average of 374,000 housing units would have to be built during the next five years. In addition, an estimated 4.8 million housing units need to be serviced, upgraded or rebuilt to address the qualitative housing deficit that is attributed to lack of access to basic infrastructure, aging stock, overcrowding and use of substandard materials (World Bank, 2015: 14-15).

There are now thousands of state and private real estate development companies who play an increasing role in the supply of housing. Most of them are small. Foreign companies invest in large urban housing projects. A large number of individuals acquires land and develops housing for rent or sale, but is not registered as developer or contractor. Developers mostly cater to the demand of higher-income households. Only a small group of wealthy persons can afford private-sector apartments, and housing

inequality is growing. Due to the still underdeveloped housing finance system, developers normally ask a high down payment and this puts their units further beyond the reach of low-income households.

In 2006, the state resumed its role as a supplier of housing. The 2006 Housing Law introduced public social housing, i.e. housing for those within the government work force, workers in economic zones and industrial areas, students and low-income persons with an urban household registration. Government incentives for social housing development include land use fee exemptions, 0 percent value added tax, a four-year income tax exemption and a reduction of income tax to 50 percent in the following five years. A low-level business tax of 10 percent is charged during the entire period of project. There are favorable loan conditions, a free provision of unit design and support in the use of modern construction technology. The removal of restriction of six floors as the maximum height of social housing allows developers to build taller buildings and apply a construction ratio and land use index 1.5 times higher than that of commercial projects. Concretizing the Housing Law, the Decree No.188/2013/NĐ-CP require all developers to set aside at least 20 percent of urban housing project's land area for building social housing.

However, as of 2015, only a few private developers are willing to join the social housing program, because it is difficult to supply housing at VND 11-15 million per m² if commercial housing costs VND 23-30 million per m². In Hanoi, only Muong Thanh company, which thoroughly utilizes all loopholes of the related laws and even violates the requirements of Building Coverage Ratio and Maximum Building Height, can provide apartment houses at VND 12-20 million per m². There is also confusion about the responsibility for allocating social housing units. If developers allocate the units, there is a concern that there will be speculation and unfair treatment. If local government is in charge, there is concern about too much red tape (Vietnam News Agency 15 April 2016).

The "National Housing Development Strategy up to 2020 with a Vision towards 2030", adopted in 2011, states that housing development is a joint task of the state, society and the people. The government will introduce policies to promote the real estate sector through market mechanisms, while helping poor people own a home. The strategy sets the construction of 100 million m² of floor area annually as a target until 2020. The average floor area per capita in urban areas will increase from 19.2 m² in 2010 to 29 m² by 2020. Apartments will form a large share of the new housing, particularly in large cities, while rental houses will also be developed.

In order to achieve its targets, the government has created favorable conditions for the real estate sector to supply houses for sale, lease and lease-purchase through the market to serve better-off customers. Concurrently, the government has adopted policies to support those who face housing problems but cannot afford to buy a home. It has reviewed laws on planning, land and finance to remove regulatory obstacles for housing development. A fund of Vietnam Dong 30,000 billion have been established with proceeds from the sale and lease

of state-owned housing, the collection of land use fees from housing projects, allocations from local budgets and other sources to create a publicly owned housing network to maintain the state's role in the housing market and provide soft loans to investors of social housing projects and social house buyers and lessees.

The legal system and policies to support the development of social housing have been constructed and adjusted in line with the Strategy, ensuring the social security, serving the needs of cities' socio-economic development and relatively suitable for each targeted group. Nevertheless, it is not often the case in reality as many urban households, even if they qualify for a housing loan, they cannot afford a small formal housing unit. Some middle- and low-income households rely on private-sector rental housing, but this is a still neglected and largely unregulated sector with poor-quality housing. Tenants who are predominantly immigrants tend to be poor and do not enjoy tenure security or rent protection. Low- and middle-income households which aim for homeownership therefore resort to informal self-built housing in the peri-urban areas.

As a result, informal housing has proliferated in and around the cities, catering mainly to the local urban poor and rural-urban migrants. Around 75 percent of all urban housing is thought to be built by the owner, often informally, i.e. disregarding planning and building regulations and without adequate supporting infrastructure (MOC, 2016).

↘ Table 12-3

Proportion of urban population living in informal housing

Year	Percentage	Population	Year	Percentage	Population
1990	60.5	8,118,137	2005	41.3	9,491,068
1995	54.6	8,852,034	2007	38,3	9,396,278
2000	48.8	9,395,125	2009	35.2	9,223,950

Source: UN, 2015.

Informal housing production is the dominant mode of housing supply in many urban areas, but little is known about the processes and the actors involved. Of what is known, three features stand out: (a) land for such housing is acquired on the informal land market and becomes available through the progressive conversion of farmland into small building plots in the urban fringe; (b) informal housing is usually self-built by the owner-occupant or is built by a private developer for sale or rent; and (c) the authorities eventually provide basic services in the informally developed area.

In the peri-urban areas, industrial zones generate large-scale employment, but most enterprises do not provide housing for their workers. As of the end of 2016, only the smartphone manufacturing complexes of Samsung – the biggest FID enterprise - were providing suitable accommodation for 13 percent of its 160,000 workers. Because of their low income, many of the workers rent cheap housing in informal settlements near the factory. Workers of enterprises which provide accommodation are better housed, but their living conditions are still far from comfortable. The accommodation usually consists of lines of single-storey buildings, divided into separate rooms for 4-8 people each, with shared bathroom and toilet.

Over the past decades, the private sector has become the major housing supplier, but it is mainly targeting high- and upper-middle-income households that can afford to buy housing with (or even without) formal housing finance. The next step for the real estate sector is to move down-market and target middle- and lower-middle-income households. This will remove the need for those households to acquire informally developed housing and will also reduce pressure on public-sector social housing. To do so, the real estate sector must reduce production costs through greater efficiency, while the government in its role as facilitator reviews its regulations and procedures, and amends or replaces those which unnecessarily raise the costs of house production and acquisition. The 2014 Housing Law has already taken steps in this respect by revising regulations regarding the minimum floor area.

In addition, an adequate supply of land with basic infrastructure (roads, drains, power supply) in peri-urban areas and an efficiently operating housing finance sector will be critical for the development of affordable housing. As the housing finance sector is a subsector of the financial sector, the development of the housing finance sector requires the maturation of the financial sector as a whole. Improved access to housing finance for middle-income households may also require a review, the amendment and/or replacement of existing regulations. While such measures will enable some households to buy a complete house, other households will continue to rely on informal or rental housing.

While waiting for micro-finance organizations which can provide small housing loan for households, a number of big private developers like VinGroup, SunGroup, FLC, NovaLand, Saigon Thuong tin Real Estate can coorporate with banks to build apartments and sell it on hire-purchase/instalment. That could help many middle-income households own an appropriate home. Policies that promote private rental housing will help low-income households rent suitable home. In addition, the current urban upgrading projects – conducted by the Ministry of Construction in some small cities - provide opportunities to find effective approaches to improve informal housing and to emulate informal housing in a planned manner to prevent the proliferation of new informal housing in unplanned peri-urban settlements.

3. Climate change

Vietnam is one of the most disaster-prone countries in the world. About 70 percent of the country population is vulnerable to typhoons, tropical storms, flooding and landslides. There are low to moderate risks of droughts, earthquakes, tsunamis, forest fires, cold and heat waves and animal disease epidemics. The climate change projections indicate that Vietnam will be especially hard hit by sea level rise and more intense and frequent extreme weather. Industrial and urban developments are mostly located on the coastal areas and plains that are susceptible to typhoons, tropical storms, sea surges, salt intrusion and to sea level rise.

Impacts of climate change

The annual average temperature in Vietnam already increased by 0.62℃ during the period of 1958-2014 and by 0.42℃ in the period of 1985-2014. The average temperature rise per decade is about 0.10℃, lower than the global average (0.12℃ per decade, IPCC 2013). Temperatures increased fastest in winter and lowest in spring and temperatures in the Central Highland and the North increased faster than in the South (MoNRE, 2016b: 30).

During the period of 1958-2014, the average annual rainfall in the country tended to increase slightly. Rainfall increased the most in the winter and in spring and decreased in the autumn. In general, the annual rainfall in the North showed a downward tendency (from 5.8% to 12.5% / 57 years) and tended to increase in the Southern areas (from 6.9% to 19.8% / 57 years). South Central saw the largest increase (19.8% / 57 years) and the Northern Delta region recorded the largest decrease (12.5% / 57 years). (MoNRE, 2016b: 31).

According to the monitoring data gathered between 1961-2014, the highest and lowest daily temperatures have increased markedly, with the highest increase of up to 1℃ / 10 years. Hot days (days with temperature ≥35℃) tend to increase in most areas of the country. The records of average and very high temperatures are witnessed year after year. A typical example is in NgheAn, where the highest temperature observed during the 1980s was 42℃, which rose to 42.2℃ in 2010 and 42.7℃ in 2015.

The frequency of droughts, especially severe droughts, has increased across the country. New records have continuously been set in recent years. From 2000 up to 2016, the country was hit by harsh drought almost every year. In 2010, the level of water shortage in rivers and streams on average ranged from 60% to 90%, the water level in many places was very low, corresponding to the 40 to 100 years frequency. In 2015, the rainy season ended early, leading to a huge shortfall in rainfall compared to average, especially in the South, South Central and Central Highlands.

The number of severe cold days in the North tended to decrease, especially in the last two decades, but there are long record cold waves with relatively low temperature. In 2008, the North experienced a long cold which lasted for 38 days (from January 13 to February 20). During the winter of 2015-2016 in the North, the temperature reached its lowest in 40 years (from -5 to -4℃). Snow and ice appeared in many places, especially in some places such as Ba Vi (Hanoi) and Ky Son (Nghe An) which had the first snowfall in history.

Observed data show that unseasonal rain and heavy rain occurred more often. Heavy rain is becoming more abnormal in terms of time, location, frequency and intensity. For example, heavy rainfall in 2008 in Hanoi which lasted for 30 hours (30/10/2008 to 1/11/2008) was recorded at 408mm. Heavy rains in October 2010 which hit areas from Nghe An to Quang Binh with a total rainfall of 10 days ranged from 700 to 1,600 mm, accounting for over 50% of total annual rainfall. Heavy rains in QuangNinh in late July and early August 2015 set the record of precipitation intensity in a narrow area; particularly, in the rainy season from July 23 to August 4, the total rainfall measured ranged from 1,000 to1,300 mm, in Cua Ong the rainfall was measured at nearly 1,600 mm. Heavy rain not only occurs during the rainy season, but even in the dry season, the unseasonal rain between March 24-27, 2015 that fell on regions from ThuaThien-Hue to Quang Ngai had a prevailing rainfall of 200-500mm.

According to data gathered between 1959-2015, tropical cyclones and typhoons that affected and landed on Vietnam fluctuated fairly clearly in the number of storms; There are 18 to 19 tropical storms and tropical cyclones (19 in 1964, 18 in 1989, 18 in 1995); But there were only four to six attacks (four in 1969, six in 1963, 1976, 2014, 2015). In recent years, strong storms (the strongest wind speed of 118 km/h – equivalent to the level 12 of the Beaufort scale and above) tend to have increased slightly. The activity and impact of tropical storms and typhoons in recent years have been abnormal. The typhoon season ends late and the path of the typhoon tends to move to South with more storms landing on the South than in recent years (MoNRE, 2016b: 31).

Summary of trends in sea level change in Vietnam

1. According to water level data observed at sea stations:
   - Water levels at most stations are on an upward trend.
   - PhuQuy Station saw the biggest increase (by 5.6mm / year).
   - Hon Ngu and Co To stations tended to decrease (by 5.77 and 1.45mm / year).
   - Con Co and QuyNhon stations showed no clear trend.
   - Average water level at all stations increased by about 2.45mm / year.
   - For the period of 1993-2014, the water level at the stations rose by about 3.34mm / year.
2. According to satellite data for the period of 1993-2014:
   - The average water level in the East Sea tended to increase (4.05 ± 0.6mm / year).
   - The average water level in Vietnam's coastal area has increased (3.50 ± 0.7mm / year).
   - The water level in the South Central Coast increased the most (5.6mm).
   - The water level in the Gulf of Tonkin Gulf rose the least (2.5mm / year).

Climate change threatens the socio-economic development of Vietnam as well as the health, livelihoods, and property of its inhabitants. The great majority of the country's urban development lies in coastal areas and flood plains susceptible to typhoons, tropical storms, storm surges, salt intrusion, and sea level rise. Improper local planning and governance, structural poverty, substandard infrastructure, high population densities and concentrations of economic assets intensify these risks. If such issues remain

unaddressed, climate change impacts will multiply current threats, increasing risk to intolerable levels for urban communities in Da Nang, Can Tho, Ho Chi Minh City, Hai Phong, Hanoi and elsewhere (Hung, 2011).

A sealevel rise of 1 m by 2100 would permanently inundate 14,500 km² of land in Vietnam (4.4 percent of the land area). Some 39 provinces would be affected; all but one of the top ten most affected provinces are located in the Mekong Delta region. The top five most affected provinces would have 40-50 percent of their land area flooded; 43 percent of Ho Chi Minh City province would be flooded. A 1 m sealevel rise would directly affect almost 6 million people or 7.3 percent of the population. In six of the Mekong Delta's 12 provinces over 30 percent of the population would be affected. Ho Chi Minh City would have more than 660,000 people (12 percent of the population) affected by inundation, but the number would likely be much higher. The city's current population growth is witnessed in areas that are highly threatened by sealevel rise inundation (Jeremy, 2008: 2).

Droughts and heavy rainfall could cause significant reductions in crop yields and lower productivity of agriculture, possibly leading to malnutrition, micronutrient deficiencies and, in extreme cases, starvation. An increase in the number of very hot days in urban areas, along with forest fires and dust storms will adversely impact air quality and aggravate the occurrence and intensity of respiratory diseases and health complications. Changes in rainfall patterns and temperature will increase the occurrence of vector-borne diseases (malaria and dengue), and possibly extend the geographical habitat of the vectors of such diseases.

Climate change will negatively affect the agriculture, industry and energy sectors at times of reduced water availability, and will force these sectors to compete for limited water supply. Altered rainfall patterns will lead to reduced and less reliable river flows during the dry season. Pressure on the water supply will also come as the result of an increase in evaporation from paddy fields. Agricultural productivity will increasingly be affected due to constraints on water access for irrigation during the dry season and reduced sediment deposition on agricultural lands from irrigation and flood waters.

Linked to sealevel rise is saline intrusion or increased salinity which is most serious at the end of the dry season during the months of April to July. Due to low water levels in the rivers, high tide could push seawater inland, permeating farmland and reducing yields. Saline intrusion can cause changes in the aquatic eco-systems, damage infrastructure through corrosion and affect groundwater and urban water supply. In Hoi An, it has already affected water supply, as water is primarily extracted from shallow depths. During the dry season, water supply cannot operate 24 hours per day, with interruptions of up to 12 hours. Saline intrusion affects shallow underground water resources which people use when piped water supply is cut. Hoi An residents have already reported a loss of rice yields of up to 50 percent due to salinity (UN-HABITAT, 2014: 16, 18).

↘ Table 12-4

Current and future population and assets exposed to coastal flooding

	Ho Chi Minh City	Hai Phong
Exposed population		
Current	1,931,000	794,000
Future (2070s)	9,216,000	4,711,000
Exposed assets ($ billions)		
Current	26.86	11.04
Future (2070s)	652.82	333.70

Source: Nicholls et al, 2008: 57.

The rapid urbanization of low-lying areas in Ho Chi Minh City will increase the economic assets at risk from extreme weather events (Table 12-4). This is of national concern as the city accounts for 23 percent of total national GDP. Increasingly, urban expansion and infrastructure development will be affected by the inundation of low-lying areas as hard surfaces proliferate and reduce rainwater infiltration into the ground. Management of rainwater runoff during high-intensity inundations will become a pressing issue. The urban poor will be particularly vulnerable to extreme events, as they tend to live in areas along the canals and riverbanks and in swampy coastal lands which are mostly at risk.

Seaports are among the urban infrastructure most exposed and vulnerable to climate change. Vietnam has 116 seaports along its 3,200 km coastline. Using MoNRE's climate change scenario of a sealevel rise of 75 cm by 2100, an assessment of the susceptibility of 96 seaports to flooding and storm surges showed that 36 seaports face problems of flooding and storm damages without taking account of the impacts of climate change. Another 26 seaports will begin to experience flooding by 2050, and 19 more will experience flooding during the period of 2050–2100 (ADPC, 2014: 143).

Vietnam has been experiencing a rapid urbanization process. Most of the economic growth (about 70 percent) has taken place in the industrial, construction and service sectors, which are concentrated in large urban centers, particularly in Hanoi, Ho Chi Minh City, Da Nang, Hai Phong and Can Tho. As a result of economic growth, the number of rural to urban migration has increased accelerating urbanization, putting stress on urban services, infrastructure and particularly on housing. While urban population has been steadily increasing, it is projected that extreme climate events will affect urban areas particularly coastal cities. The series of severe floods, typhoons, sea surges and salt intrusion which consecutively damaged Hanoi, Ho Chi Minh City, Da Nang, Can Tho from 2007 to 2016 have made the projection more convincing

Disaster risk management

Between 1980 and 2010, Vietnam had an annual average of 4.46 disasters caused by floods and storms, while the occurrence of drought was just 0.16 and fires 0.03 (IFRC, 2014: 13). It is likely that cities will increasingly be affected by natural disasters and their impact will not only be felt in the city itself, but by the country as a whole, as cities are engines of economic growth and poverty reduction. Disaster may even have impacts globally due to the globalized supply chain and economy.

The number and severity of natural disasters are increasing. Natural disasters cause on average 392 deaths and economic losses of over 1 percent of GDP annually. In 2015 alone, severe hot weather with the highest temperatures recorded in 60 years hit the North and the South, scorching 190,000 hectares of farming land and killing 44,000 cattle and poultry (VGP News, 21 December 2015). Storms, floods and other extreme weather events cause serious damages to houses and infrastructure and can reduce food production in the affected areas, particularly among poor and near-poor households.

The 2013 Law on Natural Disaster Prevention and Control has brought the areas of disaster risk reduction under a single umbrella law. Despite some gaps, this legal framework has been vital in achieving substantial improvements in the area of disaster risk reduction. The Central Committee for Flood and Storm Control plays a prominent role in the coordination and mobilization of resources when floods or storms are forecasted. With established and active committees at national, provincial, district and commune levels, the system provides the institutional framework through which early warning communications are channeled to communities.

Addressing climate change

Vietnam is committed to responding to climate change and it has shown this by issuing a range of national policies and concrete mitigation and adaptation measures during the past decade, funded primarily from national resources. It signed the United Nations Framework Convention on Climate Change in 1992 and ratified it in 1994. It signed the Kyoto Protocol in 1998 and ratified it in 2002. It established a Steering Committee to implement the Convention and Protocol. It presented its Initial National Communication (2003) and the Second Communication (2010) to UNFCCC. In 2014, Vietnam issued the initial Biennial Update Report with the latest climate change response efforts and greenhouse gas inventories. Vietnam was also among the countries that adopted the Paris Agreement on climate change in 2015.

Vietnam's “Intended Nationally Determined Contributions” lay out its efforts to contribute to global climate change mitigation and meet the ultimate goal of maintaining the global average atmospheric temperature rise below 2o C by the end of the 21st century. Vietnam is proactively implementing climate change response activities with a view to transition towards a low-carbon and green economy. It will intensify the implementation of its mitigation options in key economic sectors (energy, industry, transport, agriculture and waste) and increase carbon sinks. Adaptation measures have been introduced, but only 30 percent of the

required investment has been met so far. Expenses to remedy damage caused by climate change are expected to rise significantly and the cost of adaptation could exceed 3-5 percent of GDP in 2030.

Vietnam has the capacity to respond to the impacts of climate change due to its strong agricultural sector and its long tradition of dealing with natural disasters. The government has adopted three policies directly related to climate change: The National Target Program for Climate Change Response (2008), the National Strategy for Climate Change Response (2011) and the National Project of Developing Vietnam's Cities to Respond to Climate Change in the Period of 2013-2020 (2013).

The National Strategy calls for the establishment of a system to monitor and forecast climate change trends and its impacts in line with international standards, to be in place by 2020. The objectives of the National Target Program are to assess climate change impacts on all domains, sectors and localities, and to formulate feasible short-term and long-term action plans in response to climate change. It delegates responsibility for the climate change response action plans to provinces, cities and districts to ensure that they meet local conditions and needs.

The Program recognizes that many local governments lack the capacity to formulate and implement local adaptation action plans and sets priorities accordingly. It lists several difficulties: limited awareness of the scope of climate change and measures to be taken; poor coordination between agencies when drafting and implementing plans; inadequate knowledge on climate change trends and their socio-economic impacts; insufficient apprehension of the need to integrate climate change issues in development policies and plans; and a lack of data on climate change and of tools and methods to analyze the data in order to formulate plans and policies. Consequently, the program stresses the importance of research, data collection, training and knowledge building.

The National Project aims to actively respond to climate change, rationally use natural resources for urban renewal and upgrading; to review, supplement and perfect the system of legal documents, planning and management of urban development investment in the context of increasing risks of climate change; and to raise awareness and strengthen the coordination among ministries, branches and localities in the management of urban development to response to climate change.

4. Main challenges and opportunities

Although the urbanization process in Vietnam has come with increase of quality of life in some areas, it has been encountering a number of barriers. Lying behind the barriers are main challenges that need to be identified. In order to shift the urbanization process toward building sustainable cities and communities, finding measures to overcome the challenges and change it to opportunities are crucial.

Effectiveness of urban planning system and explicit urban policy

Vietnam's urban planning system was originally designed for a centrally based economic framework. From the late 1990s, with the economy's transitions from a centrally-planned to a market-based one, private companies and foreign sources (ODA and FDI) have played an increasingly important role in the economy, and the government has adjusted its urban planning system to reflect the new reality through the issuance of laws and regulations related to urban planning and development.

The responsibilities for planning are divided between ministries and between the levels of government. Four types of plans are prepared for provinces and cities, each under the responsibility of a different ministry: the Ministry of Planning and Investment is responsible for the socio-economic development plan; the Ministry of Construction for the spatial plan; the Ministry of Natural Resources and Environment for land use plans in urban and rural areas; while line ministries are responsible for development plans in the infrastructure sectors such as water supply, and in economic sectors such as industrial development. The primary responsibility for urban planning and development is in the Ministry of Construction, represented at the provincial level a Department of Construction. The provincial department reports to the ministry at the national level and to the people's committee at the provincial level. While the system is constantly evolving to meet the emerging needs and demands, the reconciliation and integration of these plans is hampered by inadequate procedures of decision-making.

Urban planning is governed by the 2009 Urban Planning Law and the 2014 Law on Construction and the urban plans are supposed to give physical form to the objectives of the socio-economic and sectoral plans, but the sequencing of planning with spatial plans following socioeconomic and sector plans does not always occur and integration is limited. The two laws stipulate a series of urban spatial plans (Regional Plans, General Urban Master Plans, Zoning Plans and Detailed Urban Plans), ranging from general to specific, with each lower level having to comply with the orientations of the level immediately above it.

Master plans cover the entire area of a municipality and are often very detailed and prescriptive. They reflect the political ideals and mandated production targets. The ambitious designs and the use of rigid standards result in unrealistic and unaffordable ideals that cannot be implemented. Plans are often prepared before funding for implementation is secured. This constrains implementation which may proceed in a manner inconsistent with the plan.

Today's urban economy is driven by the market with its multitude of actors. Investments by the private sector follow demand and market

participants expect the state to respond to market demand. They do not respond to demand and market signals, as they are prepared with limited public participation. As a result, they take only limited account of the socio-economic needs. While socio-economic realities are changing rapidly, the plans are rather rigid and tend to be outdated quickly, as they are overtaken by new developments. Due to the disconnection between an idealized plan and the realities on the ground, master plans have limited impacts.

Many projects by the private and public sectors, particularly in peri-urban areas, ignore regulations, but action is rarely taken against the violations, as enforcement is weak and the pressure of development is immense. Residents who follow legal procedures for a permit or license must wait until the planners have completed their land use plans. Some residents, rather than wait, take shortcuts by asking officials to turn a blind eye or by ignoring regulations all together. By the time a master plan or a socio-economic plan has been completed, approved and translated into detailed plans, private initiatives have changed the situation on the ground and the plan has become outdated.

Given the limited impact of urban plans, urbanization often occurs in a spontaneous and informal manner. In many instances, rapid unplanned growth results in inadequate housing and infrastructure and serious environmental degradation. This informal urbanization creates problems for the government. It loses income as it cannot lease the land at a proper rate to people who want to buy or develop housing or to start a business. It is confronted with developments that do not conform to the plans and may be contrary to the accepted norms of human habitation, environmental concerns, etc. Installing infrastructure becomes expensive after unplanned development, as land has to be acquired and households have to be resettled, while space for infrastructure is limited.

As Vietnam urbanizes and its economy develops and integrates into the global economy and with cities functioning as the engines of national economic growth, urban plans must respond to the demands of urban residents for a livable city, the demands of the business sector for an efficiently performing city, the demands of civil society for conservation of the city's characteristics, its public spaces and cultural heritage, and the needs of future generations for an environmentally sustainable city. These demands strain the existing planning regime and require urban planners to establish dialogues with the stakeholders to hear their needs and demands, and reconcile these in the plans which must also preserve the socialist orientation of development.

Urban planning in a market economy with a socialist orientation requires an adaptation of the planning institutions, rules and procedures as well as different attitudes and skills to enable planners and policy-makers to identify and reconcile the needs of the stakeholders and prioritize these in their plans. In order to consult with local stakeholders and to make plans responsive to local conditions, the central government has delegated many planning responsibilities to lower levels of government. A consultative and participatory

approach can make urban planning more responsive and evidence-based, but planning and budgeting must also be based on accurate data and realistic estimates of population sizes, economic activities and peri-urban developments. This in turn requires better monitoring and evaluation methods for urban development.

The Vietnamese Government has just approved the National Action Plan for the implementation the 2030 Agenda for Sustainable Development. The action plan aims to maintain sustainable economic growth in parallel with the progress of social equity and equality; protect the environment and respond to climate change. At the same time, the Ministry of Construction (MOC) has stared drafting the new Urban Development Management Law to improve the legal system governing urban planning and development activities in an efficient manner. Crafting the new law will be a good opportunity to address the challenge of urban planning and development and develop a legislative framework which provides long-term vision for urbanization and clearer demarcation of responsibilities among relevant ministries. This MOC's initiative should be synergic with the National Action Plan so that new law can help to manage urbanization process and ultimately foster the country's sustainable economic development.

Management capacity and legal effectiveness of urban development

Over the past years in Vietnam, there has been steady improvement in many aspects of public administration, a reduction in unnecessary bureaucratic procedures and advances in the quality of government staff. The process has not been completed and in a sense will never be complete, as the needs and the conditions of cities change continuously due to developments in the globalized economy to which cities are connected. Formulation of a shared vision and mission statement for the city through the preparation of a city development strategy with the participation of the city's stakeholders can make local government more inclusive, transparent and accountable and make its activities more responsive to local needs and conditions.

A major challenge for the central government is developing the capacity of local government at all levels. As a middle-income country, Vietnam will increasingly need to rely on private sources of capital rather than official development assistance for development. Local governments will assume responsibilities for urban development that were once the remit of the central government. Thus, the authority and the powers of local governments will have to be reviewed and revised to improve their human and financial resources, to enhance their capacity to manage cities and raise local revenue for urban development, and to ensure that their levels of creditworthiness, accountability and transparency meet the demands of international capital markets.

Cities and towns will also need to improve their human resources. The first-priority target group is the current decision-makers; the second-priority group is senior and mid-career professionals at all levels of government; and the third-priority group is personnel in local planning institutions who need to learn modern planning practices, including strategic and integrated planning. Modern urban planning and management education also needs to be introduced at universities. The challenge is not only to develop technical competence, but also to change the attitudes of officials. They must accept being held accountable and required to explain what they have done and why they have done it. They must have the skills to think creatively and develop new visions, new ideas and innovative designs to meet the ever-changing needs and conditions.

Accessibility to urban services and affordable housing

Vietnam has achieved the Millennium Development Goals on urban water supply and to a lesser extent of urban sanitation, but it still has some way to go to ensure universal access to safe drinking water supply and sanitation, affordable housing and public transport. The challenges are both quantitative and qualitative. Access to the services must be extended to informally developed settlements, while the service quality needs to improve. Safe drinking water must be supplied to households; wastewater needs to be treated before it enters the sewer-drains and the surface water bodies; sidewalks must be reorganized and built to create convenient space for pedestrians;

public transport system needs to be expanded, connected between different modes and be able to compete with private vehicles.

Low tariffs hamper the development of new infrastructure, as revenue tends to cover operation and maintenance costs at most. To improve the quality of the services, local governments need to invest and raise the tariffs. Given the growing demand for urban infrastructure and the scarcity of financial resources, the development of an efficient use of available financial resources will be of primary importance. A major challenge is to gain access to private sources of finance and encourage the provision of infrastructure services by the private sector. Transparency, accountability and governance need to improve to develop creditworthiness and investor confidence.

The country has millions of urban and rural poor who are entitled to affordable services such water supply, sanitation, drainage, solid waste collection and transport. Inequalities in access inevitably develop as the economy grows and the provision of basic services is left to market forces. In a market economy with a socialist orientation, the challenge for the government is to find the means to ensure that utility companies have the resources to invest in improvements and expansion, while the services they provide remain accessible and affordable to all at adequate levels of quality.

Over the past two decades, the private sector has become the major housing supplier, but it is mainly targeting high- and upper-middle-income households that can afford to buy housing with (or even without) formal housing finance. The next step for the real estate sector is to move down-market and target middle- and lower-middle-income households. This will remove the need for those households to acquire informally developed housing and will also reduce pressure on public-sector social housing. To do so, the real estate sector must reduce production costs through greater efficiency, while the government in its role as facilitator reviews its regulations and procedures, and amends or replaces those which unnecessarily raise the costs of house production and acquisition. The 2014 Housing Law has already taken steps in this respect by revising regulations regarding the minimum floor area.

In addition, an adequate supply of land with basic infrastructure (roads, drains, power supply) in peri-urban areas and an efficiently operating housing finance sector will be critical for the development of affordable housing. As the housing finance sector is a subsector of the financial sector, the development of the housing finance sector requires the maturation of the financial sector as a whole. Improved access to housing finance for middle-income households may also require a review, the amendment and/or replacement of existing regulations. While such measures will enable some households to buy a complete house, other households will continue to rely on informal, incremental or rental housing.

Some households will need small housing loans which can be provided by micro-finance institutes. Other households will want or need to rent housing and they will benefit from policies that promote private rental housing. In addition, the current upgrading projects provide opportunities to study and draw lessons on the most efficient and effective approaches

to improve informal housing and to emulate informal housing in a planned manner to prevent the proliferation of new informal housing in unplanned peri-urban settlements

Poverty reduction and inclusive growth

Rural-urban migrants form a growing section of the urban labor force. The productivity of the labor force is determined by its knowledge and skills, but also by its health. So, to be productive, people need access to health services, but also to safe drinking water, sanitation, power supply and adequate housing that is served by drainage and solid waste collection. Rural-urban migrants have currently limited access to these critical urban services, and many live in informal housing in underserviced peri-urban areas. An expansion of the coverage of urban service to include rural-urban migrants and other households in underserviced areas can be seen as a critical investment for economic development.

Migration flows are driven primarily by the search for opportunities of employment, higher income and better access to services. As the government seeks to manage the population distribution, it acknowledges that migration can only be guided by creating the opportunities for employment, income and service access in potential growth centers. As the economy grows and incomes rise, the government weighs the efficiency of a high concentration of capital and labor in a limited number of cities against socio-political considerations of a redistribution of economic activities and urban populations over a large number of cities and towns.

In this respect, the government sees that the development of smaller cities and towns across the country is important not only for the redistribution of economic activities and urban populations, but also for the development of rural areas and agriculture. Smaller cities and towns form the links between the urban and rural economy, between supply of and demand for agricultural produce, and between supply of and demand for urban goods and services. Linkages between urban and rural areas require the development of rural and national road networks and transport services as well as other forms of communication between urban and rural centers.

Environmental protection and resilience to climate change

The environmental challenges faced by Vietnam's cities and towns are situated at three levels: (a) ensuring adequate access to environmental services (sanitation, drainage, solid waste management) for all urban households; (b) controlling air, water and soil pollution caused by rapid economic growth at the local and regional level; and (c) mitigation of and adaptation to the impacts of global climate change. Adequate treatment and disposal of wastewater and rain and floodwater and domestic solid waste constitute the basic urban services to which citizens are entitled. As the economy moves up the global supply chain, effective pollution control, disaster risk reduction and mitigation of and adaptation to climate change will enhance the competitiveness of Vietnam in the global economy. Improvements in these services will require significant investments, but also changes

in the attitudes of the population and trade-offs between the country's priorities.

Although its contribution to climate change is minor, Vietnam will play its role in the mitigation of climate change by increasing energy efficiency and conservation and reducing greenhouse gas emissions. As it aspires to develop a low-carbon economy, it will seek to adopt comprehensive, consistent and effective mitigation measures. Policies and strategies are already in place as green growth has been recognized as key development strategy in the last four years. However, implementation is slow due to insufficient awareness of the need for climate change mitigation among the population and government officials at all levels, and local governments' limited capacity to prepare and implement policies, strategies and plans and to build partnerships between public sector, the domestic and foreign private sector and the population.

Cities present a strong opportunity for renewable energy investment in Vietnam, especially for solar energy. An important policy action is to develop a local strategy for renewable energy, which can help mobilizing private investment. Energy efficiency is another opportunity area to drive urban green growth with strong potential of subnational action. Potential policy options include: developing a local (cities and towns) strategy for energy efficiency; setting up an energy efficiency central fund to leverage public and private investment in energy efficiency.

5. Conclusions

As Vietnam's urbanization continues, the role of cities in overall national economic, social and performance is growing more rapidly than ever. Therefore, making well-functioning urban areas is crucial for the country's sustainable future development. This article reviews the existing situation of Vietnam's urbanization, examines the impacts of climate change on the country's urban areas, and identifies challenges and opportunities for the cities and communities toward sustainable development. An immediate opportunity is enhancement of effectiveness of urban planning system and formulation of explicit urban policy. Increasing management capacity and legal effectiveness of urban development. Ensuring accessibility to urban services and affordable housing. Fostering poverty reduction and inclusive growth. Finally, environmental protection and resilience to climate change remain as key challenges and areas for immediate action.

References

ADPC – Asian Disaster Preparedness Center. (2014). National Training Course on Safer Coastal Zone Management, 6-10 October 2014, Ho Chi Minh City, Vietnam, Asian Disaster Preparedness Center, Bangkok.

GSO – General Statistical Office. (2016).

Jeremy, C. R. (2008). Rapid Assessment of the Extent and Impact of Sea Level Rise in Vietnam,International Center for Environmental Management, Ha Noi.

Hien, N. T. et al. (2015). Urban management in preservation of public gardens/ playgrounds in residental areas of Hanoi. The Asia Foundation and HealthBridge, Ha Noi.

Hung, H. V. (2011). Housing and Climate Change: Adaptation Strategies in Vietnam, 167- 194, in Climate Change and Sustainable Urban Development in Africa and Asia, Belinda Yuen and Asfaw Kumssa Eds, Springer 2011.

Hung, H. V. (2017). "A set of compiling articles of urban development issues in Tuoi Tre Newspaper, Vietnam News Agency, Vnexpress, the Voice of Vietnam, Kinh Te & Do Thi Newspaper, VGP News from 2008 to 2017" unpublished document (in Vietnamese).

IFRC – International Federation of Red Cross and Red Crescent Societies. (2014). Viet Nam: Country Case Study Report: How Law and Regulation Support Disaster Risk Reduction, International Federation of Red Cross and Red Crescent Societies, Geneva.

MOC – Ministry of Construction . (2016). Vietnam Country Report for Habitat III, Ministry of Construction and UN-Habitat Vietnam, Hanoi.

MoNRE – Ministry of Natural Resources and the Environment. (2016a). The National Report on the Environment 2011-2015, Ministry of Natural Resources and the Environment, Ha Noi.

MoNRE – Ministry of Natural Resources and the Environment. (2016b). Climate Change and Sea-Level Rise Scenarios for Vietnam, Ministry of Natural Resources and the Environment, Ha Noi.

MOT - Ministry of Transportation. (2017). Transportation planning and demand for smart transport in Vietnam's big cities. Paper presented in the conference on: "Smart Cities", organized by Vietnamese Ministry of Industry and Trade, Embassy of the Federal Republic of Germany and Siemens on 27 September 2017, Ha Noi.

Nicholls, R. J. et al. (2008). "Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes: Exposure Estimates", OECD Environment Working Papers, No. 1, Organization of Economic Cooperation and Development, Paris.

SRVN – The Socialist Republic of Vietnam. (2015a). Country Report: Achieving the Millennium Development Goals of Viet Nam 2015, The Socialist Republic of Vietnam, Ha Noi.

SRVN – The Socialist Republic of Vietnam. (2015b). Intended Nationally Determined Contributions of Vietnam (INDC Vietnam), The Socialist Republic of Viet Nam, Ha Noi.

UN – United Nations. (2015). Millennium Development Goal Indicators, Goal 7: Ensuring Environmental Sustainability, 7.10 Proportion of urban population living in slums (on-line: mdgs.un.org).

UN – Habitat. (2012). Vietnam Housing Profile, Draft.

UN – Habitat. (2014). Vietnam: Climate Change Vulnerability Assessment, Abridged Report, United Nations Human Settlements Program, Nairobi.

World Bank. (2015). Vietnam Affordable Housing: A Way Forward, World Bank, Washington DC.

WB and MPI – World Bank and Ministry of Planning and Investment of Vietnam. (2016). Vietnam 2035 : Toward Prosperity, Creativity, Equity, and Democracy. World Bank, Washington DC.

13

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Mainstreaming Green Growth into Urban Development for Achieving Sustainable Urban Development in Vietnam: Two Good Practices in the Central Region of Vietnam

1. Introduction

Climate change is a new challenge for Vietnam's economic, social, and environmental development. Vietnam's extensive coast and location in the tropical cyclone belt make it vulnerable to natural hazards, including typhoons, floods, droughts, saltwater intrusion, and landslides. Furthermore, because of the rapid urbanization in Vietnam and inextricably linked uncertainties, climate change's impact on cities and their vulnerability to natural hazards have become major issues for sustainable urban development. Yet cities are also significantly contributing to climate change. According to IPCC (2014), cities emit between 37 and 49 percent of the world's greenhouse gases, but they are also the first to suffer from climate change: extreme climate events have more drastic outcomes in highly populated areas, where the harmful effects of polluting activities are also felt more strongly.

Vietnam has the highest population density in Southeast Asia after Singapore,[5)] which causes life quality issues in urban environments. In addition, urban growth in Vietnam has been driven and underpinned by economic growth, with urban economies contributing approximately 70 percent of the country's GDP (World Bank, 2012). Thus, cities are now required to develop new approaches to meet the needs to define the impact of climate change, address environmental and social issues with the increased population, and play a critical role in leading economic growth.

Since its approval by the prime minister in 2012, the Vietnam Green Growth Strategy (VGGS) was introduced and rolled out for city development and planning to reduce the impact of climate change on cities and as a new motivation for further economic, social, and environmental development in urban areas. "Green growth" can be a driving force to create new growth impulses with a reduced environmental footprint, facilitating related technological and structural changes. It can also mitigate climate change at the required scale (i.e., significant, absolute, and permanent decline of GHG emissions at the global level) and pace. Moreover, the "green industry" is the sectoral strategy for

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5. A national average of 232 people/km² and up to 1,000 people/km² in the Northern Delta

achieving a green economy and green growth in the manufacturing and related productive sectors. It ensure the security of natural resources by alleviating the pressure on already scarce resources, such as water, materials, and energy, thereby contributing to the mitigation of and adaptation to climate change, better environmental management, and industrial and chemical safety (UNIDO, 2011, 2013).

In this chapter, two good practices for urban development will be introduced: the UN-Habitat's "Green Growth City Development Strategy for Da Nang" and UNIDO's "Green Industrial Development for Hoi An Eco-Town". Da Nang and Hoi-An are major cities in central Vietnam; they play critical and strategic roles in the social-economic development of the country and the region. These cities aim to become national centers for sustainable economic, environmental and social development. Thus, both cities needed to adopt green growth strategies and green industrial development to transform their development structures and to decouple economic growth from environmental impacts. Such practices demonstrate how the cities can derive solutions to address urban issues and follow a sustainable development pathway.

2. Green Growth City Development Strategy for Da Nang

Introduction

As required in VGGS, Da Nang City decided to adopt the green growth principles in urban planning in 2012. Upon the request of Da Nang City, UN-HABITAT as an agency specializing in urban development has assisted the city in developing the Green Growth City Development Strategy (GG-CDS) (UN Habitat, 2013a). The principle aim of the project was to provide support to develop strategic planning framework and to mainstream green growth principles into city development strategy. By doing this, Da Nang can develop solutions to effectively combine the urbanization, climate change, and economic growth issues using policy instruments, knowledge management, and multi-sectoral approaches, etc. It is expected that Da Nang will be recognized as the first city in Vietnam to have integrated the green growth principles into the overall urban planning.

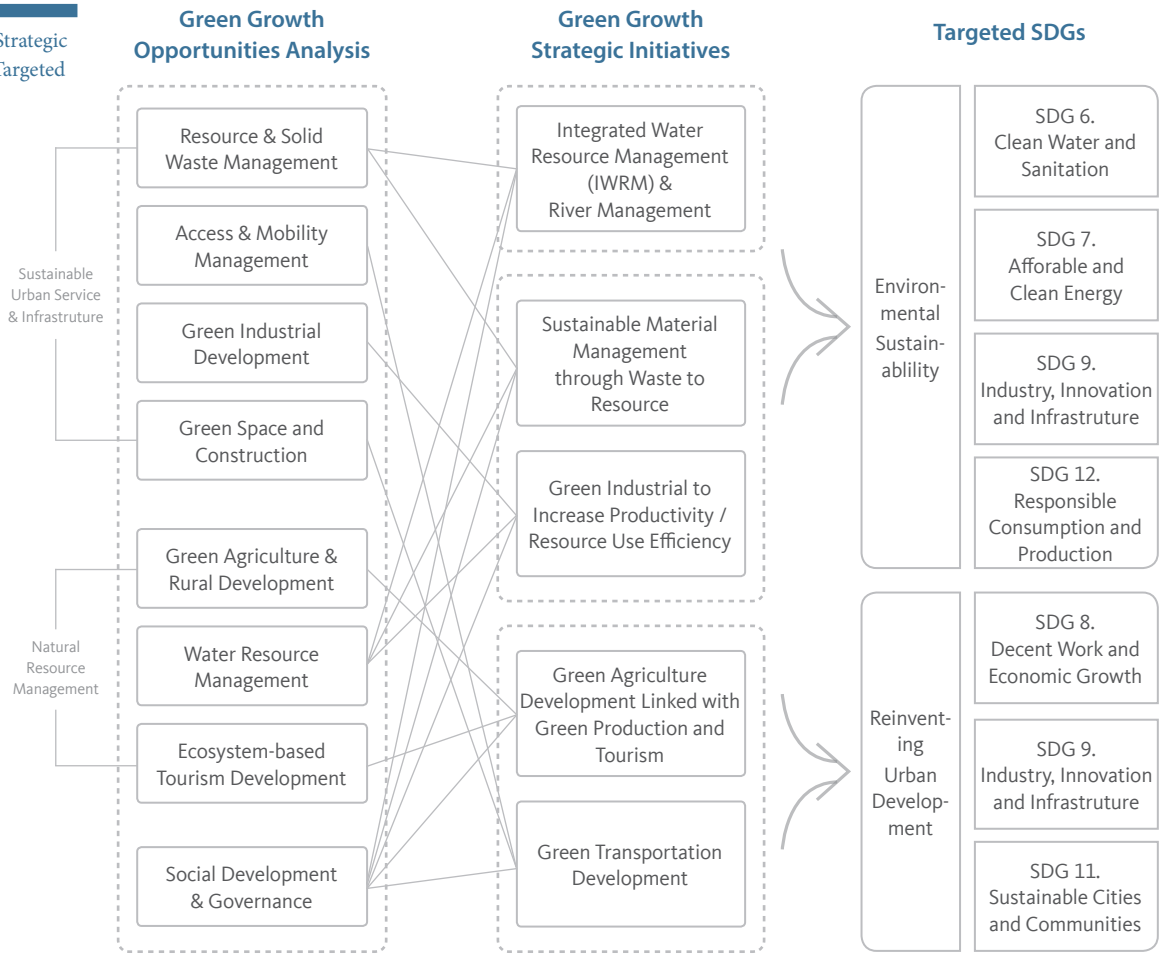
GG-CDS Development

GG-CDS has been developed in alignment with other previous development plans such as Socio-Economic Development Plan and eco-city development plan, as well as VGGS. Based on these key urban development plans, GG-CDS has been derived to deliver multi-sectoral investment planning to achieve green growth. VGGS's main strategic tasks and indicator groups from related international organizations such as OECD are considered as criteria to be used for analyzing Da Nang's green growth opportunities and gaps. The criteria include 1) Sustainable Urban Service & Infrastructure, 2) Natural Resource Management for Development, and 3) Social Development & Inclusive Growth. Based on these criteria, green opportunities and gaps were identified and SWOT analysis followed, which ultimately led to strategic initiatives for green growth of Da Nang.

Five green growth strategic initiatives were finally suggested. Each initiative includes multi-sectoral aspects covering several green growth opportunities areas. For example, Sustainable Material Management through the Waste to Resource initiative was derived from the combination of resource and solid waste management, water resource management, and social development and governance areas. All of the initiatives include social development and governance element, thus mainly those strategic initiatives can be categorized into natural resource management and sustainable urban development.

↘ Figure 13-1

Green Growth Strategic Initiatives and Targeted SDGs



Source: Adapted from Green Growth City Development Strategy for Da Nang. UN-Habitat. 2013a.

GG-CDS and SDGs

Ultimately, those initiatives contribute to attaining the Sustainable Development Goals (SDGs). Each of the initiatives has multi-sectoral objectives and expected outcomes, so the SDGs expected to be achieved are also diverse. SDGs that have direct and indirect links with the initiatives are presented in Table 13-1. Mostly, direct links to SDGs are related to environmental and urban issues such as water (SDG 6), energy (SDG 7), infrastructure (SDG 9), sustainable cities (SDG 11), and consumption and production (SDG 12). Also, as GG-CDS pursues economic growth, SDG 8 (Economic growth) is directly linked. Indirect links include pro-poor policy (SDG1), agricultural development (SDG 2), and health improvement (SDG 3) as a result of environmental management. Also climate action (SDG 13) can be dealt with and ecological elements (SDG 15) can be improved as well.

SDGs and Green Growth City Development Strategy (GG-CDS)

↘ Table 13-1

Direct link	Indirect link
6. Clean Water and Sanitation	1. No Poverty
7. Affordable and Clean Energy	2. Zero Hunger
8. Decent work and Economic Growth	3. Good health and Well-Being
9. Industry, Innovation and Infrastructure	13. Climate Action
11. Sustainable Cities and Communities	15. Life on Land
12. Responsible Consumption and Production	

Source: Compiled by the author

Background of Da Nang

Da Nang is the fifth largest city in Vietnam and one of the centrally governed cities. Da Nang's population grew by 20% during the period of 1997–2009, and the future population is expected to double by 2025, as compared to that in 2012, to reach 1.5 million (Asian Cities and Climate Change Resilience Network, 2013). According to the 2009 Vietnam Population and Housing Census (GSO[6] Vietnam, 2009), Da Nang City had an average annual urban population growth rate of 3.5%.

Da Nang is recognized as an important economic-political center as it is located in the middle of Vietnam, connecting the two major cities of the capital Hanoi and Ho Chi Minh City (Nguyen et al., 2015). Also as the fourth largest seaport in Vietnam, it is considered as an international trade corridor connecting the nation to neighboring countries such as Laos, Cambodia, Thailand and Myanmar (UN-Habitat, 2013a). Being the main center of the North–South integration of socio-economic development in Vietnam, its role is expected to grow further. Recognizing such importance and potential of this city, the leaders of city authorities committed to building the city into a "green city" by 2025 with the vision focusing on high technology and tourism development.

Managing Resources and Environment in Da Nang

Due to the rapid urbanization and population growth, environmental pollution has worsened significantly in Da Nang. Poor environmental safety standards with regard to hazardous waste treatment let water resources to be polluted by industrial waste and construction projects. In addition, lack of appropriate environmental treatment is causing the loss of economic opportunities. Thus, to tackle these problems and create economic opportunities, three strategic initiatives were suggested as shown in the upper part of Figure 13-1: integrated water resource management (IWRM) and river management, sustainable material management, and green industrialization to increase productivity and resource use efficiency.

The main objective of "Integrated water resource management (IWRM) and river management" is to improve decision-making through data collection, integrate land-use planning with natural resource management, facilitate integration of monitoring and evaluation indicators, and promote ecological and water literacy by community-based environmental management. Key program for these objectives

6. GSO: General Statistics Office of Vietnam

is to establish River Basin Coordination Organization (RBCO) to optimally manage water and natural resources throughout the Vu Gia – Thu Bon (VGTB) river basin. Establishing RBCO Committee and VGTB research center will improve water management process and governance ensuring IWRM strategies. It was suggested to establish RBCO and VGTB research center one by one, during the period of six years.

"Sustainable material management through waste to resource" is important to cities since they have closed-loop production. Recycling can increase resource efficiency and generate employment opportunities, while mitigating negative impacts on the environment. Also, biodegradable waste can be utilized by biomass power generation. On this ground, "Establishing an Integrated Resource Recovery Center (IRRC)" and "Launching biomass plans in rural areas" were suggested as key programs. The suggested IRRC is a community-based center aimed at improving waste management of each community. For IRRC to be established, the institutional system for waste management at households and workplaces needs to be reformed and multi-sectoral multi-stakeholders IRRCs must be established. Indication system needs to be implemented for waste separation and recycling, with regular monitoring to ensure compliance with the new system. Furthermore, it is essential to introduce waste collection system for farming waste in rural areas. On the other hand, Da Nang has rich bio-degradable waste in rural areas, which can generate economic benefits with appropriate measures. By launching biomass power plants in rural areas, it can gain renewable energy from rural areas and expand its use to urban areas. With IRRC and biomass power plants, Da Nang can create related industries and jobs, as well as mitigating environmental pollution. Also, civic participation and community-based waste management can be promoted.

The third initiative is "green industrialization to increase productivity and resource use efficiency." Da Nang needs to increase energy efficiency in industry and improve industrial environmental management in industrial parks. UN-Habitat suggested several key programs including 1) Improving Industrial Energy Efficiency in Production Processes through Energy Audits, 2) Establishment of the Green Industrial Symbiosis through Eco Industrial Park (EIP), and 3) Da Nang High-tech Park linked with Green Industry and Green Growth Goals of Da Nang. The first program, Energy Audit (EA) can provide opportunities to understand energy usage and save energy. The second program, Eco Industrial Park can enhance industries' environmental performance especially in terms of energy and material use. The third program is high-tech park, which can promote networking among industries for energy and resource efficiency and waste management among enterprises and factories, and increase earning and productivity and develop related industries and technologies. Also, it will help achieve cleaner production systems and networks for industrial resource circulation and internalize socio-economic costs generated from environmental pollution driven by industrial production. Moreover, mainstreaming strategic planning for high-tech park into other development plans including the master plan for construction can be expected.

These three GG-CDS strategic initiatives are directly linked to SDG 6 and SDG 7. The outcomes from these two strategic initiatives would well address SDG 11 for resilience capacity building in urban sectors for environmental sustainability.

Developing New Engines for Urban Economy

Intertwined with environmental management, other urban issues can also be tackled to create more economic opportunities for urban development. Green industrialization and tourism can be additionally developed, using the rich ecological and cultural foundation of Da Nang City. Even though Da Nang is a city focused on tourism, it lacks public transportation system, which is harming the air condition. Transportation infrastructure connecting neighboring provinces need to be developed and improved to increase accessibility as well. Along with green transportation and tourism, adoption of high-tech industry can contribute to the economic growth of the city. Plus, since there is high demand for local and safe agricultural products and rural areas have extensive natural and cultural assets, the urban-rural linkages can create green opportunities.

Based on these green opportunities analysis, two more initiatives were suggested for Da Nang's green growth, in addition to the green industrialization (high-tech park) initiative. Green public transportation, green industrialization and green agriculture development with green production tourism contribute to encouraging reinvestment of urban planning and development with integrated, and multi-sectoral planning approaches (UN Habitat, 2013a).

First, in order to deal with traffic safety, air pollution and promote tourism and economic activities among provinces, sustainable transport system development is suggested. Specifically, 1) Improving traffic safety and establishment of a walkable environment, 2) Traffic congestion management and air pollution control, 3) BRT (Bus Rapid Transit) system set-up, and 4) Public transportation oriented policy transition are recommended. This could help reduce the extensive use of private vehicles and related fossil fuel energy consumption, traffic congestion and associated losses in productivity. Also, it contributed to mitigating air pollution, and to providing safe, comfortable, and affordable public transport service to local people, in particular peri-urban residents and the poor, thus it helps improve accessibility and mobility. Through these initiatives, Da Nang City could increase economic gains by improving the efficiency of energy intensive enterprise through overall audits, and by improving energy and resources use efficiency and industrial waste to resource.

Second, a new economic position will be created for industries in Da Nang and would help the city gain global competitiveness. Connected to section 2.2, the initiative program High-tech Park has potential to create business opportunities and make Da Nang City an international hub for high-technology and industry. For doing this, land use with careful consideration is recommended for business complex sites with facilities and green space. Specialized industries can be adopted by considering hierarchy of space and technology development process with development of a cluster as a spatial unit. Da Nang can gain global competitiveness by providing top-level infrastructure and attracting global enterprises. Green space, eco-traffic systems, green technologies and green buildings are expected to make synergy effects to help the city gain a sustainable urban eco-system.

3. Green Industrial Development for Hoi An Eco-Town

Introduction

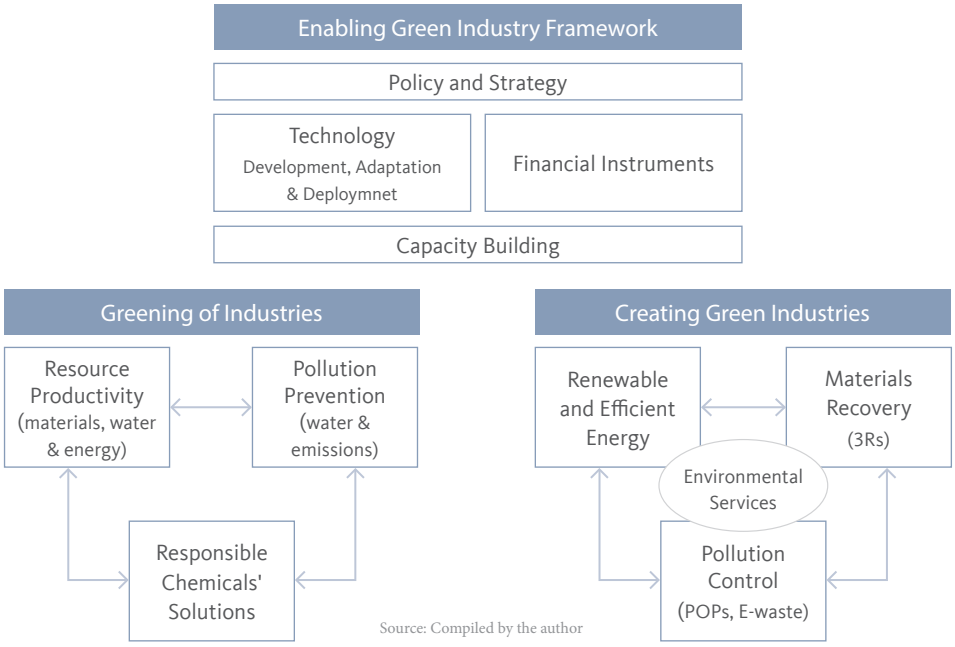
Recognizing the importance of industry and business in achieving green growth, in September 2009, the government of Vietnam joined 20 other Asian developing countries for the Manila Green Industry Declaration. This contained the commitment to work collaboratively towards greater uptake of green industry practices, policies and technologies, with the assistance of international agencies, in particular the United Nations Industrial Development Organization (UNIDO).

Green Industry

Green industry is based on proven methods, strategies and tools that contribute to decoupling economic growth from increased use of natural resources (resource decoupling) and aggravated environmental impacts (impact decoupling) (UNEP, 2011). It provides a two-pronged approach for industrialization that is robust in the context of worsening environmental degradation, climate change and resource constraints (UNIDO, 2011):

- Firstly, green industry, through the greening of industries, achieves, on an ongoing basis, reductions in the use of natural resources and of the generation of waste and pollution in any business, including through such approaches as resource efficient and cleaner production (UNIDO, 2015), energy efficiency, waste minimization and environmentally sound management of chemicals.
- Secondly, through the creation of industries, green industry realizes the supply of high quality environmental goods and services in an effective and industrial manner, including, for example, renewable energy, waste recycling and resource recovery and environmental advisory services.

↘ UNIDO Green Industry Themes



Source: Compiled by the author

At the international level, green industry developed further into inclusive and sustainable industrialization, which in 2015 has been anchored in Sustainable Development Goal 9: build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (UNGA, 2015). Inclusive and sustainable industrialization calls for industrial and related policies and business models that advance economic competitiveness, safeguard the environment and create shared prosperity (https://isid.unido.org/about-isid.html). Green industry also contributes to other SDGs such as clean water and sanitation (SDG 6), affordable and clean energy (SDG 7), sustainable cities and communities (SDG 11), responsible consumption and production (SDG 12), climate action (SDG 13), life below water (SDG 14), and life on land (SDG 15).

Through its Green Industry advisory support in Vietnam (UNIDO, 2012), UNIDO assisted the People's Committee of Hoi An with planning and promotion of green industry concepts and strategies as part of its development into an eco-city. In doing so, an effort was made to learn from the Japanese Eco-Town program, which combined improved urban-environmental and spatial-planning to improve environmental amenity (in particular better air and water quality) with innovations in industries and development of innovative recycling industries. The eco-town model has been particularly successful in combining industrial symbiosis (the recovery and reuse of waste from one industry by another nearby industry) with urban symbiosis (the recovery and reuse of municipal and commercial wastes by nearby industries) (see e.g.: (Van Berkel, Fujita, Hashimoto, & Geng, 2009)).

Hoi An is an attractive tourism destination, as it is home to a UNESCO listed cultural heritage as well as a UNESCO recognized biosphere reserve. Moreover, its seaside and coastal islands as well as relatively untouched hinterland, offer potential for experience-based tourism, on beach, market gardens and crafts villages. This touristic value though was being rapidly undermined by littering and deterioration of both the historic town and the surrounding rural and village areas.

The green industry concept was found to be a valuable pillar for further operation and implementation of the eco-city aspirations of Hoi An. Firstly, businesses, through Public Private Partnerships (PPP) can contribute the clean-up and conservation of the historic center, urban area and river foreshore. Secondly, hotels and other tourism enterprises can reduce their environmental footprint by applying environmentally and socially responsible business practices. Thirdly, development of handicrafts sector, in an environmentally and culturally responsible manner, can create additional incomes and jobs, whilst also enriching the experiences of visitors.

Green Industry for Improved Environmental Amenity

The review of the city's environmental infrastructure in 2011 found many deficiencies. Waste collection rates were as low as 60 percent in the historic city and even lower outside, resulting in widespread littering and uncontrolled disposal. Only an estimated 40 percent of the city was connected to sewer, and raw sewerage was dumped in rivers. Moreover, the use of biomass in household cooking stoves contributed to poor air quality.

In recent years, there were significant improvements in environmental amenity, including sewer extension and waste collection, in connection with the restoration and renovation of the river foreshore and market areas. The wastewater infrastructure system was connected to a 6,750 m³/day wastewater treatment plant which could treat approximately 40 percent of the city's total wastewater. In addition, other wastewater treatment plants are being built to treat the remaining 60 percent. The enterprises were requested to build their own wastewater treatment system, to make their wastewater meet national standards before being discharged

to the city sewage system. Up to now, over 80 percent of the enterprises have met the requirement.

To address the increasing amount of solid waste, a composting factory was constructed in 2012 with a capacity of 55 tons per day, contributing to 10 percent reduction of waste discharged to the landfills. In addition, a waste incinerator with a capacity of 96 tons per day was built. The charging of a notional entry fee (VND80,000 (about US$3.5) per person) for tourists entering the historic city aids in raising funds for operation and maintenance of the environmental facilities.

Moreover, Hoi An further promoted waste minimization and separation at source in 12 wards and communes which attracted participation of 75 percent of the city population. In the ancient town, 62 dust bins were placed for waste separation. In Cu Lao Cham island, a 500kg/hour waste incinerator was installed. This facility in combination with the composting factory could basically solve the solid waste issue of the island. Furthermore, the "Saying No to Plastic Bags" campaign has been continued with active support from local people and tourists, and became a role model for other cities.

Greening of the accommodation sector

It was also found that hotels and other tourism enterprises were not contributing to eco-city development, whilst as per UNIDO experience elsewhere in Vietnam good opportunities had been found for Resource Efficient and Cleaner Production (RECP) (e.g. (VNCPC, 2013) and (Corporate) Social Responsibility (CSR) (Beranek, 2011). RECP is aimed at achieving a virtuous cycle of more efficient use of natural resources (materials, energy and water), leading to minimization of wastes (including effluents and air emissions), in turn improving the well-being of employees, consumers and community (UNIDO, 2015). RECP is a key enabler for CSR defined by the International Organization for Standardization as "the responsibility of an organization for the impacts of its decisions and activities on society and the environment through transparent and ethical behavior" (ISO, 2010). CSR contributes to sustainable development, including health and welfare of society, takes into account the expectations of stakeholders, is in compliance with applicable law and consistent with international norms of behavior, and is integrated through the organization and practiced in its relationships.

During 2011-2012, UNIDO therefore assisted hotels and tourism enterprises in Hoi An with capacity building and enterprise assessments. It was found that multiple win-win solutions existed (UNIDO, 2012). Electricity was typically supplied at 10 percent excess voltage causing 5-10 percent extra energy consumption in common equipment (refrigerators, air conditioning units, etc.) and 20-80 percent extra in lighting, a situation that could be easily corrected with periodic voltage adjustments. Air conditioning could be set at higher default temperatures, e.g. 25℃ instead of the common practice of 18-20℃, with an average energy saving of 6 percent per degree set point. Moreover, air conditioning units were often poorly positioned, which severely limited their efficiency and caused excessive noise and discomfort.

A further particularly promising option was installing solar hot water

↘ Greening Accommodation Sector

Source: UNIDO, 2012

systems. The water and wastewater situation was of further concern due to the regular use and erratic extraction of groundwater and lack of wastewater treatment. Water consumption could be significantly reduced with the introduction of low water flow devices, including low and dual flush toilets and aerated low flow showers and faucets. Waste though was found to be segregated at source in most hotels, with some cost recovered from the sales of recyclables. These measures were found to be typically cost saving. For example, the 3-star Golf hotel with 69 rooms identified 26 RECP options of which 24 could be implemented with zero or minimal costs. Over a 6-month period, the hotel managed to reduce electricity use per guest night by 21 percent, which represents an annual saving of approximately 50,000 kWh, or USD 3,500.

Green Handicrafts

Hoi An has a rich tradition of handicraft. Of particular significance to Hoi An is lantern making and rice-noodle making. UNIDO assisted with the identification and trial of better techniques to save costs and reduce environmental impact (UNIDO, 2012).

- In lantern making, it was found that bamboo waste could be reduced by using a stand during the initial cutting of the bamboo culms (stems). Moreover, a typical crafts producer could save about 1,250 kg of fuel wood annually by cooking the bamboo laths in an insulated boiler instead of a large vat on an open fire. In drying, improved ventilation enhanced drying quality and reduced fuel wood consumption and smoke exposure. Further environmental improvements could be made by changing the cover material from painted silk to painted Poona paper, manually produced from local tree bark, and/or recovery and reuse of silk offcuts for other craft items (e.g. bags).
- The artisanal production of fresh rice noodles also offered an ample potential for improvement. Increasing the height and thermal mass of the cooker could help save an average crafts group about 3 tons annually of rice husk used as fuel. Moreover, water use could be reduced with better housekeeping, also contributing to better work environment.

Moreover, UNIDO identified potential for expanding crafts

↘ Resource Efficiency in Lantern and Noodle-Making

Source: UNIDO, 2012

production in the region, by tapping into locally available materials, skills and traditions. Following areas were found to be particularly promising: bronze casting (bells, gongs, incense burners); textile (hand woven silk and cotton cloth); wood carving (small furniture and home decorations); and ceramics (decorative items) (UNIDO, 2012). To overcome resource constraints, crafts development would benefit from the application of green production practices and sustainable product designs, as extensively demonstrated elsewhere in Vietnam in e.g. handmade paper, seagrass, bamboo, lacquerware and silk sectors (UNIDO, 2013).

Moreover, it was found that opportunities existed for diversification and expansion of income generation from crafts production, by actively involving guests in crafts activities. In recent years, the craft villages in Hoi An have started to offer visitors at a fee a hands on tour of crafts areas, including opportunities to try different authentic methods and techniques. For example a tour to Thanh Ha ceramic village costs VND15,000 (about US$0.65) per person, offering unique experiences such as “a day being ancient town resident in ceramic village”. The generated income is spent on maintenance and improvement of the livelihoods in the respective crafting areas. Thanks to these tour options, the craft villages are preserved and developed sustainably.

The good examples have since been promoted both formally through government and business liaison as well as through informal channels. In concert with other investments, Hoi An had succeeded in tidying up and providing a more enriching tourism experience for its visitors.

4. Conclusion

The United Nations has supported sustainable urban development in Vietnam by developing strategies and plans, as well as providing technical assistance for project implementation. Those strategic initiatives, plans and projects have diverse objectives and SDGs to be achieved. But the key points in urban development in Vietnam are mainstreaming environmental sustainability in urban planning and creating green growth opportunities through integrated approach.

Firstly, it was recognized that the city should focus on efficient use of resources and sustainable management of local assets, mainstreaming the notion of "sustainability" into urban planning and policies. It will challenge dominant outdated preconceptions while considering specific

local ecological constraints. New planning approaches are emerging that offer a range of possibilities to finance environmental action and recognize the value of environment in supporting or facilitating economic growth.

Secondly, urban planning and implementation need to be reinvented through a holistic and multi-sectoral planning approach by considering the links among the sectors. Local circumstances, needs, and requirements must be met, but also need to be prepared at various geographic scales and integrated to support sustainable and coordinated infrastructure, environment, housing, economic development, and land use in the city. Thus a holistic approach that engages more stakeholders by creating motivation and generating bigger effects with win–win solutions is essential for urban planning, management and development,

The technical assistance provided in the pilot of Hoi An Green Industry has demonstrated this integrated approach. The enterprise assessments, demonstrations, capacity building and publications provided with the support of UNIDO during 2011-2012 confirmed that businesses and handicraft communities can adopt green industry methods and techniques that contribute to building an eco-city whilst also making good business sense.

Those key messages can be applied to any urban development cases. They are expected to contribute to successful sustainable urban development of Vietnam in the future.

References

2009 Vietnam Population and Housing Census: General Statistics Office of Vietnam, (2009)

Hasanbeigi, A., & Price, L. (2010). Industrial energy audit guidebook: Guidelines for conducting an energy audit in industrial facilities (No. LBNL-3991E). Ernest Orlando Lawrence Berkeley National Laboratory, Berkeley, CA (US).

Asian Cities Climate Change Resilience Network. (2013). ACCCRN City

Beranek, F. (2011). Responsibility for Generations: the CSR starter. Ha Noi, Vietnam: United Nations Industrial Development Organization.

Da Nang Investment Promotion Agency, Da Nang Government (http://ipc.danang.gov.vn, accessed on 27th June 2017)

Ernest Lowe (2001), Eco Industrial Handbook, The Asian Development Bank

IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

ISO. (2010). ISO 26000:2010 Guidance on Social Responsibility. Geneva, Switzerland: International Organization for Standardization.

Projects, The Rockefeller Foundation Asia Office.

Tuệ, N. T., Nhuận, M. T., & Liểu, T. M. (2015). Analysis of Rural-Urban Linkages in Fast Growing Cities for Enhancing Resilience to Natural Disasters (Case study: Đà Nẵng City, Vietnam). VNU Journal of Science: Earth and Environmental Sciences, 31(3).

UN HABITAT. (2011). Cities and climate change: Global report on human settlements 2011. London: Earthscan.

UN HABITAT. (2012), Sustainable Urbanization in Asia: A Sourcebook for Local Governments, Fukuoka, Japan, United Nations Human Settlements Program.

UN HABITAT. (2013a), Green Growth City Development Strategy for Da Nang, Hanoi, United Nations Human Settlements Program.

UN HABITAT. (2013b). Planning and design for sustainable urban mobility: Global report on human settlements 2013. Taylor & Francis.

UN Habitat. (2013c). Planning for Climate Change – Toolkit. A strategic, values-based approach for urban planners Cities and Climate Change Initiative. UN Habitat.

UN HABITAT. (2014). Hoi An, Vietnam: Climate Change Vulnerability Assessment, Nairobi, United Nations Human Settlements Program.

UNEP. (2011). Decoupling natural resource use and environmental impacts from economic growth, A Report of the Working Group on decoupling to the International Resources Panel. Paris: United Nations Environment Program.

UNGA. (2015). Transforming Our World: the 2030 Sustainable Development Agenda (A/res/70/1). New York: United Nations General Assembly.

UNIDO. (2011). UNIDO Green Industry Initiative for Sustainable Industrial Development. Vienna: United Nations Industrial Development Organization.

UNIDO. (2012). Towards Green Growth through Green Industry Development in Vietnam. Ha Noi, Vietnam: United Nations Industrial Development Organization.

UNIDO. (2013). Green Growth: from labor to resource productivity - best practice examples, initiatives and policy options. Vienna: United Nations Industrial Development Organization.

UNIDO. (2013). Greening Value Chains for Sustainable Handicrafts in Vietnam. Hanoi, Vietnam: United Nations Industrial Development Organization.

UNIDO. (2015). National Cleaner Production Centres - 20 years of achievement. Vienna: United Nations Industrial Development Organization.

Van Berkel, R., Fujita, T., Hashimoto, S., & Geng, G. (2009). Industrial and Urban Symbiosis in Japan: analysis of the Eco-Town program 1997-2006. Journal of Environmental Management , 90, 1544-1456.

VNCPC. (2013). More profits, less waste and much more. Ha Noi, Vietnam: Vietnam Cleaner Production Center.

World Bank. (2011). Vietnam development report 2012: Market economy for a middle-income Vietnam. Washington DC: The World Bank.

VIII

Responsible Consumption and Production

14.

Efforts toward Sustainable Manufacturing:
Cleaner Production and Eco-industrial Parks in Vietnam

14

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Efforts toward Sustainable Manufacturing: Cleaner Production and Eco-industrial Parks in Vietnam

Introduction

After 30 years of reform, Vietnam has made important achievements in the development of all socio-economic aspects. That development of the country was achieved by important contributions from the industry. However, Vietnam's industrial production with low technology and poor management led to poor saving of resources and energy and huge emissions. This is one of the direct and fundamental causes of environmental pollution, resource degradation and depletion and ecological imbalances in Vietnam in recent years.

The government of Vietnam has soon recognized the significance and role of sustainable development in general and manufacturing in particular. Sustainable development has been mentioned and emphasized in many guidelines and policies of the Party, the central government and the action programs of the ministries, and local governments. In which, sustainable manufacturing was highlighted in various policies. Efforts to transform the production model from environmentally unfriendly to sustainable production, reduce resource consumption, save energy, improve economic efficiency, reduce emissions and be environmentally-friendly have been and are being made in many branches and localities.

This chapter aims at analyzing and evaluating the application of solutions towards sustainable production in Vietnam through two main tools: cleaner production and initiative of eco-industrial parks from the perspective of policy mechanism and results of implementation in Vietnam. The chapter includes three sections. The first section describes policies and guidelines for sustainable production in Vietnam's sustainable development framework as the basis for the implementation of sustainable production practices and programs. The next 2 sections present the two approaches to sustainable production in Vietnam, cleaner production and eco-industrial parks. The final section presents conclusion.

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1. Framework and policies for sustainable development of Vietnam

Sustainable manufacturing is “the creation of manufactured products that use processes that minimize negative environmental impacts, conserve energy and natural resources, are safe for employees, communities, and consumers and are economically sound.”[4] The reality in the world as well as in Vietnam shows that sustainable manufacturing is carried out in different modes and sizes. Among them, cleaner production is always considered as a fundamental solution for every business, by "continuously applying integrated environmental protection strategies to production processes, products and services in order to increase productivity and reduce risks for people and the environment."[5]

At the industrial park scale, the policy of developing sustainable industrial zones is one of the basic contents of the sustainable development program in industry. The eco-industrial park, in which "member enterprises improve economic, environmental and social performance through collaboration on environmental and natural resources management" (Leuenberger, 2016) is also considered as a potential solution for achieving the goals of sustainable manufacturing.

Facing environmental pollution challenges in the course of development, the government has stressed sustainable development as one of the key issues on the agenda. Sustainable development has been incorporated into development strategies, plans and development plans at national, sectoral and local levels. Important policies directly related to sustainable development include:

- The National Plan for Environment and Sustainable Development in 1991: This could be considered as the first official Vietnamese document to address sustainable development. This plan has provided a framework for action for environmental planning and management at various levels and has therefore addressed specific environmental protection and sustainable development activities during the period of 1991-2000. The two main objectives of the plan are to satisfy the basic needs of the material, spiritual and cultural life of the present and future generations of the Vietnamese people and to develop and implement policies, action plans and organizational mechanisms to ensure sustainable development
- The National Environmental Protection Strategy for the period of 2001-2010 and the Environmental Protection Action Plan for the period of 2001-2005 which were developed by the Ministry of Natural Resources and Environment are considered as important legal documents for identifying priorities for the environment and planning for environmental protection in the early years of the 21st century towards sustainable development objectives. The overall objective of the National Strategy for Environmental Protection is to continuously protect and improve the environment in order to improve the quality of people's lives and health and to ensure the country's sustainable development. The objectives and content of the Strategy are not separated from the objectives and contents of

4. Definition of “Sustainable Manufacturing" by the US Department of Commerce, 2009, as referred to in OECD (2017). Sustainable manufacturing and the toolkit: seven steps to environmental excelence.

5. Definition of "Cleaner Production" by the UNEP, as referred to in VNCPC (2009). Annual report 2009 (at http://vncpc.org/download/an-pham/cac-bao-cao/2009%20-%20Bao%20cao%20nam%20VNCPC.pdf, accessed on 10th July 2017)

the socio-economic development strategy, but constitute an integral part of the socio-economic development strategy. Both the Strategy and the Action Plan for protecting the environment in this period have included concrete contents and plans to build sustainable production, in which cleaner production is one of the most important solutions.

- Vision for sustainable development in Vietnam (Agenda 21) was formally promulgated in 2004.[6] Guiding documents developed by ministries, sectors and localities for sustainable development vision for relevant sectors based on the sustainable development vision of the whole country were also published. Of the 18 priority sectors, Agenda 21 lists the following activities: Implement the process of clean industrialization, i.e. from the beginning, the planning of industrial development with the structure of industry, technology and equipment must be compatible the principle of environmental friendliness; and actively prevent and treat industrial pollution to build a "green industry". In order to achieve the objective of sustainable economic development in general, and in the industry in particular, the government has promulgated and implemented the policy framework in the direction of "Greening the existing industries". This is made more concrete through programs such as "National Plan for Environmental Pollution Control to 2010", "Cleaner Production Strategy for Industry to 2020", and "National Target Program On Energy Saving and Efficiency".
- In 2012, the Vietnam Sustainable Development Strategy for 2011-2020[7] was promulgated with the objective of sustainable and effective growth, coupled with social progress, equality, protection of natural resources and environment, maintenance of political and social stability, and firmly defending the independence, sovereignty, unity and territorial integrity of the nation. In this strategy, for the first time, the indicator set for the monitoring and evaluation of sustainable development in Vietnam is released including the general indicators (green GDP, human development index, environmental sustainability index); Economic indicators (efficiency of using investment capital, labor productivity, reduction of energy consumption to produce one unit of GDP, CPI, etc.); Social indicators (poverty rate, unemployment rate, percentage of trained working population in the economy, sex ratio at birth, unequal distribution of income); Indicators on natural resources and the environment (forest coverage ratio, percentage of protected land, land degradation). This strategy is also based on the criteria that set out the priority orientations for sustainable development in the period 2011-2020, namely:
  - Economic indicators: Maintain sustainable economic growth, implement green growth step by step, and develop clean energy and renewable energy; Implement sustainable production and consumption; Ensure food security, and develop agriculture and rural areas sustainably; Pursue regional and local sustainable development.
  - Social indicators: Focus on promoting sustainable poverty reduction; Create sustainable employment; Achieve social improvement and justice; Properly implement social security policies; Stabilize the scale and improve the quality of population; Develop culture in harmony with economic development, and build and develop Vietnamese

6. Decision No. 153/2004/QD-TTg dated 17th August, 2004, by the Prime Minister on promulgating the oriented strategy for sustainable development in Vietnam (Vietnam's Agenda 21)
7. Decision No. 432/QD-TTg dated 12th April, 2012, by the Prime Minister on approval of sustainable development strategy of Vietnam period 2011-2020

families; Develop urban areas sustainably, build new rural areas, and ensure rational distribution of population and labor by region; Improve the quality of education and training to improve the people's intellectual level and professional qualifications appropriate to the requirements of national, regional and local development.

- Natural resources and environmental indicators: Combat degradation and promote efficient and sustainable use of land resources; Protect water environment and use water resources sustainably; Rationally exploit and use mineral resources economically and sustainably; Protect the marine, coastal and island environment and develop marine resources; Protect and develop forests; Reduce air and noise pollution in big cities and industrial parks.

To carry out the above tasks, the Vietnam Sustainable Development Strategy for the period of 2011 to 2020 sets out eight main groups of solutions, including: Continue to improve the system of sustainable development institutions; Improve the quality of governance for national sustainable development; Strengthen financial resources for sustainable development implementation; Propagandize, educate and raise awareness of sustainable development; Strengthen capacity for sustainable development management and implementation; Enhance the role and responsibility and increase the participation of the business community, socio-political organizations, socio-professional organizations, NGOs and communities in sustainable development practices; Develop human resources for sustainable development practices; Enhance the role and impact of science and technology, and promote technological innovation in sustainable development practices; Expand international cooperation.

- Green Growth is part of the Vietnam Sustainable Development Strategy for the period of 2011 to 2020 in order to ensure rapid, effective and sustainable economic development and at the same time mitigate the impacts of climate change during present time. The National Strategy for Green Growth, for the period of 2011 to 2020 with a Vision to 2050[8] was also approved to accelerate the process of economic restructuring to advance the efficient use of natural resources, reduce emissions and greenhouse gases through the research and application of modern technology, develop infrastructure to improve economic efficiency, respond to climate change, contribute to poverty reduction and motivate economic development in a sustainable way. The specific objectives of the strategy are: (i) Economic restructuring and institutional refinement to encourage efficient use of natural resources with high added value, and eliminate sectors that waste natural resources and pollute the environment; (ii) Study and widely apply modern technology to effectively use natural resources, reduce greenhouse gas emissions, and contribute to effective response to climate change; and (iii) Improve people's livelihoods by creating more jobs from industry, agriculture, and green services and improve the quality of life by building green infrastructure, and environment friendly lifestyle.

8. Decision No. 1393/QD-TTg dated 25th September, 2012, by the Prime Minister on approval of the national strategy on green growth

To achieve the above objectives, green growth activities in the near future are inseparable from sustainable production and consumption activities, namely:

- Reduce the intensity of greenhouse gas emissions (based on GDP unit) and increase the share of renewable energy use;
- Greening production: Restructure the economy in the direction of deep development, reduce the use of natural resources, enhance ecological industries and environmental services, and renew technology;
- Greening lifestyles and sustainable consumption: Build a lifestyle that is in harmony with the environment in line with the long tradition of the Vietnamese people. Combine traditional beautiful lifestyle with new means brought by modern civilization to create a comfortable and high-quality life, and instill national identity for the modern Vietnamese society.

• The National Target Program on Energy Use Efficiency and Conservation in the period of 2012-2015.[9] One of the key objectives of the program is to improve the efficiency of electrical energy use in industrial production and increase the efficiency of machinery and equipment. The program's core objectives include: i) Strengthen awareness raising and dissemination in policy-making institutions on energy saving and efficient use of energy, environmental conservation and protection, ii) Organize training and certification of energy management for more than 2,000 people in the industrial manufacturing sector, iii) Replace low-efficiency equipment and apply technical standards to improve the energy efficiency in production activities. iv) Reduce at least 10% of the energy intensity of energy intensive industries such as steel, cement and textiles, and v) Implement mandatory management in accordance with the Regulation Standard for Building in Vietnam "Energy Efficient and Economical Buildings" from 2012 and use high-performance lighting systems.

The policies mentioned above have clearly demonstrated the policy, viewpoints, principles and solutions towards the sustainable development of Vietnam in the coming period. It is not difficult to realize that sustainable production and consumption solutions and green production are the key solutions mentioned in most of the above documents. This shows the important role of sustainable production as well as consumption in the process of sustainable development in Vietnam.

2. Cleaner Production in Vietnam

Policy framework for cleaner production in Vietnam

Cleaner production is considered as one of the key solutions to Vietnam's sustainable development strategy and is reflected in various documents such as i) Vietnam Sustainable Development Strategy for the period of 2011 - 2020 (2011); ii) National Action Plan on Sustainable Production and Consumption to 2020 (2016); iii) Cleaner Production Strategy in Industry toward 2020 (2009); iv) National Strategy for Environmental Protection to 2020 with a vision to 2030 (2012); v)

9. Decision No. 1427/QD-TTg dated 2nd October, 2012, by the Prime Minister on approval of the national targeted program on energy efficiency and conservation period 2012-2015

Resolution 24 of the Central Committee of the Communist Party on active response to climate change, improvement of resource management and environmental protection (2013); vi) National Strategy on Biodiversity to 2020, with a vision to 2030 (2013); vii) Strategy for sustainable exploitation and use of natural resources and marine environment protection to 2020 with a vision to 2030; viii) Strategy on sustainable exploitation and use of natural resources and marine environmental protection to 2020 with a vision to 2030; ix) National Green Growth Strategy for the period of 2011-2020 with a Vision to 2050 (2013); x) National Strategy on Integrated Management of Solid Waste to 2025 with a vision to 2050 (2009). In general, the strategies and policies of Vietnam, especially the documents on sustainable development, discuss sustainable production and consumption in general as well as the specific issues on cleaner production. Some milestones and important content are as follows:

- In 1989, the concept and initiative on "Cleaner Production" was first introduced by the United Nations Environment Program (UNEP), which emphasized not just the application of "clean technology" and stressed that production activities need to continuously promote the effectiveness of organizational activities and production management. In 1998, the term cleaner production was formally used in UNEP's "International Declaration on Cleaner Production". In 1999, Vietnam signed the International Declaration on Cleaner Production confirming its commitment to sustainable development strategy (MPI, 2016). This commitment was reflected in strategies and action plans for the coming years.
- National Environmental Protection Strategy for the period of 2001-2010 (2000) and Environmental Protection Action Plan for the period of 2001-2005 (2001): National Environmental Protection Strategy proposed 13 different contents divided into 17 priority programs, among which the tenth program is about CP. It is clear that for CP implementation, the authorities need to develop a national regulatory program, promulgate policies that encourage the transfer of clean technology and promote the exchange of information between related social components. And among the 17 priority programs, the program which aims to protect and improve the industrial environment through cleaner production is one of the most important programs in achieving the goals of industrial development in particular and national socio-economic development in general. Meanwhile, the Environmental Protection Action Plan for the period of 2001-2005 was put into 21 target programs, including one CP program and five other programs related to CP.
- A five-year CP Action Plan (2001-2005) was enacted in 2002, including 10 specific action programs, including the establishment of a legal basis for cleaner production; Raising public awareness; Building human resources for cleaner production; Seeking financial sources for CP; Building financial tools; Coordinating awareness and encouragement; Developing national and local programs; Implementing CP in industry; and Developing Cleaner Production Program for other sectors.

- In 2003 the "National Strategy for Environmental Protection to 2010 with a Vision to 2020"[10] also defined the concept of "Precautionary principle, combined with pollution treatment and control" and cleaner production has been included in one of the 36 national priority programs/projects. The strategy has set specific objectives for each stage such as:
  - By 2020, 80% of production and business establishments will achieve certificates of environmental standard or ISO 14001 certificate; 100% of industrial parks and export processing zones will have concentrated wastewater treatment systems meeting environmental standards; Establish and develop a recycling industry for recycling, with the goal of recycling 30% of collected waste.
  - By 2010: 100% of newly-built production establishments must apply clean technologies or install equipment for pollution minimization and waste treatment meeting environmental standards; 50% of production and business establishments will achieve certificate of environmental standard or ISO 14001 certificate; 70% of enterprises will have tools to classify waste at source; 70% of industrial parks and export processing zones will have concentrated wastewater treatment systems meeting environmental standards, collecting 90% of domestic, industrial and service solid waste;

10. Decision No. 256/2003/QD-TTg dated 2nd December, 2003, by the Prime Minister on approval of the national strategy on environmental protection till 2010 and orientation towards 2020

↘ Saitex, a garment company, has applied zero-emission production system (Photo credit: Nguyen Dinh Chuc)

- By 2009, the "CP Strategy for Industry to 2020"[11] is approved, which specifies objectives for each specific period, including:
  - By 2015: 50% of industrial production establishments will be aware of the benefits of applying cleaner production in industry; 25% of industrial production establishments will adopt cleaner production; Cleaner industrial production establishments will save 5-8% of their energy, raw materials, fuel and materials consumption per unit of production; 70% of the Department of Industry and Commerce will have specialized staff capable of guiding the application of cleaner production to industrial production establishments.
  - From 2016 to 2020: 90% of industrial production establishments will be aware of the benefits of applying cleaner production in industry; 50% of industrial production establishments will apply cleaner production; Clean industrial production establishments will save from 8% to 13% of their energy, raw materials, fuel and materials consumption per unit of production; 90% of medium and large enterprises have a department dedicated to cleaner production; 90% of Departments of Industry and Trade will have specialized staff capable of guiding the application of cleaner production to industrial production establishments.
- In 2012, the "National Strategy for Environmental Protection to 2020 with a Vision to 2030" (Decision 1216-QD-TTg) is also approved, with cleaner production issues also included. It is defined as: encouraging the application of environmental management models in accordance with ISO 14000, cleaner production, waste audit, product life cycle assessment, and advanced environmental management models in production and business, at the same time promoting the development of models of industrial zones, industrial parks, export processing zones, production establishments, etc., which are environmentally friendly.

Thus, it can be seen that:

- Milestones and programs/strategies set steadily over the past years show Vietnam's determination and expectation in using cleaner production solutions to achieve sustainable development goals in production in particular and sustainable development of the country in general.
- The legal framework for cleaner production in Vietnam is quite comprehensive from a technical perspective to financial support. Businesses who are awarded the title of cleaner production will develop their own standards of resource use to save costs and enhance their competitiveness. The resource saving results for enterprises operating in IPs will be combined to produce integrated results on the implementation of clean production in the IP. As a result, the Strategy's objectives for industrial establishments are generally applicable to enterprises operating in IPs, first of all, for the application of cleaner production and save raw materials and fuel.

11. Decision No. 1419/QD-TTg dated 7th Septem, 2009, by the Prime Minister on approval of cleaner production strategy in industry till 2020

Programs, projects and results achieved

In parallel with the promulgation of policy mechanisms, a series of programs and projects have been implemented and applied for cleaner production in practice and have yielded remarkable results. Typical activities include:

- In 1995, two projects: “CP in the paper industry” (1995-1997) and “Textile waste reduction” in Hanoi (1995-1996) sponsored by UNEP/ NIEM in Bangkok (Thailand) and CIDA-IDRC (Canada) are considered as introductory projects on the concept of cleaner production and application of cleaner production in industrial practice. These projects were designed to introduce the concept of cleaner production and identify potential for minimizing waste in the manufacturing process (Hue University of Education, 2012).
- In 1998, the Vietnam Cleaner Production Center (VNCPC) was established under the project VIE/96/063, signed by MoET and the United Nations Industrial Development Organization (UNIDO) with the mission of widespread dissemination of the concept as well as promoting cleaner production application in practice in Vietnam with four main activities: Demonstration of CP techniques at industrial establishments; Training; Dissemination of information; and Recommendations on policies to encourage the application of cleaner production. (VNCPC, 2009).
- In 2004, Project VIE/04/064 "Promote new CP services through the Vietnam Cleaner Production Center" was funded by SECO (Switzerland) through UNIDO (2005-2007). This project extended the scope of application of cleaner production to other pressing issues such as: Energy Efficiency and Clean Development Mechanism (CDM), Occupational Health and Safety (OHS), social responsibility, and implementation of multilateral conventions on the environment. However, the main priorities of the project with the aim of promoting CP implementation are: Assessment of technology backwardness and transfer of cleaner technology; Expansion of the CP network in Vietnam; and Modeling Sustainable Manufacturing in Industry (VNCPC, 2010).
- In 2009 together with the enacted "CP Strategy for Industry to 2020", the Cleaner Production Institute (CPI) in industry was assigned to the Ministry of Industry and Trade (MOIT), with the overall objective of benefitting the community and enterprises through cleaner production implementation. The three immediate objectives of the component are: i) Make domestic stakeholders committed to CP implementation who were trained to be capable of implementing CP, ii) Ensure that key contents of the national CP strategy are effectively implemented in target provinces and iii) Use demonstration of CP techniques and lessons learned to complete the Strategy and replicate in other provinces. The Institute started in September 2005 and ended in December 2011 with 8 activity groups deployed over 5 selected provinces, including Thai Nguyen, Phu Tho, Nghe An, Quang Nam and Ben Tre (RIO + 20, 2012).

After 20 years of establishment and development in Vietnam, cleaner production activities have made quite good progress, contributing significantly to the improvement of sustainable production in Vietnam.

From August 2010 to February 2011, the Cleaner Production Institute (CPI) conducted a baseline survey to assess the targets set out in the Cleaner Production Strategy for Industry to 2020 on 63 provincial Departments of Industry and Trade and 9,012 industrial enterprises nationwide and obtained the following results:

Comparison of the results of practical implementation with the objective of the CP Strategy for industry up to 2020

↘ Table 14-1

The goal of the strategy	Strategic objectives		Survey results		Comments
	2010 - 2015	2016-2020	2010	2015	
1. The percentage of industrial establishments aware of the benefits of applying CP	50%	90%	28%	55%	Up to 55% of surveyed enterprises responded that they knew about CP at different levels. 92% of enterprises are aware of both economic and environmental benefits of cleaner production and the remaining 8% believe that cleaner production has only environmental benefits. Compared to Goal 1, the above figures show that the objective has been achieved and the modes of propaganda and promotion can be seen as appropriate and effective.
2. The percentage of establishments applying cleaner production that reduced consuming energy, raw materials and fuel per unit of product	25%	50%	11%	32%	According to survey results, 32% of enterprises were applying CP, of which 24% said they had reduced their consumption of energy, raw materials, fuel per unit of product and 8% had no obvious benefit. This also means that Goal 2 of the strategy is basically achieved.
3. Reduction of energy and raw materials per unit of product	5-8%	8-13%	Diver-sified	0-99%	The results showed that 34% of enterprises said that the application of CP helped enterprises reduce energy and fuel consumption per unit of product from 5% or more, the remaining 66% of enterprises reduced consumption of energy and raw materials per unit of product unnoticeably or less than 5%. Since the target of the strategy doesn't regulate the percentage of enterprises that have a 5-8% reduction in energy, raw material and fuel per unit of product, the survey result shows that the application of cleaner production helped a number of enterprises achieve target of saving level.
4. The percentage of medium and large enterprises having a specialized department for cleaner production	-	90%	0%	Unde-fined	This objective should be further defined to facilitate the measurement of performance in the future as well as to identify appropriate activities to achieve the target.
5. The percentage of Department of Industry and Trade with qualified staff to guide cleaner production for industry	70%	90%	18%	73%	73% of Department of Industry and Commerce have qualified staffs who are capable of guiding cleaner production for industry with relatively different capacities, including 25% of departments have staffs who are trained on enterprise guiding practices as well as having practical activity of guiding local businesses and 48% of departments either have staff trained in enterprise guiding, or have practical enterprise guiding activity. The results show that the target has been fulfilled.

Source: Cleaner Production (2016)

One of the factors contributing significantly to the achievements of CP in Vietnam in recent years is the contribution of the CPI of the Ministry of Industry and Trade. This is considered as a case study for the development of cleaner production in Vietnam. After 6 years of implementation from 2005 to 2011, the Institute has achieved remarkable achievements:

- Developed Cleaner Production in Industry Strategy to 2020 (approved in 2009),
- Developed and operated CP units in the Ministry of Industry and Trade and 5 target provinces of Thai Nguyen, Phu Tho, Nghe An, Quang Nam and Ben Tre;
- Brought CP into the pollution control plan and developed a CP action plan in target provinces;
- Performed CP demonstrations at 61 enterprises, higher than the initially planned number of enterprises.
- Exceeded original expectations in communication activities and scaled up the CP implementation model to non-target provinces; Specifically, by the end of 2011, CPI had implemented CP support activities for all 63 provinces/cities nationwide at different levels by training CP experts, trainers and held conferences, workshops, conducted rapid assessment of CP for industrial establishments, and assisted the establishment of provincial CP units and CP action plans, web site development and database development. By the end of 2011, CPI provided support to 50% of provinces to develop action plans on cleaner production and CP support, conducted rapid assessment of CP at 260 manufacturing establishments, and held nearly 300 conferences and workshops on cleaner production for over 22,000 people nationwide. (RIO+20, 2012).

Some issues

Achievements in cleaner production over the past years are remarkable, however, in reality, cleaner production development has yet to meet full potential. According to statistics in 2013, there are over 1,200 production establishments in different industries applying CP; In general, the activities of sustainable production in general and of cleaner production in particular are being implemented and the results are low on average (see table below).

↘ Table 14-2

Evaluation of the quality of cleaner production solutions.

Activity		Evaluation
Cleaner production	National policy	1.5
	Demonstration project	2
	Raise awareness	2
	Consulting services	1
	Financial incentives	1
Environmental management system	ISO 14001	2
	Environmental Impact Assessment	1.5
Life-cycle approach	Ecological design	1.5
	Environmental auditing	1.5

Of which: 0=None/No information; 1=Low; 2=Average; 3=Good

Source: Nguyen The Dong (2013)

The problems set for cleaner production from the policy mechanism and practical implementation are: weak awareness of enterprises of CP, especially small and medium enterprises; Lack of resources for CP development including human resources, information, finance, advanced technology, etc.; State policies and mechanisms have not been effective, as well as investment and business environments that are not truly fair, leading to the fact that the number of enterprises who are aware or interested in and apply cleaner production in production and business is low, although in theory, this is one of the best solutions optimizing the efficiency of the production process for each enterprise.

3. Eco-Industrial Park development in Vietnam

Development context

The first industrial park (IP) in Vietnam was established in 1991, and nowadays there are 324 industrial parks nationwide. The SouthEast has 109 IPs (34%), followed by the Red River Delta with 83 IPs (26%) and SouthWest with 52 IPs (16%). The establishment and operation of industrial parks have contributed significantly to the economy as one of the main driving forces for attracting greater investment, especially foreign direct investment (FDI). As of November 2016, IPs nationwide have attracted a total of 6,947 FDI projects with a registered capital of USD 110.2 billion. Among them, USD 66.8 billion was disbursed, accounting for 60.7% of total registered capital. Meanwhile, domestic projects operating in IPs are 6,464 with total registered capital of VND 705.6 trillion (USD 30 billion), half of which have been disbursed (UNIDO and MPI, 2016).

Along with its positive contributions to economic growth, industrialization and development, the IP system has created enormous environmental challenges. According to MPI statistics, in 2013, there are 92 industrial parks in the country without centralized wastewater treatment plants (UNIDO and MPI, 2013). Wastewater from some of the industrial parks is discharged directly to unprocessed receiving sources, causing heavy pollution to surface water as well as to aquatic ecosystems and causing negative impacts on agriculture, aquaculture, drinking water and domestic water. In addition, the amount of solid waste is increasing in industrial parks, and hazardous solid waste accounts for 20% of all waste generated from IP enterprises. The amount of reusable waste is relatively high as the process of collecting, transporting, recycling and reusing solid waste from IPs is still limited. Air pollution is occurring in many industrial parks in which enterprises use outdated technology and have no exhaust gas treatment system. In addition, the backward technology system in industrial parks is causing greenhouse gas effect, which is one of the main causes of climate change.

In order to better address similar environmental issues in industrial parks around the world, the world has emerged and popularized the concept of eco-industrial park model since the early 1990s. International experiences show that EIP is one of the most effective solutions to solving development problems in existing industrial parks. The EIP is a community of manufacturing and service enterprises

that strives to achieve better economic and environmental outcomes through coordinated management of the environment, coordinated use of resources such as energy, water, raw materials, etc., by taking advantage of industrial symbiosis, cleaner production, etc., in order to gain a greater total benefit than each enterprise optimizing its own production process. Given the large number of IPs in Vietnam, the conversion into EIP is very necessary. Improving the environmental, economic and social impacts of enterprises will bring benefits to not only enterprises and the IPs, but also to the surrounding community and sustainable development.

Meanwhile, industry and industrial park development policies and mechanism in Vietnam are quite comprehensive and serve as a good basis for the development of an official legal document promoting the development of EIP in Vietnam. These include: i) Regulations on environmental protection in industrial parks; ii) Regulations on construction, planning and management of industrial zones; iii) Regulations on the use of resources and cleaner production; iv) Regulations on the implementation of closed processes and industrial symbiosis; v) Regulations on the use of energy that has less impact on the environment; vi) Regulations on labor and society; and vii) Regulations on financial support for CP (UNIDO and MPI, 2016).

With the convergence of such theoretical and practical conditions, it appears that the development of EIP in Vietnam is necessary and feasible. And from 2015, the United Nations Industrial Development Organization (UNIDO) will provide grants to Vietnam from the Global Environment Facility (GEF) and the Swiss State Secretariat for Economic Affairs (SECO) to proceed with the first project of EIP named "Implementing an eco-industrial park initiative towards a sustainable industrial park model in Vietnam" (UNIDO and MPI, 2013).

Target of eco-industrial park development:

Theoretically, Lowe and Evans (1995) degines the notion of industrial ecology as the integration of cleaner production into interaction at the regional or industrial level, especially locally and ultimately global ecology. Therefore, the industrial ecology in general and the EIP in particular have the following objectives: i) All industrial activities, as natural systems, must be integrated into the ecosystem and the biosphere of the area; ii) Ecosystem dynamics and principles provide guidance in the design and management of industrial systems; iii) Achieving high energy and material efficiency in the production, use, reuse and service processes will create competitive advantage and economic benefits; and iv) the final target is the sustainability of local and regional ecosystems. And in fact, the goal of building an EIP is to increase the economic benefits of member enterprises while minimizing the environmental impact of the business. The construction of the EIP includes the design of the infrastructure of the site and the factory (new design or redesign), cleaner production, energy efficiency and the promotion of cooperation among enterprises. An EIP will also ensure the benefits of the surrounding community and ensure that there is positive impact on the overall development. The EIP plays a pioneering role and leverages change in the region and the domestic industrial community. An IP that wants to become an EIP can act as a center within the national EIP network through its own

improvement projects or by linking its factories with suppliers and external customers (ADB, EIP, EA Lowe 2005). As for the first pilot EIP project in Vietnam, the project aims to increase the transfer, application and dissemination of cleaner production technologies and practices to reduce hazardous waste and greenhouse gas emissions as well as water pollutants and good chemical management practices in industrial parks in Vietnam.

↘ AMATA Dong Nai, an example of industrial park aiming to be certified as eco-industrial park
(Photo credit: Nguyen Dinh Chuc)

After more than 2 years of implementation, the project has carried out many activities and initially saw encouraging results. Specifically:

- Reviewed the mechanisms and policies related to the formation and development of IPs and EPZs as the basis for the formulation of policies and regulations meeting the criteria of EIPs in various fields. Planning and management of industrial parks, management of environmental pollution and industrial pollution in IPs, responsibilities and investment support measures of related parties for investment in clean technology and low carbon emission of enterprises in IP.
- Organized many training courses, strengthening the capabilities with various forms on construction planning, management of EIPs and linking the development of industrial parks with local communities for full-time staffs from central and local government agencies to retrain the stakeholders; Strengthened the technical capabilities on technology transfer, application of clean technology and low carbon emissions, safe production methods and efficient use of

natural resources for state management agencies in industrial parks and enterprises in IPs.

- Identified pilot projects for developing EIPs in the selected industrial parks (Khanh Phu, Ninh Binh, Hoa Khanh, Da Nang, Tra Noc 1 & 2, Can Tho). The specific task is to select potential enterprises in the IPs which are able to participate in the application of clean and low carbon technologies, assess the technological level of the enterprise and develop strategic plans for technology transfer of these enterprises according to the criteria of EIP; Developed a comprehensive process to transform industrial parks into EIPs on the basis of cooperation between enterprises in the industrial parks on the reuse and recycling of waste, effective use of water sources and good management of chemicals; Developed projects aimed at enhancing the capability of the community and community service.
- Raised public awareness of EIPs through workshops, events and websites on EIPs; and
- Developed a monitoring and evaluation mechanism for project activities and appropriate project management systems (UNIDO and MPI, 2015).

Issues to be addressed for successful EIP in Vietnam:

The first project on EIP in Vietnam is still in the process of implementation. Initial results show that the system of policies for IP development in Vietnam is generally quite comprehensive, covering all economic, social, environmental and institutional issues in accordance with the direction of sustainable development as one of the basic favorable factors for the development of EIP in Vietnam; However, until now, there is no legal document on EIP, and the issues of the operating apparatus, infrastructure preparation, technology, investment capital are at the beginning stage. Therefore, to promote the conversion and deployment of EIPs, it is necessary to focus on the following areas (UNIDO and MPI, 2016):

- Defining clearly the functions and tasks of the State in converting traditional industrial parks into EIPs: The amendment of Decree 29/2008/ND-CP should emphasize the task of transforming to EIP and set the transitional goals of governments at all levels. The management of EIPs at the central level is assigned to the Ministry of Planning and Investment and at the provincial level, is assigned to the Management Boards of industrial parks on the basis of the current management mechanism with consideration for adding the organizational structure to conduct the duties on managing EIPs.
- To implement the task of supporting and converting EIPs, the State encourages the establishment of off-budget financial funds. The charter capital of the fund is provided by the budget. Funds are mobilized from other sources such as voluntary contributions and donations from domestic and foreign organizations and individuals for green industry and EIPs as well as mobilizing other sources according to the law. The Fund Management Council is composed of representatives of leaders of ministries, central sectors and localities.
- Revision of Circular 26/2014/TTLT-BTC-BCT dated February 18, 2014 in the direction of setting specific norms for cleaner production activities

in the locality as a basis for allocating funds for cleaner production locally in general and within the IP in particular.

- Monitoring and promoting the activities of EIPs:
  · Develop and operate an automated monitoring system to monitor the emissions of wastewater and pollutants from enterprises to monitor the compliance with environmental standards of the EIP as required in Clause 1 of Article 8 Circular 35/2015-TT-BTNMT.
  · Establish database systems of enterprises on production, use of raw materials and wastes and operate them in EIPs to create the basis for industrial symbiosis activities.
  · Promote a mechanism for effective dialogue between the three parties (employers, employees, and government agencies) to address the issue of wages, social insurance, and to ensure decent working conditions.
- Researching, pilot issuing in industrial parks:
  · Research and provide supports to water saving enterprises in the direction of water price preferences, service charges and recognition as water saving enterprises.
  · Study and propose a pilot mechanism for exchange of waste and wastewater among enterprises in EIP.
  · Research on proposed mechanism for biogas exchange among enterprises in EIPs.

4. Conclusion

Sustainable development is the indispensable trend of every nation; at the same time, it is also the goal of global development. For Vietnam, the views, guidelines and objectives of sustainable development are evident in a wide range of policies. From the first documents such as the National Plan for Environment and Sustainable Development in 1991, to the Orientation for Sustainable Development in Vietnam (Agenda 21 of Vietnam); The Vietnam Sustainable Development Strategy for 2011-2020 or the National Green Growth Strategy, 2011-2020 with a Vision to 2050, all show that sustainable production and consumption is one of the core content of sustainable development, and at the same time, cleaner production is always the key to solving the problem.

Because of its decisive role, cleaner production is governed by a specific framework of law and planning; Typically the National Environmental Protection Strategy 2001-2010 (2000) and the Environmental Protection Action Plan 2001-2005 (2001); National Action Plan on Cleaner Production in 5 years (2001-2005); The National Strategy for Environmental Protection to 2010 with a vision to 2020, the CP Strategy for the industry up to 2020 and in parallel, the implementation of CP in practice is also quite abundant with different plans, programs and projects; A typical example is the Cleaner Production Institute in industry established to fulfill the goals set out in the CP strategy for the industry up to 2020. Although the results of the program itself are quite convincing, cleaner production

in general has not had many outstanding achievements. The cause of this situation is believed to be attributable to the enterprise side, the state policy as well as the common characteristics of the Vietnamese economy.

On the other side of sustainable production development, both the theory and practice of countries around the world show that the development of an EIP is one of the potential solutions and expected to solve problems of environmental pollution, waste of resources of industrial production, by combining two strategies: cleaner production in each enterprise and symbiosis, linkage among enterprises in the same industrial park. And in the context of industrial development in Vietnam, this is a necessary trend. However, sustainable production is only in its early stage in Vietnam; The lack of necessary elements for the development of the EIP, such as legal basis and organizational structure, as well as sources of capital, human resources, infrastructure and technology must be addressed.

The report shows the close links as well as the need for cleaner production and EIP development for sustainable production as well as sustainable production and the goal of sustainable development of Vietnam in the near future.

References

Cleaner Production (2016). Site for information on cleaner production, at: http://sxsh.vn/en-US/Home/tongquansanxuatsachhon-14/2011/San-xuat-sach-hontren-toan-quoc-874.aspx, accessed on 10th July 2017.

Hue University of Education (2012). Cleaner production syllabus. Faculty of Environment. Hue.

KEEI (2013). Yearbook of regional energy statistics. Yang-hoon Sonn, Korea Energy Economics Institute

Leuenberger H. (2016). Background information related to Eco-Industrial parks. Presentation at the Traning Workshop on Eco-Industrial Park. Ha Noi, October 2016.

Lowe, Ernest and Laurence Evans (1995). Industrial ecology and industrial ecosystems. Journal of Cleaner Production, 3 (1-2), pp.47-53

MPI (2016). Study and review 17 goals and 169 objectives of the United Nations Sustainable Development Program 2030 to assess the situation and identify possible and feasible objectives of Vietnam, as the basis for the nationalization of global sustainable development goals. at: http://va21.gov.vn/Portals/0/va21/Bao cao tong hop.pdf, accessed on 10th July 2017.

Nguyen The Dong (2013). Sustainable production and consumption in Vietnam: situation and solutions. Environment Magazine.

NIER (2014). Yearbook of Industrial wastewater generation and treatment. National Institute of Environmental Research.

PCGG (2009). The Five-Year Plan for Green Growth. Presidential Committee on Green Growth.

RIO + 20 (2012). Vietnam: Some Sustainable Development - Vietnam Report at UN Conference on Sustainable Development RIO + 20. At http://va21.gov.vn/Portals/0/va21/30348_Rio_SDinVNM_VN.pdf, accessed on 10th July 2017.

UNIDO and MPI (2013). Project Document "Implementation of the Eco-Industrial Park Initiative towards a sustainable industrial park model in Vietnam".

UNIDO and MPI (2015). Draft report of the project "Implementation of eco-industrial zone initiative towards sustainable industrial park model in Vietnam".

UNIDO and MPI (2016). "Reviewing and evaluating the existing legal framework, policies and regulations on industrial zones", draft report of the project "Implementing an industrial park initiative towards a sustainable industrial park model Firm in Vietnam".

VNCPC (2009). Annual Report 2009. Accessed at: http://vncpc.org/download/an-pham/cac-bao-cao/2009%20-%20Bao%20cao%20nam%20VNCPC.pdf on 10th July 2017.

VNCPC (2010). Annual Report 2010. Accessed at: http://vncpc.org/download/an-pham/cac-bao-cao/2010%20-%20Bao%20cao%20nam%20VNCPC.pdf on 10th July 2017.

Yuan, Zengwei, Jun Bi and Yuichi Moriguichi (2006). The Circular Economy: A New Development Strategy in China. Journal of Industrial Ecology, 10 (1-2), pp.4-8.

Zhang, Ling, Zengwei Yuan, Jun Bi, Bing Zhang and Beibei Liu (2010). Eco-industrial parks: national pilot practices in China. Journal of Cleaner Production, 18, pp.504-509.

Concluding Remarks

Concluding Remarks

The previous chapters have described the current status and efforts of Vietnam regarding the implementation of the 2030 Agenda for Sustainable Development with the environmental focus on water and sanitation (SDG 6), energy (SDG 7), human settlements (SDG 11), sustainable consumption and production (SDG 12), climate change (SDG 13), oceans and terrestrial ecosystems (SDGs 14 and 15). Promoting sustainable development and the implementation of the 2030 Agenda are long-term processes that require up-to-date information for systematic follow-up purposes with review and interpretation of the information from experts of various fields and open dialogue between all stakeholders.

Significant progress has been made in Vietnam with the integration of 2030 Agenda for Sustainable Development into its national agenda by formulating the VSDGs and National Action Plan since 2016. The National Action Plan formulation process was based on the involvement of a broad range of related stakeholders, including the national assembly, government agencies at national and local levels, civil society, associations, academic and business communities, and development partners. The National Action Plan has expressed the strong Vietnamese government's political will and commitment in implementing 2030 Agenda for Sustainable Development.

Despite such efforts, challenges remain. As pointed out in chapter 1 and in many additional chapters throughout the publication, mainstreaming VSDGs in the national and local socio-economic development strategies, plans and programs is crucial. Although the national Action Plan already indicated the responsibilities of specific government agencies at both central and local levels in implementing the VSDGs related to environmental sustainability, it is important to ensure that these VSDGs are reflected in their operational agendas and annual work plans. In addition, it is important to ensure the enforcement of the Action Plan and participation of all related parties in the society throughout the implementation process.

In regards to the Climate Actions (SDG 13), Chapter 3 explores opportunities for reductions of GHGs through a wider economic transition to green growth model focusing primarily on economic factors. The key emission reduction potential lies within the power sector with the planned major investments into coal-based power generation which can contribute to more than a threefold increase of Vietnam's net GHG emissions between 2010 and 2030. The chapter also points out the importance of mobilizing private investment for mitigation actions and the for policy interventions to help reflect environmental externalities and motivate private investment.

Chapter 6 provides an in-depth overview of the energy status in Vietnam with opportunities and challenges in the clean and renewable energy sector. As pointed out, the Vietnamese government has made significant efforts in the development of the renewable energy over the past decade. However, policy

gaps in the regulations remain. Overlapping authority between different state agencies is one of the biggest issues in the management and development of clean and renewable energy in Vietnam. In addition, the lack of market-based principles in the policy design and implementation has led to the failure to boost the renewable energy projects. A long-term and comprehensive legal framework for the renewable energy development and the national technical standards are required to help avoid overlapping and confusion among different laws and authorities.

Recognizing the importance of the forestry sector in Vietnam, Chapter 8 focuses on promoting the implementation of sustainable management of forests and progress towards sustainable forest management which is one of the target indicators for Life on Land (SDG 15). The Vietnamese government has developed guiding documents to mobilize all social resources involved in forest protection management and development in support of sustainable livelihoods and natural environmental security. Despite the efforts, the livelihoods of the locals depending on the forest resources continue to face difficulties. Recommendations for sustainable forest management suggested by the authors include: i) establishment of legal framework and policies to encourage and attract all social stakeholders to participate in sustainable forest management; ii) enhance management capacity and mechanism to promote the decentralization and coordination in forest management; iii) promote social-economic solutions with mid to long term credit investment compatible with forestry development conditions; and iv) promote research and transfer of scientific technological knowledge into forest protection management and developments.

Chapter 10 provides a comprehensive review to ensuring sustainable exploitation and utilization of marine resource and environment protection in Vietnam. The authors of the chapter provides the following recommendations: i) to improve and unify legal documents on the protection of marine resources and the environment by taking into account the international conventions on the protection of marine resources and the environment and assign clear responsibilities to ministries to avoid overlapping functions; ii) to raise awareness and action of the overall society on SDGs and the conservation and sustainable use of oceans, seas and marine resources; iii) to enhance scientific research and application of technologies in investigation, exploitation and use of natural resources and the protection of the marine environment; iv) to mobilize resources and efficiently utilize international resources to invest in facilities to support the management and implementation of priority task; and v) to strengthen international cooperation and capacity building.

In regards to Clean Water and Sanitation (SDG 6), Chapter 11 provides an overview on safe and affordable drinking water and wastewater treatment in Vietnam. Challenges identified in the chapters include the lack of detailed

programs and roadmaps to implement the National Action Plan over time as well as the lack of actions to promote the cooperation between related management agencies at both central and local levels. It is required to develop specific sectoral action plans with detailed action programs, roadmaps and monitoring indicators. There is also the need to develop an integrated action plan which considers the integration and role between related agencies both at central and local levels.

In making cities and human settlements inclusive, safe, resilient and sustainable (SDG 11), Chapter 12 reviews the exiting situation of Vietnam's urbanization, examines the impacts of climate change on Vietnam's urban areas and identifies challenges and opportunities for the cities and communities towards sustainable development. The authors suggests i) the enhancement of effectiveness of urban planning system and formulation of explicit urban policy, ii) increasing management capacity and legal effectiveness of urban development, iii) ensuring accessibility to urban services and affordable housing, iv) fostering poverty reduction and inclusive growth and v) environmental protection and resilience to climate change as the key challenges for sustainable cities and communities in Vietnam. Furthermore, Chapter 13 provides two good practices in the central region of Vietnam in mainstreaming green growth into urban development. The chapter stresses on mainstreaming environmental sustainability in urban planning and creating green growth opportunities through integrated approach.

Finally, in ensuring sustainable consumption and production patterns (SDG 12), Chapter 14 has focused on the efforts toward sustainable manufacturing for cleaner production and eco-industrial parkdevelopments in Vietnam. The chapter describes policies and guidelines for sustainable production in Vietnam's sustainable development framework as the basis for the implementation of sustainable production practices and programs. It also presents on the cleaner production and eco-industrial parks as two approaches to sustainable production in Vietnam.

This Environmental Sustainability in Asia publication series demonstrated a comprehensive picture of the progress, challenges and opportunities of the Sustainable Development Goals (SDGs) implementation in Vietnam. With extensive scientific evidence, consultations and intergovernmental process and policy recommendations on seven principal themes (SDG6 - clean water and sanitation, SDG 7 - affordable and clean energy, SDG 11 - sustainable cities and communities, SDG12 - responsible consumption and production, SDG 13 - climate action, SDG 14 - life below water, and SDG 15 - life on land) of the SDGs highlighting the complexity of the interlinked challenges confronting decision makers at various levels.

Acronyms and Abbreviations

List of Tables and Figures

Acronyms and Abbreviations

ADB	Asian Development Bank
BAU	Business as Usual
BTC	Belgium Technical Cooperation
CBD	Convention on Biological Diversity
CC	Climate Change
CDM	Clean Development Mechanism
CERs	Certified Emission Reductions
COP	Conference of the Parties
CP	Cleaner Production
CPEIR	Climate Public Expenditure and Investment Review
DAC	Development Assistance Committee
EE	Energy Efficiency
EIP	Eco-industrial Park
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GGAP	Green Growth Action Plans
GG-CDS	Green Growth City Development Strategy
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Corporation for International Cooperation)
GSO	General Statistical Office
IAEG-SDG	Inter-agency and Expert Group on SDG Indicators
INDC	Intended Nationally Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
JCM	Joint Crediting Mechanism
JICA	Japan International Cooperation Agency
KOICA	Korea International Cooperation Agency
M&E	Monitoring and Evaluation
MACC	Marginal Abatement Cost Curve
MARD	Ministry of Agriculture and Rural Development
MCS&T	Ministry of Culture, Sports and Tourism

MDGs	Millennium Development Goals
MOC	Ministry of Construction
MOET	Ministry of Education and Training
MOF	Ministry of Finance
MOIC	Ministry of Information and Communication
MOIT	Ministry of Industry and Trade
MONRE	Ministry of Natural Resource and Environment
MOT	Ministry of Transport
MPI	Ministry of Planning and Investment
MRV	Measurement, report, and verification
ODA	Official Development Aid
OECD	Organisation for Economic Co-operation and Development
PDP7	Power Development Plan 7
PPP	public-private partnerships
RE	Renewable Energy
SDGs	Sustainable Development Goals
SEDP	Socio-Economic Development Plan
SEDS	Socio-Economic Development Strategy
SLR	Sea Level Rise
TA	Technical Assistance
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
VCCI	Vietnam Chamber of Commerce and Industry
VDGs	Vietnam Development Goals
VGGAP	Vietnam Green Growth Action Plan
VGGS	Vietnam's national Green Growth Strategy
VND	Vietnamese Dong
VSDGs	Vietnam's Sustainable Development Goals

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