POLICY RECOMMENDATIONS

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Nguyen Chu Hoi, Bui Thi Thu Hien

INTERNATIONAL UNION FOR CONSERVATION OF NATURE

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SOLID WASTE GOVERNANCE IN VU GIA – THU BON RIVER BASIN AND DA NANG – QUANG NAM COASTAL AREA: FROM SOURCE-TO-SEA APPROACH

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INTRODUCTION

River basin, coastal areas, and seas are important and potential geographic spaces for human life and development. However, rapid changes as the results of human development activities are seriously impacting water resources security, environment, and livelihoods of local communities living in the river basins as well as coastal areas. Basically, the impacts in river basins are of "transboundary" nature, from upstream to downstream and into the sea, and the management do not rely on boundaries of natural systems or administrative boundaries between localities and provinces, or even between countries. As a result, there is an increasing tendency in conflicts among stakeholders regarding exploitation and use of river basins and coastal areas. Given this situation, the International Waters Program of the Global Environment Facility (GEF) has advised the countries and transboundary waters to apply the approach "from source to sea management" (or from Ridge to Reef – R2R) in order to link Integrated Water Resources Management (IWRM) with Integrated Coastal Management (ICM) aiming at strengthening the ability of freshwater resources and sea resources sharing for the future of a long-lasting stable and effective economy via adaptive institutions[3].

Being aware of the importance of the above mentioned issue, in 2012, IUCN Vietnam via its Mangrove For the Future (MFF) with support from Danida, Norad, Sida, and Hans Seidel Fund (HSF), coordinated with Da Nang city and Quang Nam province to implement the initiative "Integrated Management of Vu Gia - Thu Bon River Basin and Coastal Area of Quang Nam – Da Nang: From Ridge to Reef Approach". In the period 2017 - 2020, the initiative moved to the piloting phase with continuous support from various international organizations, IUCN and the Join Coordination Committee for Integrated Management of Vu Gia - Thu Bon River Basin and Coastal Area of Quang Nam – Da Nang (hereinafter called the Interprovincial Join Coordination Committee (JCC)) acting as the focal points. During this phase, some experiences in integrated river basin management which emphasized hydropower development were shared by the Swedish Agency for Marine and Water Management (SWAM)[4] and recently, the Stockholm International Water Institute (SIWI) has provided technical support for the implementation of the pilot project "Foundations for Source-to-Sea Management in Vu Gia – Thu Bon river basin with focus on management of solid wastes, including plastic waste. Based on the project's research results, the source-to-sea management in the river basin considers six key flows that link land, freshwater, coastal and marine environments, including: water, sediment, pollutants, biota, materials, and ecosystem services[5].

[3] GEF (2011). From Ridge to Reef: Water, Environment and Community Security. GEF action on transboundary water resources.

[4] Peter Funegard (2017). Source to Sea and the United Nations Agenda 2030 for Sustainable Development: Linkages between freshwater (SDG 6) and marine targets (SDG 14) with focus on future hydropower development in Viet Nam. Presentation in technical workshop on "Integrated Management of Vu Gia –Thu Bon River Basin and Coastal Area of Quang Nam – Da Nang", Hoi An 26-28 October 2017.

[5] Stockholm International Water Institute (SIWI) and Resource and Waste Advisory (RWA) Group (2019). Plastic Waste Management in Vu Gia –Thu Bon basin: Report on quantitative and qualitative assessment characterizing plastic solid waste flows from Vu Gia –Thu Bon basin "from Source-to-Sea". The draft in December 13, 2019.

Of the above-mentioned flows, solid waste management is considered as a core service to be provided by utilities and a crosscutting issue that can link directly to 12 out of 17 Sustainable Development Goals (SDGs), especially goals SDG 6 and SDG 14. Solid waste management requires that the two fundamental aspects of governance - "Who" and "How" are properly addressed in order to change behaviour and engage stakeholders[6]. Within the framework of SIWI-IUCN project, attention has been given to *solid waste governance in Vu Gia – Thu Bon river basin following source-to-sea* (S2S) *approach*. A short-term national consultant has been recruited for the implementation of related activities with the main purposes of:

(i) Providing general understandings of the strengths, weaknesses, opportunities, and challenges of the current local governance system relating to solid waste management, with emphasis on plastic waste in Vu Gia – Thu Bon river basin and Da Nang – Quang Nam coastal area; and

(ii) Recommending necessary changes for improvement of the current governance situation in two localities through specific policy proposals.

This report of *policy recommendations* is the main output of the consultancy work related to solid waste governance, including plastic waste in Vu Gia – Thu Bon river basin and Da Nang – Quang Nam coastal area.

It should be added that, the time schedule for this work under the consultancy contract is from 16 January to 15 May 2020, including field surveys (1 week) and meetings, as well as finalization of the report. However, the global COVID-19 pandemic with unpredictable consequences has been happening before, during, and after this period which affects the progress of the consultancy work. The time for field surveys, meetings and workshops of the JCC has been delayed again and again because the provincial/city People's Committees and relevant agencies of the two localities (inside infected areas) could not arrange the agenda. Especially, the survey was conducted in early March 2020 which was right at the time of the COVID-19 outbreak. The infected cases in Da Nang, Hoi An, and Quang Nam were confirmed in the locations where the consultants stayed just one day before. After the field survey, the survey team experienced the anxiety about the "possibility of infection", especially when social distancing was applied in the whole country and people were recommended to work from home. After more than one month of less productive working, normality has returned to working life and this is really an unforgettable memory.

On this occasion, we would like to express our sincere thanks to provincial/city People's Committees, relevant agencies, departments, and sectors of Quang Nam province and Da Nang city; private enterprises, NGOs and experts, as well as local people in study areas for their support during our field surveys. We would also want to thank the SIWI expert team, IUCN Vietnam staff for their support and facilitation of our work.

[6] Ljiljana Rodic and David C. Wilson (2017), Resolving Governance Issues to Achieve Priority Sustainable Development Goals Related to Solid Waste Management in Developing Countries, Sustainability 2017, 9, 404; doi:10.3390/su9030404 www.mdpi.com/journal/sustainability, pages 1-18.

I. BACKGROUND

1. Scope and object of the study

1.1. Geographical Scope

This research (governance of solid wastes, including plastic waste) is carried out within Vu Gia – Thu Bon river basin and Da Nang – Quang Nam coastal area, in central Vietnam. This is one of the 9 largest river basins in Viet Nam, starting from high and steep mountainous area of the east side of Truong Son mountain chain (Ngoc Linh mountain range, Kon Tum province) and ending in the downstream of Da Nang – Quang Nam coastal area with the length of the coastline being over 220 km (95 km belong to Da Nang city, 125 km belong to Quang Nam province) (Figure1).

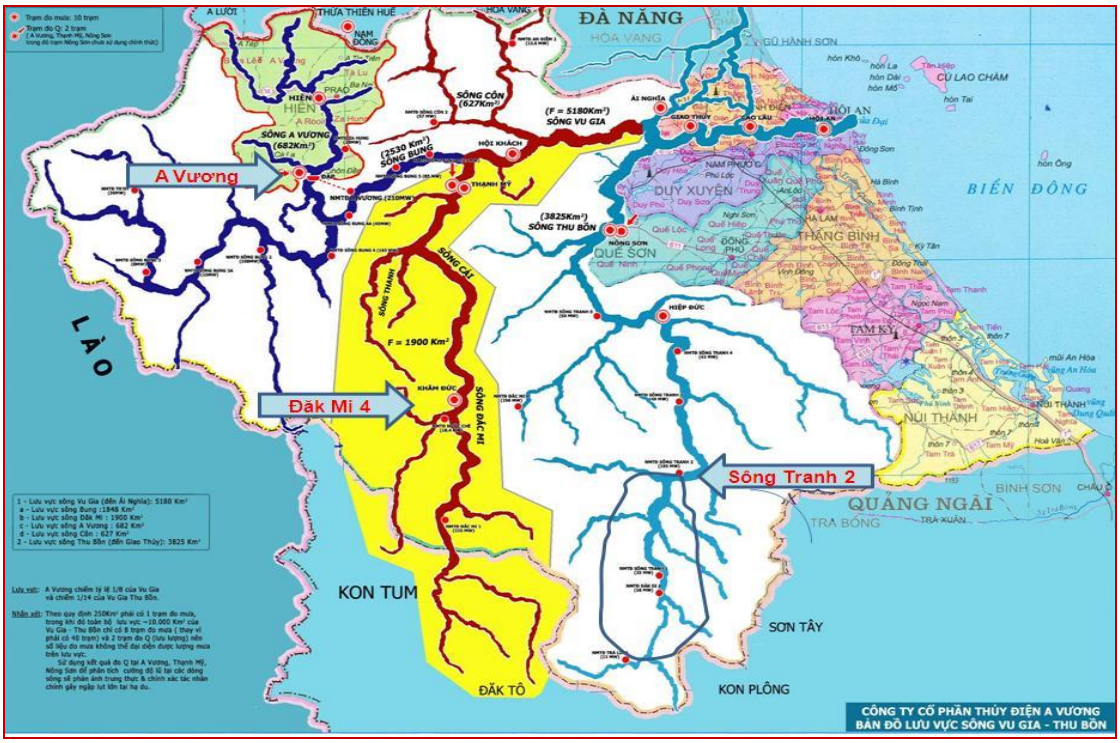

Figure 1: Vu Gia - Thu Bon river basin and Da Nang - Quang Nam coastal area

(*Sourse: A Vuong Hydropower Joint Stock Company*)

As the area of the whole river basin of Vu Gia - Thu Bon from upstream to coastal estuary is very huge (10,350 km^2), based on the source-to-sea management approach, this study has basically inherited the previous survey transects and sites of the RWA's project,[7] as well as the available data and informaton. At the same time, due to the limited field survey time and with the study object being solid wastes governance, the study sites were selected on the basis of pollutant and material flows in three main geographycal areas: highland in river basin, urban area (Da Nang, Hoi An, Tam Ky) and coastal area. The principle applied for selection of study sites is: from upstream to dowstream (vertical structure) and along the interprovincial coastal area (horizontal structure). Specifically, the consultants have conducted survey and research in

[7] RWA (2019). Plastic Waste Management in Vu Gia –Thu Bon basin: Report on quantitative and qualitative assessment characterizing plastic solid waste flows from Vu Gia –Thu Bon basin "from Source-to-Sea". The draft in December 13, 2019.

various coastal sites including Da Nang city, Cam Le commune, Tho Quang boat lock, communes along Tuy Loan river in Hoa Vang district; Hoi An city, Cam Thanh commune and Dien Ban district, Tam Ky city, Tam Hai II commune, Nui Thanh district, and along Thu Bon river in Duy Hai commune of Duy Xuyen district (Quang Nam province).

1.2. Issue Scope

Governance is analyzed to understand the context of disposal of solid wastes[8], including plastic waste leakage; to determine the responsible agencies and individuals; the reasons and levels of engagement of local agencies and sectors. The study also provides an overall insight to build general understanding of the strengths and weaknesses of the current situation, which is the basis for determination of necessary solutions for changes. Therefore, the study looked into different functions regarding behavior modification from individuals to private and state organizations in such aspects as: policy, strategy, regulation, coordination mechanism, planning, finance, management, implementation, and measures for linkage among the segments from source to sea and among the sectors (cross-sector).

This study is conducted by using the guidance on implementing the source-to-sea approach[9] by answering various specific questions to analyze and evaluate the current local governance system relating to integrated management of solid wastes, including plastic waste, within the study area. Emphasis is placed on institutional frameworks, policies, regulations, levels of legal binding, rights and obligations of communities, responsibilities of stakeholders, transitional agreements, commitments by local communities; roles of NGOs, mass organizations, and gender issues, local socio-political organizations; effectiveness and levels of compliance regarding enforcement of laws and policies related to the studied objects. Especially, the role and influence of the Interprovincial Join Coordination Committee (JCC) on governance of solid wastes, including plastic waste, have been examined.

1.3. Objects of study

As mentioned above, the object of study is governance of solid wastes, including plastic waste. Thereby, *governance* is understood as the whole process of management and execution of management authority by the state, local authorities, and social networks (private sector, NGOs, local communities) through laws, norms, power, official or unofficial agreements, commitments between government and social networks (according to Wikipedia – Figure 2).

To be simpler, *governance is to make decisions and ensure the conditions for effective implementation of those decisions*. In other words, it means who decides what to do (for example: management of solid wastes and plastic waste) and how to do it (to implement the decisions); who has the power, authority and responsibility, and who must or should take accountability and deal with conflicts, relations and engagement of stakeholders in management. Unlike governance, *management is to do what is needed to achieve the set*

[8] The report uses the Vietnamese terms of “rác thải rắn” and “chất thải rắn” which have the same meaning and are translated into the English term of “solid waste”.

[9] Mathews et al., (2019), Implementing the Source-to-Sea Approach: A Guide for Practitioners, SIWI, Stockholm; and Mathews and Stretz, (2019), Source-to-Framework for Marine Litter Prevention: Preventing Plastic Leakage in River Basins, SIWI, Stockholm.

targets, such as to understand the nature of the problem using scientific researches, to implement specific actions (conservation, protection,...), to apply existing measures, i.e. human resource training, financial mobilization, etc.; or to evaluate whether the achievements are as expected or not[10].

Figure 2: Elements of governance

On the basis of the above-mentioned perception and actual conditions, the consultants have selected the actors for discussions, interviews, and understanding of suitable contents. The selected actors include: People's Committees of Da Nang city and Quang Nam province; JCC, provincial departments, agencies, and sectors of the two localities such as Provincial Departments of Natural Resources and Environment (DONRE), Provincial Departments of Environmental Protection and Sub-Departments of Sea and Islands, Divisions of Water Resources and Climate Change, Provincial Construction Departments (DoC), Provincial Department of Agriculture and Rural Development (DARD), People's Committees of Hoi An city, Economic Division of Hoi An city, URENCO Quang Nam and Hoi An city; NGOs and mass organizations such as: EverGreen Labs, Center for Environment and Community Research (CECR), Zero Waste Alliance (ZWA), Keep Vietnam Clean & Green , RMIT University, Thanh Dong Organic Farm (Cam Thanh commune), Green Youth Collective (GYC), Quang Nam Tourism Association, An Nhien Farm, Women Association and Farmer Association of Tam Hai II commune; Cam Ha and Tam Xuan landfills; local people in Tho Quang boat lock, riparian fishmen and hawkers in Duy Hai commune of Duy Xuyen district, local people living along Tuy Loan river of Hoa Phong commune (Hoa Vang district).

2. Approach and Methods

2.1. From Source-to-Sea Approach

The source-to-sea (S2S) approach was shaped during the process of integrated management of international waters (GEF, 2011) on the basis of the general awareness of important linkages among natural systems, including: land systems, freshwater systems, deltas, estuaries, coastline, near-shore, adjoining sea, shelf, and open sea. This requires a new approach for governance and management, i.e.: by spatial (link activities from source to sea), coordination by vertical structure (between central and local levels) and horizontal structure

[10] Borrini-Feyerabend, G., N. Dudley, T. Jaeger, B. Lassen, N. Pathak Broome, A. Phillips and T. Sandwith (2013). Governance of Protected Areas: From understanding to action. Best Practice Protected Area Guidelines Series No. 20, Gland, Switzerland: IUCN. xvi + 124pp.

(among relevant stakeholders in the same locality and with other localities) and integration (integrate identified problems into specific programs and projects).

According to Mathews et al., (2019)[11], in the source-to-sea approach, there are six key flows, including: *water, biota, sediment, pollutants, materials, and ecosystem services*. Within the framework of this SIWI-IUCN project, solid wastes, including plastic waste (belonging to the pollutants flow) were selected as object of the study. The analysis and assessment of the solid waste governance system are carried out following the guidelines for implementing the source-to-sea approach in the two important SIWI documents mentioned above. Specifically, during the study, the consultants have to answer the following questions:

- Which institutional framework, laws and policies, rights, ownership and informal agreements at national, provincial, and district levels prevent plastic waste leakage in the stages from production, consumption to disposal?

- What stages in the governance system which lead to plastic waste leakage into the rivers and coastal areas do the conflicts or compatibilities and gaps belong to?

- In which areas are responsibilities for accountability or supervision of solid waste management and related fields still unclear or in conflict among the authorities? Where does the lack of agreement on responsibilities by vertical and horizontal structures exist?

- Are the agencies, with different duties by segments from source to sea, effectively coordinating to achieve the shared purposes and objectives or conflicting with each other?

- Are there other actors, apart from the public sector, for example: companies or NGOs, that can improve governance related to plastic waste? And how can these organizations prevent ocean wastes?

- Do the behaviours of target stakeholders against governance system or implementation of governance meet any failures?

- Are there mechanisms for engagement of stakeholders in decision making process?

Which procedures are in place to solve the conflicts that might arise among the stakeholders and are they effectively applied?

- Are there any policies, procedures or regulations in place to support source-to-sea management?

2.2. Methods

With limited time for the assignment, the consultants used different “quick” study methods in order to answer the questions as required by the above-mentioned S2S approach. Field survey activities were conducted from 4 to 11 March, 2020. The methods used can be divided into the following main groups:

a. Desk study:

- Collect and analyze secondary information and data before and after the field survey, including: related documents of SIWI-IUCN project; international and domestic publications

[11] Mathews et al., (2019), Implementing the Source-to-Sea Approach: A Guide for Practitioners, SIWI, Stockholm; Mathews and Stretz, (2019), Source-to-Framework for Marine Litter Prevention: Preventing Plastic Leakage in River Basins, SIWI, Stockholm.

related to governance, institutions, and policies on solid waste management in Vietnam in general and in the studied area in particular; results of related research by IUCN-HSF project on integrated management of Vu Gia - Thu Bon river basin and coastal area of Quang Nam – Da Nang, etc. Analyze secondary information to set orientation for the tasks to be done and issues to be added during the field survey in order to close existing information gaps. It is found out that, existing data of wastes in general and solid wastes, including plastic waste, in particular are unsystematic, not updated regularly and some are out-of-date. Within Vu Gia – Thu Bon river basin and Da Nang – Quang Nam coastal area, the most updated material about plastic waste is the report on "Plastic Waste Management in Vu Gia –Thu Bon basin: Report on quantitative and qualitative assessment characterizing plastic solid waste flows from Vu Gia – Thu Bon basin''.[12]

- Participate in related meetings and workshop organized by IUCN in collaboration with its partners (MONRE, SWAM, SIWI, Life Cycle Initiative, UN environment, GreenHub) regarding management and mitigation of solid wastes and plastic waste disposed to the sea in Vietnam, in Da Nang city and Quang Nam province. Through the meetings and workshops, related information, data, and initiatives were discussed and shared. As a member of the National Advisory Board (NAB) of the IUCN MarPlastics project and on integrated management of Vu Gia – Thu Bon river basin and coastal areas, the consultants had the chance to report, and discuss in important meetings and workshops of the JCC. Especially, during the field survey, in the afternoon of March 5th, 2020, the survey team participated in the workshop of the JCC on results of the activities in 2019 relating to integrated management of Vu Gia – Thu Bon river basin and coastal area of Quang Nam – Da Nang. Concluding the workshop, leaders of both localities[13] affirm their continuous priorities for mitigation and effective management of solid wastes (plastic waste) and wish the international organizations to continue their support.

b. Stakeholder consultation:

- During field surveys, the consultant conducted *target group interviews* which were selected previously with IUCN consultation and the SIWI-IUCN project reference. The questions regarding analysis of solid waste governance system, focusing on plastic waste, using source–to-sea approach were raised to all mentioned target groups. Depending on the functions, duties, and positions of each group and group members, different perceptions, assessments, and views about the same question or problem were provided. Therefore, the consultants could gather multi-dimensional, diversified, and comparative information. The number of people participating in the interviews varied in each group, with the minimum number of 2 people (due to their busy schedule and the Covid 19 pandemic) and the maximum number of 8 people. In addition to on-site results, we also received the information in form of written, copied, and PDF documents via email exchange after the survey. Main groups consulted and discussed during the field survey include: Division of Water Resource and Climate Change under the Environmental Protection Sub-Department of Da Nang Province (Da Nang DONRE), Division of Engineering Infrastructure (Da Nang DoC), and Provincial Sub-Department of Sea and Islands (Quang Nam DONRE).

[12] RWA (2019). Plastic Waste Management in Vu Gia –Thu Bon basin: Report on quantitative and qualitative assessment characterizing plastic solid waste flows from Vu Gia –Thu Bon basin "from Source-to-Sea". The draft in December 13, 2019.

[13] The workshop was co-chaired by Mr. Ho Ky Minh – Vice Chairman of Da Nang People's Committee and Mr. Huynh Khanh Toan - Vice Chairman of Quang Nam People's Committee.

- *Consultation with experts* of various sectors relating to management and governance of solid wastes, including plastic waste. Most of the consultations were with experts from NGOs operating in Da Nang and Quang Nam. Collected information is often objective, straightforward, and diversified depending on personal perspectives and experience of the experts. The experts are those representing EverGreen Labs on "circular economy" for plastic waste treatment; Center for Environment and Community Research (CECR) on general local awareness on source–to-sea; Zero Waste Aliance (ZWA), Keep Vietnam Clean and Green, RMIT Da Nang on community involvement, role and solutions for communication on enhanced awareness and knowledge for the communities; Thanh Dong Organic Farm, Cam Thanh commune (Hoi An) on plastic waste in clean agriculture; Green Youth Collective (GYC) on clean agriculture and plastic waste recycling by the blinds; Quang Nam Tourism Association on plastic waste in the province's tourism industry and roles of the Association; An Nhien Farm on green agriculture and zero plastic waste model.

- *Consultations with provincial/city leaders* were conducted to get insights into the viewpoints, perception, and judgement of the leaders representing provincial/city People's Committees regarding governance and management of solid wastes, including plastic waste. Consultations were also conducted with representatives of the JCC under Da Nang City on the role and operational performance, and possibility for modification of functions and duties of the JCC in order to effectively implement source–to-sea; with leaders of Economic Division of Hoi An City on landfill issue in Hoi An city and Quang Nam province; with representatives of Hoi An city authorities (URENCO Hoi An, Division of Natural Resources and Environment, Cu Lao Cham Marine Protected Area) on plastic waste issue and measures to mitigate plastic waste; with representatives of Quang Nam authorities (DONRE, DoC, DARD) on mechanisms, policies and institutions relating to state management of solid wastes, including plastic waste; etc.

c. *Field surveys*:

- *Field observation and description* during workshops and meetings before and during the field surveys to update information and proofs about the situation of solid and plastic wastes, as well as to record the evidence by taking real documentation photos. During this survey time, the consultant team had chance to visit the following sites: EverGreen Labs on some products using circular technology for plastics; Tho Quang Wharf – Da Nang on waste issues at the fishing wharf; Hoa Phong and Hoa Phuong communes along Tuy Loan river (Hoa Vang district, Da Nang) on solid waste collection; Thanh Dong Organic Farm, Training Club on waste recycling of An Nhien Farm; Triem Tay Garden (Dien Phuong commune, Dien Ban town, Quang Nam province); Duy Hai commune (Duy Xuyen district, Quang Nam province) along Thu Bon river on plastic wastes from fishing boats and riverside restaurants; Tan Xuan II Landfill (Nui Thanh district).

- *Getting information from community* is the focus of attention in the current governance system following S2S approach regarding solid and plastic wastes. During the consultation meetings and workshops, the consultant team had chance to work with stakeholders on solid waste governance. In addition, the team also met with some representatives from communities, such as: representatives of farmer women community of Tam Hai II commune (Nui Thanh district – Quang Nam province) on the role of women (gender) in collection and separation of solid wastes and situation of landfills in Nui Thanh district; interviews with fishermen and traders in Tho Quang Lock on waste management in the lock and on the sea; interviews with members of bottles (ve chai) purchasing group (informal group) near Tho

Quang Wharf on the capacity to buy, separate, and sell materials after separation; interviews with local people in riverside communes where the team visited about the ability to maintain waste collection and source-separation practices.

II. ACTUAL SITUATION OF SOLID WASTES IN VU GIA – THU BON RIVER BASIN

1. Land-based pollution hotspot

Da Nang city and Quang Nam province are situated in a strategic location of the central economic region – one of the most dynamic developing economic zones of Vietnam recently, attracting attention of various investors, large transnational corporations, and companies worldwide. Da Nang city is considered the largest economic - political - cultural center of the Central Vietnam. The ancient Hoi An city of Quang Nam province, which is recognized as a World Heritage Site by UNESCO together with Cu Lao Cham form the Cu Lao Cham - Hoi An Biosphere Reserve. To the south, Tam Ky city together with Chu Lai coastal economic zone and Dung Quat economic zone (Quang Ngai) create an important "growth pole" of Quang Nam province and is the gateway to the ocean of provinces in the Central Highlands, Central and Southern Laos PDR. This is a region with various favourable conditions for investment attraction, technological and scientific development, economic and cultural exchange with other places in the country and with the world.

However, besides the economic benefits gained from the above-mentioned development advantages, Da Nang city and Quang Nam province are facing several environmental and natural resources issues, including wastes in general and solid wastes (including plastic waste) in particular, which are becoming a "critical problem" due to extremely fast level of wastes discharge with remarkable load of pollutants in recent years. Whereas, as we already know, Da Nang city and Quang Nam province are located entirely inside Vu Gia – Thu Bon river basin with contrasting terrain, steep streams and rivers, variable natural water balance, and the rainy season causing damages to local livelihoods, etc. Therefore, together with the high levels of sediments, pollutants are from mainland carried by the rivers to the sea. This area has become one of the five "*pollution hotspots*" along the coastline of Vietnam.

According to the results of preliminary inventory of the pollutant load discharged to the sea (in 2010)[14], annually, the Da Nang – Quang Nam coastal area receives about 92,600 tons of COD, 22,400 tons of BOD (excluding pollutants from rivers), 53,800 tons of nitrogen content, 11,900 tons of total phosphorus, 428,400 tons of total suspended solids, nearly 83 tons of pesticides and insecticides and about 430 tons of heavy mentals. Beside contaminants overflowing into the sea, this area also receives contaminants transported by Vu Gia and Thu Bon rivers. However, the total discharged waste load from these two rivers is mainly the total suspended solids (accounting for 44%), followed by 12% of organic materials, 28% of nitrogen content, and nearly 3% of total phosphorus. Agricultural activities are still the main source of organic materials, nutrients, and total suspended solids (about 42 - 87%) transported to the coastal area, followed by other sources (Figure 3). If detailed inventory was carried out at the present time, the total discharged waste load would probably be higher due to the rapid socio-economic growth, which is sometimes "hot", while the capacity to deal with environmental problems fails to catch up and correspond to practical requirements.

[14] VASI-IMER-UNEP GPA (2010), The rapid assessment of land-based pollution to coastal and marine areas of Vietnam, The report of UNEP GPA project on Global Marine Pollution Management from Land-based Sources.

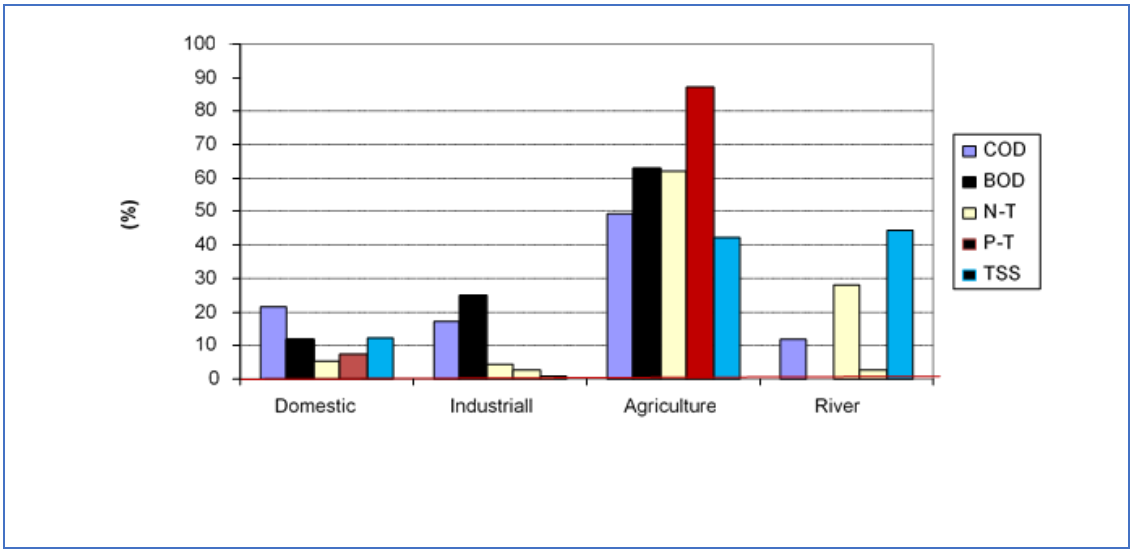

Figure 3: Pollutants from different sources transported to the coastal area of Quang Nam - Da Nang (VASI – IMER – UNEP GPA, 2010)

2. Actual situation of solid wastes

In Vietnam, urbanization together with rapid economic and population growth are generating a huge amount of wastes, which has doubled in less than 15 years, with the estimated volume of over 27 million tons in 2015. With this rapid growth rate, it is estimated that the generation rate of domestic solid wastes is 8.4%/year of total solid wasstes in urban areas and the total estimated increase is about 5% per year. The estimated waste volume in the whole country will increase to 54 million tons by 2030[15].

Da Nang city is now facing with the problem of increasing solid wastes. In 2016, there were about 780 - 800 tons of solid wastes generated each day within the city area. This number increased to about 900 - 930 tons/day in 2017 and to over 1,100 tons/day at present, while the rate of waste separation and recycling is only over 2%. Solid waste generation is estimated at over 1,800 tons/day for the period 2020 - 2025, over 2,400 tons/day for the period 2025 – 2030, and over 3,000 tons/day for the period 2030 - 2040[16]. At the same time, the volume of urban solid wastes generated in Da Nang city is significantly increasing: from 8 - 10%/year during the period 2007 – 2017 to nearly double in two years of 2017 and 2018[17]. Da Nang city is

[15] International Bank for Reconstruction and Development / The World Bank (2018), Solid and industrial hazardous waste management Assessment: options and action areas to implement the national strategy, Washington, DC 20433, USA.
[16] Orientation for solid waste management in Da Nang, online Natural Resources and Environment Newspaper, 18/07/2019 https://baotainguyenmoitruong.vn/dinh-huong-quan-ly-chat-thai-ran-o-da-nang-249557.html
[17] Vu Lê (2019), Da Nang: Solid wastes account for 16 – 17%, online Industry and Trade Newspaper 28/02/2019 https://congthuong.vn/da-nang-rac-thai-ran-chiem-ty-le-16-17-116368.html

forecasted to be one of the biggest cities in Vietnam with rapidly increasing solid waste generation due to rapid urbanization and industrialization[18].

In Quang Nam province, daily waste generation in the whole province is about 1,000 tons/day on average. About 400 m³/day of wastes are not collected, transported, and treated. Therefore, at present, the amount of untreated wastes in the entire Quang Nam province is about over 17,000 m^3. Without measures for timely collection and treatment, the residential areas and roads will become "open dumping sites"[19] (Figure 4). In 2017, the total amount of domestic solid wastes generated in the whole province was about 921.3 ton/day, of which domestic solid wastes in rural areas was 564.4 tons/day (accounting for 61.3% of the total amount of solid wastes) and in urban area was 356.9 tons/day (accounting for 38,7%)[20].

Regarding diversity of solid waste sources in Vu Gia – Thu Bon river basin, the research by RWA (2019) initially focused on examining three cluster types, including: rural area, urban area, and coastal area. Results of calculation show that, total solid waste generation is 1,649 tons/day, of which 338 tons/day are from rural area, 1,189 tons/day are from urban area, and 122 tons/day are from coastal area. In the study area, the total volume of plastic waste generated is 281 tons/day, of which 55 tons/day are from rural area, 206 tons/day are from urban area, and 20 tons/day are from coastal area. Waste generation rate in Da Nang city is about 0.8 kg/person/day and in Quang Nam province (except Hoi An city) is 0.42 kg/person/day, while in Hoi An city it is 0.7 kg/ person/day. The rate of plastic waste generation in urban areas is about 0.7 – 0.8 kg/person/day, in rural areas is 0.42 kg/person/day, and in coastal areas is 0.42 kg/ person/day. Industrial, commercial, and domestic wastes in urban areas account for 20% - 30% of total solid wastes, in rural area account for about 15%, and in coastal area account for 15% - 20%. Wastes from tourism activities in some urban areas in Vu Gia – Thu Bon river basin (Da Nang, Hoi An and Duy Xuyen) are about 0.75 kg/tourist/day. Plastic waste composition in solid wastes from urban area is 17% (Da Nang) and 20% (Hoi An), from rural area is 16%, and from coastal area is 16%[21].

[18] Ministry of Natural Resources and Environment (2015), Report on the current status of national environment for the period 2011 – 2015, Hanoi.

[19] Hai Yen (2019), Quang Nam: Over 17,000 m^3 of untreated wastes, Rural Economics Newspaper, 02/10/2019 https://kinhtenongthon.vn/quang-nam-hon-17000m3-rac-thai-ton-dong-chua-duoc-xu-ly-post30907.html

[20] Quang Nam Institute of Urban and Rural Planning (2018), Adjustment of Planning for solid waste management in Quang Nam province until 2020, with orientation to 2030, archived at Quang Nam Department of Construction, page 39.

[21] RWA (2019), Plastic Waste Management in Vu Gia –Thu Bon basin: Report on quantitative and qualitative assessment characterizing plastic solid waste flows from Vu Gia –Thu Bon basin "from Source-to-Sea", The draft in December 13, 2019, page.21-24.

Figure 4: Solid wastes accumulated throughout traffic routes, causing environment pollution and unbeautiful landscape

Regarding waste composition, in Vietnam, about 60% of the wastes are organic wastes, about 16% are plastic wastes, 7% are glass, 6% are metals, 2% are paper, and 9% are mixed wastes (WB, 2012)[22]. In Da Nang – Quang Nam area, the proportion of plastic waste ranges from 8-16% of domestic solid wastes. In Da Nang city, regarding waste composition in general, the amount of solid wastes accounts for 16% - 17% and includes mainly plastic bags and bottles[23]. In Quang Nam province, about 70% of domestic wastes are biodegradable organic materials, about 14.5% are flammable materials, about 6.5% are inorganic materials such as Persistant Organic Pollutants (POPs) (plastic, leather, sponge) and 5.6% are inert substances (glass chips, ceramics)[24].

3. Solid waste management and mitigation efforts

So far, planning for solid waste treatment of Da Nang city has not yet been suitable with the National Strategy, the main treatment technology is of burying, limited human resource, etc. Therefore, the priority of Da Nang city People's Committee is to manage solid wastes by focusing on three main groups of solutions: (i) waste separation at source, (ii) strengthening of collection and transportation lines, (iii) recycling treatment of solid wastes, including plastic waste. It is time to synchronize the steps of separation, collection, recycling and apply the "circular economy"[25]. Da Nang city has equipped 41 special garbage trucks, 521 manual rickshaws, and 2,854 garbage bins of all kinds. The number of workers involved in direct waste collection and road sweeping in the whole city is 862 people. At present, there are five active waste transfer stations including Le Thanh Nghi, Wholesale Market, Nguyen Duc Trung, Hoa An,

[22] Cited from RWA (2019), Plastic Waste Management in Vu Gia –Thu Bon basin: Report on quantitative and qualitative assessment characterizing plastic solid waste flows from Vu Gia –Thu Bon basin "from Source-to-Sea", The draft in December 13, 2019, page.20.

[23] Vu Le (2019), Da Nang: Solid wastes account for 16 – 17%, Industry and Trade Newspaper dated February 28, 2019, https://congthuong.vn/da-nang-rac-thai-ran-chiem-ty-le-16-17-116368.html

[24] Quang Nam Institute of Urban and Rural Planning (2018), Adjustment of Planning for solid waste management in Quang Nam province until 2020, with orientation to 2030, archived at Quang Nam Department of Construction, page 40.

[25] According to Ms Nguyen Thi Kim Ha, Deputy Director of Da Nang Division of Environment Protection at the discussion with the consultant team on March 6th, 2020.

and Hoa Tho with average capacity of 72 tons/day. In the whole city, there are 133 temporary stations for bins gathering and waste transferring. However, environmental sanitation in waste gathering stations is still in bad condition.

So far, in Da Nang city, only Khanh Son Waste Treatment Plant receives domestic solid wastes and treats them using burying technology. However, this technology is out-of-date and possesses many limitations: it requires large area of land, fails to exploit and make use of the resources from waste, is expensive for treatment of leachate and likely causes environmental pollution if the landfill is not operating properly. At present, Khanh Son landfill still has a limited capacity of receiving and operates in only a short time. Whereas, the project on upgrading and improving some construction items in Khanh Son landfill is facing some obstacles including: the area of land for national defense purpose within the project boundary has not yet been defined and measured; etc. According to the Vietnam Environment Administration[26], if Da Nang city does not promptly take drastic actions for solid waste treatment, there will soon be environmental hotspots. In addition, despite the increasing amount of solid wastes, there is still the lack of environmentally standardized transfer stations and some solid waste transfer and treatment stations are not suitable to the actual situation; monitoring in localities is still diffused which results in low performance. Waste recycle and treatment is not so attractive to the investors; the economic actors participating in waste collection, transportation, treatment, etc. are not so diverse.

To overcome this situation, Da Nang city has adjusted the planning of and investment in waste transfer stations. According to which, some construction items of Khanh Son Landfill will be improved and upgraded to ensure proper solid waste treatment of the city after 2020 and the project "Khanh Son Solid Waste Treatment Plant" with capacity of 650 tons/day & night using waste-to-energy incineration technology will be implemented. Investments will also be spent for Le Thanh Nghi and Tho Quang Waste Transfer Stations in order to completely solve environmental pollution in waste transfer stations, as the basis for expansion and improvement of waste collection network in the entire city. The construction of another two solid waste treatment plants with the capacity of over 1000 tons and without requirement for source-separation will help to deal with the waste generation in the city which is approximately 1,100 tons[27]. At the same time, planning for a solid waste treatment complex in Hoa Nhon commune of Hoa Vang district has been made to provide for the future. Investment is spent on upgrading and improving leachate treatment system and mitigating environmental pollution. Da Nang People's Committee also request effective implementation of the "Plan for solid wastes separation at the source in the whole city until 2025" and adjustment of the "Planning for solid waste treatment in Da Nang city until 2030, vision to 2050". Emphasis is placed on investment in hazardous solid waste incineration facilities, septic tank sludge treatment system, and improved capacity of officers responsible for state management of solid wastes and climate change adaptation activities[28].

[26] Orientation for solid wastes management in Da Nang, online Ratural Resources and Environment Newspaper, July 18th, 2019

[27] According to Mr. Nguyen Duc Binh, expert of the Division of Infrastructure Engineering, Da Nang Department of Construction, during the discussion with the consultant team on March 6th, 2020.

[28] Source: Actual investigation source by the consultant team, March 2020

Box 1: Piloting waste separation at source

Recently, in Da Nang city, waste separation at source has been piloted for one year in Hai Chau district (Thuan Phuoc and Thach Thang wards) and in Thanh Khe district (Thanh Khe Tay and Hoa Khe wards). In Hai Chau district, 40,000 participating households are equipped by the city with waste collection tools and 80% of solid wastes have been collected and separated. The city is now carrying out assessment and learning from experience of Hai Chau model for replication and continuing to provide thousands of garbage bins and bags for the remaining districts[29]. In addition, the city has implemented the project "Ocean without plastic – the program of collection, separation, and recycle of solid wastes for a healthy community and green city" since mid-2018 in Son Tra district with an aim to "propagandize, guide, and encourage waste separation at source in 70 residential areas of seven wards with about 14,000 participating households[30].

Da Nang city assigns District People's Committees to develop detailed plans for waste collection at source which are suitable to each locality based on the general criteria of the city. According to that, wastes are classified into three categories: recycled wastes (waste as a resource), hazardous wastes, and others. It is planned that, after the year 2025, Da Nang city will continue to carry out detailed classification of waste compositions such as nylon, glass, inorganic and organic wastes, etc. In the meantime, the households will be provided with propaganda documents and guidelines, and garbage bags. The city will provide residential areas with garbage bins to store hazardous wastes according to the requirements as well as 2/3 - compartment bins in public places and some landscape routes[31].

Box 2: Decentralization mechanism for collection and separation of wastes at source

At present, local people have to pay the waste collection fee of 25,000 VND/month for town houses and 30,000 VND/month for alley houses; the city spends 60,000 VND/ton for burying waste, cost approx. 25 US$ for burning and 140,000 VND/m^3 for leachate treatment. So, what mechanism does the city apply to pay localities for waste collection to promote reproduction? Da Nang city is studying a mechanism that ensures equity for localities in order to encourage them to actively manage and collect wastes at source, collect and use service fee to pay for workers of waste collection group.

(Source: *Ms. Nguyen Thi Kim Ha,* Deputy Director of Da Nang Division of Environmental Protection at the discussion with the consultant team on March 6th, 2020).

The planning for solid waste management in Quang Nam province in the period 2011 - 2020 was approved in accordance with the Decision No.154/QD-UBND dated January 12th, 2011. At present, the province has submitted for approval of the planning adjustment for the

[29] Source: Ms. Nguyen Thi Kim Ha, Deputy Director of Da Nang Division of Environmental Protection at the discussion with the consultant team on March 6th, 2020.

[30] Source: Orientation for solid wastes management in Da Nang, online Natural Resources and Environment Newspaper, July 18th, 2019.

[31] Source: Actual investigation by the consultant team, March 2020.

period 2021 – 2030. Comparing with the objectives to 2020 specified in Decision No.154/QD-UBND, the rate of common solid waste collection is 80% on average, of which the rate in Tam Ky and Hoi An cities is about 95%; in coastal plains (Dien Ban, Phu Ninh, Nui Thanh,…) is 70 - 90%; in mountainous and rural areas is 30 – 40%. Besides, many industrial clusters have not had solid waste gathering points; the amount of hazardous solid wastes to be treated is about 40%; the collection and treatment of medical solid wastes basically satisfy the requirements[32]. Construction solid wastes are not properly collected and treated, however, according to some officers of construction sector, this type of wastes is often reused right away so it is not an inadequacy[33]. So far, 28 solid waste treatment stations with the total area of 181.7 ha have been planned in Quang Nam province (Figure 5).

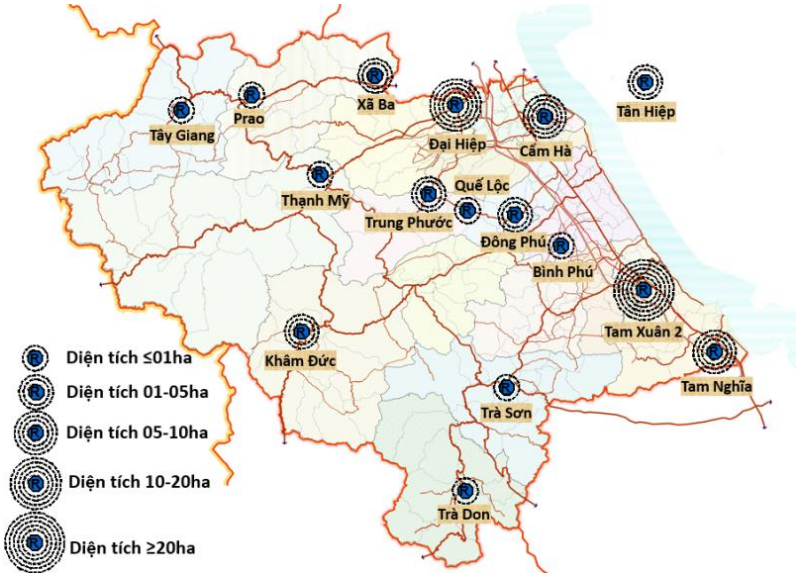

Figure 5: Location map of solid waste treatment stations operating in Quang Nam province (Note: a circle shows area in hectar)

According to the decision of the provincial People's Committee, in 2020, daily wastes will be treated in the landfills of Tam Nghia, Tam Xuan 2 (Nui Thanh), Dai Hiep (Dai Loc) and collected in Tam Ky, Dien Ban, Nui Thanh, Tien Phuoc, Thang Binh, Que Son, Phu Ninh, Hiep Duc, Duy Xuyen, Dai Loc with an estimated amount of 200,000 tons and maximum unit price of over 65,000 VND/ton[34] and total estimated budget of over 13 billion VND. The provincial People's Committee requests that waste treatment must follow the procedures issued by Ministry of Construction and that the operation of landfills must follow the regulations[35].

Within Vu Gia – Thu Bon river basin, the RWA estimations (2019) show that, the rate of plastic waste collection in urban area (96%) is higher than that of rural area (62%) and coastal area (66%). On average, in the entire river basin, about 12% of total plastic wastes are not collected and the amount of plastic wastes to be treated and recycled is very small (around 7%). Based on the observations in the field, most of the uncollected waste is retained on land (50%), while some is either burned or accumulates in drains. The potential average leakage to

[32] Quang Nam Institute of Urban and Rural Planning (2018), Adjustment of planning for solid waste management in Quang Nam province until 2020, with vision to 2030, archived at Quang Nam Department of Construction, page 40.
[33] Source: Actual investigation by the consultant team, March 2020.
[34] According to the Decision No. 22/2017/QD-UBND dated September 19th, 2017 of Quang Nam People's Committee
[35] Châu Nữ (2020), More than 13 billion VND for waste treatment service in 2020, Quang Nam online, January 30th, 2020, Tam Ky.

waterways is estimated to be around 31% of unmanaged plastic waste with the urban areas releasing only 19% due to their better collection services and coverage. Due to their large amount of waste generated this still accumulates to 714 ton/year. A total of 4,268 tons of plastic waste or 4% of the total plastic waste is estimated to enter the waterways in the Vu Gia – Thu Bon river basin yearly compared to total plastic waste generated. If put in relation to the population of the Vu Gia – Thu Bon river basin each person releases between 0,6kg/per (urban) and 4kg/per (rural) plastic waste entering waterways per year. This is equivalent to 120 (urban), 2.000 (rural) and 1.500 (coastal) plastic bags released per person per year[36].

4. Advantages and disadvantages of solid waste governance and management in Vu Gia – Thu Bon river basin

There are strengths and weaknesses, opportunities and threats in the solid waste governance and management in Vu Gia – Thu Bon river basin. The promoted SWOT analysis shows that the strengths and opportunities create the advantages, then weaknesses and threats equal disadvantages which are folowings:

4.1. Advantages

- The management of solid wastes is being paid greater attention by stakeholders, local communities, and local authorities from rural to urban and coastal areas.

- There have been significant achievements in socio-economic development in the entire province with high annual growth and diversified structure of business activities. This has created more resources and preconditions for investment and development in solid waste management. More investors are paying attention to solid waste treatment locally.

- Scientific – technological advances and inventions are increasingly applied in solid waste management practices. Several new and modern technologies meeting the requirements of solid waste management and treatment have been the focus of attention of foreign and domestic investors.

- Authorities of two localities has promulgated various policies on solid waste management, including the policy of “socialization” of solid waste management aiming at calling for and attracting investment as well as creating many incentive mechanisms for solid waste management and treatment.

- The traffic network in Quang Nam province and Da Nang city is being upgraded, expanded, and newly constructed which makes it more convenient for solid waste collection and transportation.

- The construction and upgrading of rural infrastructure also contribute to the collection, transportation, and treatment of solid wastes in this area.

[36] RWA (2019), Plastic Waste Management in Vu Gia –Thu Bon basin: Report on quantitative and qualitative assessment characterizing plastic solid waste flows from Vu Gia –Thu Bon basin “from Source-to-Sea”, The draft in December 13, 2019, pag.27-30.

4.2. Disadvantages

- The amount of solid wastes is rapidly increasing, especially domestic and industrial solid wastes whose composition is more diversified and difficult to treat, which include hazardous and plastic wastes.

- Unequal development between areas (or cluster) in Vu Gia – Thu Bon river basin and the limited ability to link between the areas make it difficult to develop a large solid waste treatment complex with advanced technology and high capacity (input solid waste). Some garbage dumps have been built up (for example the Cam Ha garbage dump) and are potentially leaking to the sewers, rivers, and then to surrounding environment and the sea.

- For rural and mountainous areas: there is the lack of human resources for management and difficulties in socialization; the collection and transportation of wastes is very costly and it is very difficult to organize inter-regional treatment due to the complex geographic setting; low fee and small number of households paying fee make the service infeasible financially; at present, there are still environmentally unfriendly landfills in mountainous districts;.

- The common situation of Da Nang city and Quang Nam province is the difficulty in finding the place for construction of solid waste treatment complex, mainly because local people do not want to bring wastes from other places to near their home. The construction of many solid waste disposal sites is not accepted by local people though they were planned previously.

- There are still difficulties in complying with existing regulations on selection of sites for construction of garbage treatment complex that ensure environmentally-safe distance. Therefore, many active solid waste treatment facilities still have not been certified of assuring environmental protection requirements as there have been no legal basis for the orders and procedures to guide this certification process.

- Regarding waste treatment technology: it is very difficult to control the quality of the advertised technology and equipment, moreover, the capacity of waste treatment of the province is also limited. Most of the imported technologies for solid waste treatment are not suitable for the actual situation of solid wastes in Vietnam (without source-separation, low heating value of solid wastes, high air humidity,...), whereas the equipments and technologies for solid waste treatment produced domestically are incomplete or sometimes troublesome (like the case of Hoi An waste incinerator). Investment and operation of solid waste treatment complex with advanced and modern technology (waste-to-energy incineration) has very high costs[37].

- In Quang Nam province, the proportion of local people paying waste collection fee is still very small and unstable, leading to the shortage of funds to pay waste collection and transportation service groups and units; source-separation of domestic wastes is still not effective (this is only done in Hoi An city, while in other places it is only limited to encouragement of waste separation at source to reduce the amount of wastes disposed of).

[37] Quang Nam Institute of Urban and Rural Planning (2018), Adjustment of Planning for solid waste management in Quang Nam province until 2020, with orientation to 2030, archived at Quang Nam Department of Construction.

4.3. Reasons for disadvantages

- As the area of unused land in Da Nang and Quang Nam province is not so big, the selection of site for solid waste treatment complex that ensures environmentally safe distance is very difficult. Therefore, most of the anticipated solid waste treatment plants can only ensure the safe distance of 500 m (meeting the requirement for incineration technology), and only a few sites in mountainous districts (Quang Nam) can ensure the safe distance of 1,000 m following the requirements of the burying technology. Thus, the majority of localities propose to use incineration technology, though this technology has potential risks during operation.

- Parts of the population still have limited awareness of environment protection, including plastic waste, due to irregular awareness activities; there are still many obstacles in encouraging local people to keep the environment clean, separate wastes at source, pay waste collection fees. Moreover, source-separation of domestic wastes is very difficult, which requires changes in waste disposal practices as well as synchronization of technical infrastructure (collection and transportation means and vehicles, treatment technology).

- Quang Nam province has a large area, complex and diverse terrain with plains, midlands, and high mountains. Therefore, the management of domestic wastes faces many difficulties including: the collection and transportation of wastes is very costly; inter-regionally centralized treatment of wastes is very difficult leading to the existence of various small-scale garbage dumps not operating in line with required procedures in mountainous districts.

- Limited human resource for solid waste management: The human resource involved in the management of solid wastes at all levels (from province to commune) comprises mainly the officers on concurrent job with the main task of environment protection, which does not meet the requirements for solid waste management; investment in environmental infrastructure is not responsive to actual development needs; funds allocated to districts are not enough for the organization and management of wastes in general and solid wastes in particular.

- Unprofessional waste services in rural and mountainous areas have resulted in increasing illegal waste disposal into open lands, river banks, and seaside. Increase in the use of disposable plastic bags/packaging due to their use convenience and cheap price results in a huge amount of plastic waste being disposed into the environment and sewers.

- Source-separation of wastes or other collection mechanisms are not integrated into management of solid wastes in a constructive manner. Therefore, the rate of resource recovery from wastes is relatively low. Only the informal sectors are active in resource recovery from wastes.

- A huge amount of solid wastes from Vu Gia – Thu Bon river basin are causing impact to downstream communities (Hoi An, Nui Thanh, Duy Xuyen, Da Nang), especially in rainy and flooding seasons. The coordination mechanism between Quang Nam and Da Nang through JCC for integrated management of Vu Gia - Thu Bon river basin and coastal areas of Quang Nam – Da Nang has not yet selected the solid waste flow as a high priority issue.

- The policy framework and regulations to restrict/minimize the production and use of plastic products (especially disposable plastics) are not complete, leading to the lack of necessary and minimum legal basis for governance to stimulate the circular economy.

Box 3: The reason why local residents block access of garbage trucks to Tam Xuan II Landfill (Nui Thanh district, Quang Nam province)

The reason local residents prevent URENCO garbage trucks entering Tam Xuan II Landfill is that: URENCO fails to thoroughly address the problem of unbearable stench coming from the landfill; initially local people were allowed to go into the landfill to collect recycle materials, however, this activity has been stopped in recent years; local people only accept wastes from Nui Thanh and reject those from other places. Consultation with communities directly impacted by the landfill (Bich Nam village) was not carried out during the planning stage, instead community consultation was only done with Bich Son village. When access to the landfill was blocked, URENCO failed to deal with the situation "wisely", therefore local people seem to be "upset".

Source: *Discussion with Ms. Huynh Thi Hong Vy (President of the Tam Xuan Commune Women's Union) and Mr. Dong (Vice Chairman) of Tam Xuan 2 commune, Nui Thanh district in March 2020.*

III. SOURCE-TO-SEA GOVERNANCE OF SOLID WASTES IN VU GIA - THU BON RIVER BASIN

1. Legal framework for solid waste management

1.1. General context

The administration system in Vietnam is divided into four levels, including: central level, provincial level (including centrally governed cities), district level (including district towns and provincially governed cities), and commune level (including wards/townships). At the provincial level, there are 5 centrally governed cities and 58 provinces, making up a total of 63 units, of which 28 units are in coastal areas. Centrally governed cities include: two special urban centers (Hanoi and Ho Chi Minh City) and three cities of type I (Hai Phong, Da Nang, and Can Tho). At the provincial level, there are 70 cities, 54 district towns, and 591 districts. At district level, there are 1,581 wards, 9,043 rural communes, and 590 townships. These levels are administered by the People's Councils and People's Committees of their corresponding levels. These levels play different roles in the management of solid wastes[38].

In Vietnam, economic and population growth together with rapid urbanization have exacerbated the problem of wastes and have contributed to the annually increasing amount of wastes. Due to the limited institutional framework, the scope of waste collection is narrow, especially in rural areas. Weak control and enforcement, together with an incomplete legal framework, are causing environmental issues which contribute to an increased health risk for the people. Environmental risks also emerge due to the practices of informal groups in handicraft villages, where a significant amount of wastes, including solid and hazardous wastes, are generated and treated. In addition to careless disposal of wastes, waste treatment in formal facilities is not effective or in line with internationally designed standards. Waste management in Vietnam is lacking the principle of "the polluters must pay" with very low fee imposed on households and other entities generating wastes, and at least 80% of the costs are subsidized by the Government[39]. Though operating through four administrative levels, the institutions and policies relating to the decisions on management of the environment, solid wastes in particular are only set up at the provincial level, while district and commune levels are only at "implementing" levels. The community level has no clear position in the above-mentioned institutional framework and policy system.

1.2. Institutional framework for solid waste management at central level

In Vietnam, the responsibility for solid waste management at the central level belongs to two key ministries: MONRE and MoC. At present, the main shortcoming at central level is the lack of a clear division of responsibilities regarding specific duties in solid waste management as

[38] Nguyen Chu Hoi and others(2018), Sustainable Management of Vietnamese Seas and Islands, Nationl Politics Truth Publishing House, Hanoi.

[39] International Bank for Reconstruction and Development/The World Bank (2018), Solid and industrial hazardous waste management Assessment: options and actions areas to implement the national strategy, Washington, DC 20433, USA, Hong Duc Publishing House (Vietnamese version), page 32.

there are different ministries involved. The MoC has the highest authority in management of municipal domestic solid wastes and determination of landfill locations. In addition, the Ministry also has the responsibility to manage normal construction wastes; specifically for burying. The responsibilities of the MoC include: (i) formulate policies and regulations; (ii) develop and guide the implementation of an investment program for solid waste treatment; (iii) formulate, review, guide, and supervise the planning of inter-provincial solid waste management; (iv) guide and monitor the development and management of the planning for the establishment of solid waste management facilities; (v) conduct the appraisal of the planning for solid waste management of centrally governed cities; (vi) organize investment promotion activities and provide guidance for investment in inter-provincial solid waste management facilities. However, the MONRE is the united state management body for environmental management, being responsible for formulating policies, strategies, and regulations as well as examining and supervising the implementation of the Report on Environmental Impact Assessment (EIA) and Report on Strategic Environmental Assessment (SEA), especially being responsible for management of hazardous wastes, waste management in general and environmental protection. In 2019, the Ministry of Natural Resources and Environment was assigned to be the focal point for integrated management of solid wastes[40]. However, a detailed division of duties and responsibilities between the two ministries is not clear at central or local levels.

Other key relevant ministries include: (i) Ministry of Health (MoH), being responsible for medical wastes. Responsibilities for waste management of this ministry include a basic assessment of the impacts of solid wastes on human health and the inspection and monitoring of waste treatment activities by hospitals; (ii) MARD being responsible for management of rural domestic solid wastes as part of the National Target Program for New Rural Development, and wastes from agricultural and aquacultural activities. In reality, in rural areas, hygienically burying of decomposable organic wastes within a household's residential area is encouraged and some communes even provide financial support for solid waste burning at home; (iii) Ministry of Industry and Trade (MoIT), being responsible for state management relating to plastic industry and trade development, the promotion of production of environmentally friendly products and services; (iv) Ministry of Transport (MoT), being responsible for management of wastes from ships and boats in port waters; (v) Ministry of Science and Technology (MoST), being responsible for management of radioactive wastes. Regarding waste management, the Ministry of Planning and Investment (MPI) and the Ministry of Finance (MoF) both review and allocate funds and financial sources to ministries, governmental agencies, and localities for the implementation of waste management plans on the basis of their annual and long-term waste management. Besides, these two ministries will coordinate to provide economic incentives to facilitate waste management, including tax incentives, fixed asset depreciation incentives, and land use incentives. MoST will coordinate with the MoC and the MONRE to evaluate solid waste treatment technology studied and applied for the first time in Vietnam[41].

[40] Resolution of Regular Government Meeting in January 2019 (09/NQ-CP, dated February 3rd, 2019).

[41] International Bank for Reconstruction and Development/The World Bank (2018), Solid and industrial hazardous waste management Assessment: options and actions areas to implement the national strategy, Washington, DC 20433, USA, Hong Duc Publishing House (Vietnamese version), page 33

1.3. Solid waste management institution at local level

According to the 2019 report of MONRE, the agencies responsible for domestic solid waste management are assigned by the People's Committees of the provinces/cities: 35 provinces/cities assign the provincial departments of construction to manage solid wastes, including domestic solid wastes; 20 provinces/cities assign the provincial departments of natural resources and environment to manage solid wastes; 8 provinces/cities assign both provincial departments of construction and provincial departments of natural resources and environment to manage solid wastes. After the issuance of the Resolution No. 09/NQ-CP dated February 3rd, 2019, provinces/cities have started to assign the provincial departments of natural resources and environment as the responsible agencies in solid waste management.

Provincial People's Committees (such as Quang Nam) and centrally – governed cities (such as Da Nang) are responsible for the implementation of national policies within their local jurisdiction. The assigned authority and responsibilities for waste management at local level include: (i) execute state management regulations on environment protection; (ii) approve projects of waste treatment in the locality; (iii) mobilize funds from various sources to invest in the landfills; (iv) instruct Departments of Natural Resources and Environment of the provinces/cities to design, develop, supervise, and implement the EIA report for waste treatment projects; (v) instruct provincial/city URENCOs (the names may vary between provinces/cities based on the company's role and functions) to organize the activities of waste collection, transportation, and treatment; and (vi) approve waste treatment tariff based on the recommendations of provincial/city Department of Finance.

In addition, the provincial/city Department of Construction is the provincial unit of the Ministry of Construction operating in the field of municipal domestic solid waste management in the "vertical line". Responsibilities of this department in management of municipal domestic solid wastes and determination of landfill locations include: (i) support the Provincial People's Committee to make decisions for projects on waste treatment facilities and (ii) coordinate with the Department of Natural Resources and Environment to report and propose suitable locations to make planning the landfills for approval by the Provincial People's Committee. The Department of Natural Resources and Environment is the provincial unit of Ministry of Natural Resources and Environment has an important role in the management of domestic solid wastes in terms of environmental quality monitoring, management and implementation of policies and regulations on waste management issued by Ministry of Natural Resources and Environment and Provincial/City People's Committee, review of reports on EIAfor waste treatment projects, and coordinate with the provincial Department of Construction in the selection of suitable landfills to submit to the Provincial People's Committee for approval.

In practice, the collection, separation, treatment, and burying of wastes are done by URENCOs in provinces, districts, and provincially governed cities. The Government strongly encourages the participation of the private sector in the collection, transportation, treatment, and burying of solid wastes, however, regular coordination with competent governmental agencies must be ensured, which means there is no real "privatization". Responsibilities and risks are shared between private companies and the government. Recently, this encouragement policy has been implemented in the larger cities of Vietnam. After all, as

commented by the World Bank[42], the achievements in municipal solid waste management are the results of the effectiveness of operation at local levels. Unfortunately, the limitations and shortcomings at local levels, including Da Nang city and Quang Nam province, are hindering the implementation of this policy. Specifically:

- Provincial Department of Natural Resources and Environments do not have enough human resources for the execution of their management, supervision and implementation functions.

- Big cities and towns solid waste management is normally decentralized to townships/ districts. However, there are no clear guidelines or technical support from the provincial level. Moreover, there is also a lack of allocated resources.

- At present, the responsibilities for domestic solid waste management in rural areas (including role, functions, and responsible ministries) are not mentioned in government decrees. Management of rural domestic solid wastes is carried out by MARD as part of the New Rural Development Program[43].

- In handicraft villages, there has been no clear division of the functions and responsibilities of the three relevant ministries regarding hygiene issues, including: Ministry of Agriculture and Rural Development, Ministry of Natural Resources and Environment, and Ministry of Science and Technology. In other words, this means that no ministry takes the lead.

- The private sector does not find it attractive to invest in solid waste management services due to the uncertainty of the legal framework, inconsistent implementation of regulations, low fees, and lack of reliable data, etc. In addition, ministries and branches are unable to effectively implement the policies on "privatization" due to unclear processes, a wide scope, and complicated procedures.

- Ministry of Construction and provincial Departments of Construction in many provinces have prepared the overall planning for municipal solid waste management, however, they are rarely implemented. This might reflect local priorities for other sectors over management of wastes, including plastic waste, and/or shortage of funds.

- National policies and strategies have been formulated for municipal solid waste management, however, relevant ministries and sectors have not yet promulgated guidelines or the guidelines in place are not consistent.

1.4. Institution for integrated management of river basin and coastal area

In Da Nang city and Quang Nam province, there are obstacles in the institutional framework for integrated management of solid wastes. Besides, as Da Nang city and Quang Nam province are located in Vu Gia – Thu Bon river basin has its own natural, economic, social, and environmental characteristics. The specific issues of six flows (river-sea linkage) are shown clearly as already defined by SIWI[44] and inter-provincial issues emerge both in the river basin

[42] International Bank for Reconstruction and Development/The World Bank (2018), Solid and industrial hazardous waste management Assessment: options and actions areas to implement the national strategy, Washington, DC 20433, USA, Hong Duc Publishing House (Vietnamese version), page 34-35.

[43] Circular No. 55/2014-BNNPTNT: guiding the implementation of selected environmental protection activities in the National Target Program on New Rural Development for the period 2010 -2020

[44] Mathews et al., (2019), Implementing the Source-to-Sea Approach: A Guide for Practitioners, SIWI, Stockholm.

and along the coastal area of the two localities. These issues are of "transboundary" nature, such as: balance and distribution of water source, land-based pollution, coastal erosion and estuary sedimentation, benefit conflict in resources exploitation in river basin and coastal areas (hydropower development, sea encroachment, etc.). This requires a new management manner – integrated management of Vu Gia – Thu Bon river basin and the coastal area of Da Nang – Quang Nam based on the source-to-sea approach and inter-provincial coordination mechanism[45].

Box 4: Is the waste management institution in Da Nang city still complicated?

The natural resources and environment sector performs state management of solid wastes in accordance with the new decision of the Prime Minister, while the provincial Department of Construction is responsible for solid waste treatment planning and water source quality assurance. The construction sector should consult and reach agreement with relevant agencies on related matters before submitting to the provincial People's Committee for consideration and approval. Besides, the provincial Department of Construction is responsible for the supply of water, including urban clean water, while clean water for rural areas and irrigation is the responsibility of the agricultural and rural development sector. However, rural solid wastes, wastewater and handicraft villages related solid wastes are still under the management of the natural resources and environment sector.

Source: *According to Mr. Nguyen Duc Binh, expert of the Engineering Infrastructure Division, Da Nang Department of Construction during the discussion with the consultants on March 6th, 2020*.

Integrated management of river basins and coastal areas is a new issue in Vietnam both in theory and in practice. Therefore, the People's Committees of Da Nang city and Quang Nam province have agreed to coordinate with each other in the implementation of an integrated management of Vu Gia – Thu Bon river basin and coastal area of Quang Nam – Da Nang[46], which piloted for three years (2017 – 2020) accompanied by the International Union for Conservation of Nature (IUCN) and other international and national organizations. According to Decision No.4546/QD-UBNDDN-UBNDQN dated August 18th, 2017, the Chairmen of Da Nang City People's Committee and Quang Nam Provincial People's Committee stipulated the establishment of the Interprovincial Coordination Committee on Integrated Management of Vu Gia – Thu Bon River Basin and Coastal Area of Quang Nam – Da Nang. The Interprovincial Coordination Committee operates on the basis of the regulations specified in the Operation Regulations of the Coordination Committee and Standing Working Group in the period 2017 – 2020[47], according to which the Vice Chairman of Da Nang People's Committee and Quang Nam People's Committee alternately take the position of Chairman of the Coordination Committee by rotation every six months.

The main tasks of the Interprovincial Coordination Committee include: (i) Advise the Chairmen of Da Nang People's Committee and Quang Nam People's Committee on the inter-sectoral and inter-regional collaboration, coordination and direction for integrated management of Vu Gia – Thu Bon river basin; (ii) Evaluate the situation of organization and

[45] Nguyen Chu Hoi, Dao Trong Tu, Bui Thi Thu Hien (2014). Policy Recommendation: Integrated River Basin Management of Vu Gia – Thu Bon and Coastal Quang Nam – Da Nang, Viet Nam – From Ridge to Reef Approach. Gland, Switzerland: IUCN.

[46] Coordination Agreement No. 01/TTPH-UBNDDN-UBNDQN dated December 21, 2016 of Da Nang People's Committee and Quang Nam People's Committee on coordination in Integrated river basin management of Vu Gia – Thu Bon and coastal Quang Nam - Da Nang.

[47] Decision No. 4828/QD-BDP dated July 30, 2017 of the Director of Coordination Committee for Integrated river basin management of Vu Gia – Thu Bon and coastal Quang Nam - Da Nang on promulgation of Operation Regulations for Coordination Committee and Standing Working Group in the period 2017 – 2020.

implementation, and timely report to the Chairman of People's Committees of two localities on the situation, performance, difficulties, obstacles as well as recommendations and suggestions. Contents of coordination on integrated management of river basin and coastal areas include: (i) Organize periodic dialogues on integrated management of river basin and coastal areas; (ii) Evaluate the actual status, define and predict potential risks in Vu Gia – Thu Bon river basin affecting urban development in the river basin and coastal areas; (iii) Ensure interprovincial responsibilities for development planning and investment projects on resource exploitation and use in the river basin and coastal areas; (iv) Strengthen inter-sectoral and inter-regional coordination in supervision of effective exploitation and use of water resources, with focus on ecological environmental protection for the river basin and coastal areas; (v) Develop a database for the river basin and coastal areas, share and co-exploit information and data for the management of resources, environmental protection, and response to climate change; (vi) Strengthen and enhance knowledge and awareness to meet the requirements for integrated management of river basin and coastal areas of the two localities.

Box 5: Integrated management of river basin and coastal area?

Integrated management of river basin and coastal area links integrated management of water resources in the river basin with integrated coastal management aimed at strengthening the capacity to share and mitigate the conflicts in exploitation and use of freshwater resources and in coastal resources for the future of a stable economy. Integrated management of the river basin and coastal area focuses on spatial connectivity and the linkages between sectors in development management in order to achieve long-term benefits and goals.

Source: *Operation Regulations for Coordination Committee and Standing Working Group in the period 2017 – 2020; Nguyen Chu Hoi, Dao Trong Tu, Bui Thi Thu Hien (2014). Policy Recommendation: Integrated River Basin Management of Vu Gia – Thu Bon and Coastal Quang Nam – Da Nang, Viet Nam – From Ridge to Reef Approach.*

This is the first and only institution for the integrated management of river basin and coastal areas which is in its piloting phase in Vietnam. After nearly three years of piloting, relevant stakeholders all agree with the preliminary assessment of the results and benefits of the institution for integrated management of river basin and coastal areas with inter-provincial coordination mechanism as follows[48]:

(i) The Coordination Committee has maintained the coordination mechanism based on the Operation Regulations for Coordination Committee and focused on dealing with the issues of mutual concern; Operation Regulations and contents are integrated into the meetings of the City/Provincial Party Committee, which reflects the buy-in of the whole political system.

(ii) Leaders of the two localities have changed their perception. They have seated together 6 formal meetings and related workshops, resulting in the increased involvement of relevant departments and sectors in timely reporting and sharing information on benefits and coordinated issues solving; unsolved issues of two localities are publicly discussed and quickly resolved . This is a rare practice.

(iii) Recently, the Coordination Committee has given priority to dealing with the issue of water regulation and mobilizing businesses in both localities in dealing with the demand for

[48] Synthesized interview results by consultants in March 2020 with Da Nang DONRE (Mr. Dinh Quang Cuong – Deputy Director of DONRE, Ms. Nguyen Thi Kim Ha – Deputy Director of provincial Department of Environment Protection, and Ms. Dang Nguyen Thuc Anh – Deputy Manager of Da Nang Division of Water Resources and Climate Change); and Quang Nam DONRE (Ms. Nguyen Hoang Yen – Deputy Director of Department of Seas and Islands and Mr. Tran Nguyen Hien Trung – Expert).

water. Businesses are encouraged to make decisions towards reducing dependence on the Vu Gia river.

(iv) Leaders of the two localities have acknowledged the mobilization of scientists to participating more in dealing with the issues of Vu Gia – Thu Bon river basin.

(v) As a result of communication sharing among stakeholders and the buy-in of leaders, the stakeholders have shared information actively and acted jointly.

(vi) There is an active engagement of local business groups and companies operating hydropower in Vu Gia – Thu Bon river basin and a sharing of water resources/storage among the sectors for the dry season.

(vii) Initial funds relied on support from the projects. In the future, the Coordination Committee will arrange a separate budget for the activities and projects agreed by both localities (i.e.: improve efficiency of environmental monitoring system in the river basin, risk forecasting, regular information exchange; inter-household operation process).

(viii) Training activities have received greater attention and implementation according to the plan approved by the Coordination Committee.

1.5. Laws and policies on solid waste management

The system of Vietnamese legal documents on solid waste management is very diverse, including: Law on Environmental Protection, some decrees, decisions and circulars on specific contents as well as relevant technical requirements. The governing law relating to solid wastes in Vietnam is the Law on Environmental Protection which was promulgated in 1993 and amended and supplemented many times; most recently the Law on Environmental Protection in 2014. At present, the new Law on Environmental Protection is being reviewed and amended to be submitted to the National Assembly for consideration. The Law on Environmental Protection 2014 has general regulations on environmental protection. Regarding wastes, this law promotes the reduction of waste volume, reuse, and recycling; encourages organizations and individuals to use recycled and environmental friendly products; stresses the need for reduction, reuse, and recycling of solid wastes in order to minimize the amount of wastes to be buried. Article 82 of this law stipulates the requirements for environmental protection at the household level in order to minimize and separate wastes at source; Article 86 requires the separation of all recyclable wastes. The Law on Environmental Protection states the need to encourage the application of advanced technology to recycle and reuse wastes (implementation of 3R) with the aim to produce raw materials and generate energy. The minimization of solid wastes that need to be buried will be an important part of the policy on solid waste management of Vietnam.

Many decrees, circulars, and decisions have been approved relating to specific subjects and the regulations/technical standards of solid waste management. The National Strategy on Integrated Management of Solid Waste 2009 and the amended National Strategy 2018 on Integrated Management of Solid Waste until 2025 with vision to 2050[49] point out specific

[49] Decision No. 491/QD-TTg dated May 7th, 2018 of the Prime Minister on approval of the revised "National Strategy on Integrated Management of Solid Wastes until 2025, with vision to 2050".

objectives for waste classification and recycling. The World Bank (2018)[50] states that the decrees promulgated at the ministerial level are primarily concerned with landfills, waste-to-energy treatment plants, composting technology, recycling principles, strengthened management of solid wastes in rural areas, technical specifications, etc. Recently, the National Strategy on Integrated Management of Solid Waste has categorized specific objectives according to types of waste, and embraced a new perspective of considering *waste as a resource type* which gives priority to waste-to-energy plants (incinerators) and energy recovery from landfills via landfill gas recovery. However, according to the World Bank (2018), no by-laws are being developed (like for waste-to-energy) to help implement the decrees. There are no specific recommendations to achieve the above-mentioned objectives.

As mentioned above, although the system of policies and laws on solid wastes are very abundant, they are still "both redundant and insufficient". The organizations that are assigned the responsibilities for solid waste management are still diffuse and inconsistent which makes it difficult for implementation. Whereas, the implementation of policies and legal documents on solid wastes still face various difficulties and obstacles. There are many restrictions with the inspection and examination of law enforcement and the sanctions against violations of solid waste management are not effective deterrents. The implementation of approved planning for solid waste management in localities is still very slow. Investment in solid waste management is limited and not responsive to the actual needs due to the lack of financial resources[51]. The socialization is still weak due to the lack of appropriate regulations to attract investors[52].

The decrees, decisions, and circulars are not properly implemented (low level of compliance) in manufacturing facilities or waste treatment facilities. For example, a field visit to Tho Quang wharf (Da Nang) – the biggest lock in the Central of Vietnam - revealed that though there is existence of the Management Board and the Environmental Team and good infrastructure, wastes are still carelessly disposed of and not collected. Many places are highly polluted due to the open disposal of wastes and plastic waste in the production site. Further investigation showed that wastes are collected everyday by the Environmental Team, however, wastes are still disposed indiscriminately within the area under management of Tho Quang Lock. An officer responsible for the Lock management said: "There are regulations, there are rubbish bins in the lock, however wastes are still not put inside the bins. We must give up". It is obvious that the rubbish bins are too small and the number of rubbish bins is too few compared to the large amount of wastes to be disposed (Figure 6), there is a lack of compulsory regulations of the specific sanctions for workers that needs to be considered.

[50] International Bank for Reconstruction and Development/The World Bank (2018), Solid and industrial hazardous waste management Assessment: options and actions areas to implement the national strategy, Washington, DC 20433, USA, Hong Duc Publishing House (Vietnamese version), page 37.

[51] MONRE (2017), Report on national environmental status – Solid waste management, Hanoi.

[52] Vietnam Environment Administration (2019), Management model and technology for domestic solid waste treatment in Vietnam, Workshop materials on May 8th, 2019, Hanoi.

Figure 6: The rubbish bins are overloaded (photo by Nguyen Chu Hoi, Mar 2020)

Box 6: Where do solid wastes go?

Fishing boats go to the sea for about 10 days before returning to the port to sell fish. The fishing ground is in the adjoining sea and sometimes in the open seas of Hoang Sa (Paracel Islands), Truong Sa (Spratly Islands). The ice used to marinate fishes is "mild" so when the boats arrive at the port, the fish sold to traders are often "unfrozen". The income is 20 million VND/person/sea trip. Small boats do not have enough space for rubbish bins. As a result, waste collection on boats is unseen and wastes are disposed directly to the sea (said a fisherman in Tho Quang Lock). Thus, wastes from fishing boats are not only disposed of in the lock when docking but also disposed carelessly into the sea. The sea is vast but not boundless for storing the wastes!

Source: *Results of the interview by the consultant team in Tho Quang Fishing wharf, Da Nang during the field survey in the morning of March 7th, 2020.*

The analysis in Part I has acknowledged the efforts of Da Nang city and Quang Nam province in the management of solid wastes in Vu Gia – Thu Bon river basin. However, objectives set out in the revised planning for solid waste management in the coming period of the two localities for implementation of the national strategy are quite ambitious in the current practical situation. There should be a new approach for source-to-sea management by managing the "life cycle" of solid wastes based on mobilizing "people power", promoting "socialization" and gradually decentralization to the local levels. On that basis, review of the legal framework and revision of unnecessary points will be done to enable the application of clear and feasible policies. Human resources should be arranged to synchronously solve three prioritized spatial sources in Vu Gia – Thu Bon river basin and coastal Quang Nam – Da Nang: (1) rural – mountainous area, (2) urban area, and (3) coastal area.

2. Who is engaged in solid waste governance at local level?

2.1. Stakeholders engaged in solid waste governance

Stakeholders are understood as organizations and individuals having rights and benefits, obligations and responsibilities, being impacted or having the ability to interfere in solid waste management from source-to-sea. Therefore, engaging stakeholders is an essential step to the governance of solid waste in Vu Gia – Thu Bon river basin. Regarding the solid waste flow and source-to-sea governance system within Vu Gia – Thu Bon river basin, five stakeholder groups have been defined and ranked according to their descending degrees of influence[53] including: (1) Primary stakeholders; (2) Target stakeholders; (3) Enabling stakeholders (Enablers); (4) Supporting stakeholders; and (5) External stakeholders. The functions and roles of these stakeholder groups vary greatly and are discussed in detail in the guidance on the source-to-sea approach and preliminary survey results in Vu Gia – Thu Bon river basin[54]. More specific analysis of stakeholders in solid waste management in the river basin was conducted by IUCN under framework of the Foundations for Source-to-Sea Management project[55]. According to that:

(i) *Primary stakeholders* (those who are directly impacted and benefit from change in solid waste flow, including plastic waste), including: local fishermen; local people living along riversides; small businesses on the riversides (restaurants, hotels, tourist ships, tourist activities,...); companies using natural resources from Vu Gia – Thu Bon river basin (fishery, tourism services, sand mining, hydropower,...),

(ii) *Target stakeholders* (those who contribute to the change and directly mitigate change of solid waste flow), including: Management Boards of the Industrial Parks of Da Nang city and Quang Nam province, Management Board of Tho Quang Lock, Landfill Management Boards; URENCOs; private solid waste treatment companies; waste treatment companies; picker/scavenger group; URENCOs of Quang Nam province, Dan Nang city, Hoi An city and waste recycling social enterprises (Evergreen Labs (EGL), waste treatment facilities, organic fertilizer factories, waste collection cooperatives,...).

(iii) *Enabling stakeholders* (those who are responsible for implementation of activities and management duties to generate change in the solid waste flow), including: MONRE (Vietnam Environment Administration (VEA), Vietnam Administration of Seas and Islands (VASI), Department of Legislation); provincial DONRE (Provincial Department of Environment Protection, Provincial Department of Seas and Islands, Division of Water and Mineral Resources); Ministry of Construction (Department of Infrastructure); Provincial Department of Construction (Division of Infrastructure); ministries and their respective provincial departments in Da Nang city and Quang Nam province, such as: Agriculture and Rural Development, Transportation, Planning and Investment, Finance, Science and Technology, Information and Communications, Industry and Trade; People's Committees of Da Nang city and Quang Nam province, provincially-governed cities, districts, communes, and respective divisions of Natural

[53] Mathews et al., (2019), Implementing the Source-to-Sea Approach: A Guide for Practitioners, SIWI, Stockholm, page 26 (Vietnamese version).

[54] SIWI (2019). Source-to-sea framework for marine litter prevention: Preventing plastic leakage from river basins, p.19.; RWA (2019), Plastic Waste Management in Vu Gia –Thu Bon basin: Report on quantitative and qualitative assessment characterizing plastic solid waste flows from Vu Gia –Thu Bon basin "from Source-to-Sea", The draft in December 13, 2019, p. 37-40.

[55] IUCN (2019), Stakeholder analysis: Foundation for S2S management in VG – TB river basin, Vietnam (solid waste flow), A matrix table.

Resources and Environment (Tam Ky and Hoi An cities; Duy Xuyen, Dien Ban, and Nui Thanh districts of Quang Nam province); the districts of Hoa Vang, Thanh Khe, Cam Le, Hai Chau, and Lien Chieu Liên of Da Nang city; socio-political organizations (Women Union, Youth Union, Farmer's Union, Fatherland Front, war veteran association). Coordination Committee for Integrated Management of Vu Gia – Thu Bon river basin;

(iv) *Supporting stakeholders* (development partners or financial partners who have related strategies that support source-to-sea objectives), including: international donors (UNDP, EU, GIZ, UNDP GEF, UNESCO, JICA, UNESCAPE...); international organizations and INGOs (IUCN, WWF, SIWI, PEMSEA, Asian food industry, East meet West, Institute for Global Environmental Strategies (IGES), IRD, IDH; interested enterprises, and specific projects, PROVietnam, Coca Cola, Quang Nam Tourism Association, etc.). Management Board of Hoi An – Cu Lao Cham Biosphere Reserve; media agencies.

(v) *External stakeholders* (individuals and groups of people having shared interests in the project/programmeoutputs), including: relevant national NGOs, social enterprise (An Nhien Farm, GreenHub, EMIC, The Field ,...); institutes, related universities located in the area (Da Nang University, Quang Nam University, Duy Tan University, Institute of Sustainable Development of the Central Region, Central Viet Nam Institute For Water Resources,...); INGOs (Pacific Environment (PE), Vietnam Zero Waste Alliance...) and relevant national specialists.

2.2. Who are the actors of solid waste governance?

In addition to the above-mentioned stakeholder groups which are ranked according to their descending degrees of influence, realistic analysis also points out other stakeholders operating or conducting activities relating to solid waste flow in Vu Gia – Thu Bon river basin. This means the organizations/individuals observing the mitigation, management, and treatment of solid wastes from source-to-sea in Da Nang city and Quang Nam province. Some experts[56] believe that, within the river basin of Vu Gia – Thu Bon, source-to-sea issues, including solid waste flow, are ranked at different priority levels depending in each locality, for example: Da Nang city gives the highest priority to water issues although the national environment management agency believes that Da Nang's high priority should be in solid waste management.[57] Quang Nam province gives the highest priority to the mitigation and treatment of solid wastes. Recently, from pressing reality and the requirement to build an image of a "livable" city, Da Nang has begun to pay attention to solid wastes, while in Quang Nam province, the issue of solid wastes has become a "real" pressing issue that needs to be solved immediately.

With that level of attention, only government authorities and agencies of the two localities take part in dealing with the problem of solid wastes in Vu Gia – Thu Bon river basin, while enterprises and local people are still "staying out". Specifically, the policies and mechanisms relating to the mitigation of solid wastes issued by the city/provincial People's Committees are still very formalistic, focusing on implementation of Government's directive

[56] Personal discussion with Ms. Huynh Thi Lieu Hoa, representative in the Central Region of the Center for Environment and Community Research (CECR), Ms. Dang Nguyen Thuc Anh – Deputy Manager of Da Nang Division of Water Resources and Climate Change; and Quang Nam DONRE, Ms. Nguyen Hoang Yen –Head of Division of Seas and Islands).

[57] Nguyen Trung Thang (2019), Overview of solid waste management in the world and some solutions for Vietnam, Environment Magazine, Vol. 9/2019, Hanoi, page 1.

documents rather than on measures for management decentralization, mitigation and treatment of solid wastes at district, commune and community levels, including incentive policies and mechanisms for such activities. The involvement of enterprises is still very limited, partly due to the lack of policy for the management of solid waste using an integrated approach, which includes management of the waste lifecycle (from manufacturing, consumption, use, disposal, collection, transportation, and treatment of wastes). Therefore, the districts, communes, and communities still perform the assigned tasks but only at the level of "passive reaction" rather than "proactive response" against solid waste issues. In both localities, URENCO plays a prominent role in directly collecting and transporting solid wastes, including plastic waste, in urban, coastal, and rural-urban areas. In mountainous areas and island communes like Cu Lao Cham, a local waste collection team is responsible for this.

As stated, the success of solid waste management and governance is linked closely to the performance of local levels, communities, and private businesses. Therefore, a plan developed by the city/province cannot be successful if it is not implemented by the district and lower levels. Moreover, solid waste management is still fragmented without sufficient coordination between different actors to address the issue of plastic pollution across the entire Vu Gia-Thu Bon river basin. It is unanswered whether the stakeholders, local communities, and businesses have not been engaged in solid waste management and if the resources are still limited (Box 7). Reality shows that, "informal" sector such as a waste pickers, scrap purchasing teams, waste collection teams, etc. are important forces involved in dealing with the problem of solid wastes, including plastics, but at a small scale. The story of plastic waste and other solid scraps purchased, gathered and stored by individuals in the neighboring village of Tho Quang wharf (Da Nang city) is an example[58] (Box 8).

Figure 8: Wastes under separation (left) and sorted reusable wastes (right)

(Photo: Nguyen Chu Hoi, March 2020)

Box 7: Are resources for source-to-sea governance and management of solid wastes needed?

With limited resources, management activities following the source-to-sea approach has not been considered a pressing issue of two localities and priority of the JCC. Since there are places to dispose of solid wastes, both localities focus on other issues. For integrated management of solid wastes to be properly implemented, it should be a priority of Da Nang city through the attention and responsibility of the city leaders (City Party Secretary and Chairman of People's Committee). There is still a shortage of human resources at lower levels (district, commune, and community levels), the lack of effective monitoring and supervision mechanism. The situation of "superiors instruct, inferior levels do not

[58] Field survey results of the consultant team in the morning of 7th March, 2020.

listen" is still very common. Which mechanisms are in place to solve this problem? Is there a need for people and resources?
Source: *Discussion with Ms. Huynh Thi Lieu Hoa, representative in the Central Region of the Center for Environment and Community Research (CECR), former Deputy Director of Da Nang DONRE (March 5th, 2020)*.

Hoi An city alone has 17 scrap facilities which buy about 3,000 kg of recyclable wastes everyday, accounting for approximately 4.6% of the total waste generation in the city. This rate is quite low compared to other cities[59]. Only 9 facilities have received guidance to register their operation and prepare the environment profile, the rest are still in the preparation process. The total area of storage rooms in these 17 facilities is 2,120 m^2, which is 163 m^2/facility on average. These facilities buy recyclable wastes year-round, carry out pre-treatment and packaging before transferring to manufacturing plants in other cities[60].

Box 8: Operation of the informal waste collection group
This is a private group formed by Ms. Hai "spontaneously" purchasing plastic wastes with a cheap price. The plastics include: fiber mesh, plastic bucket, and other reusable solid wastes (Figure 8). After purchasing, they (about 10 people) directly separate wastes into two types: reusable and non-reusable wastes. Reusable wastes, after being "refreshed", are sold directly to users, while non-reusable wastes are sold as scraps at the price of 4,000 – 5,000 VND/kg, which will then be sold to a larger collection point in Quang Ngai province. The average purchasing price is 3,000 VND/kg and the wage for picker is about 4,000,000 VND/person/month. Further research on informal groups and recycle waste collection chain is needed. Is it the case that, if there are incentive policies in place and better organization, this can be a replicable model?

Support (financial and technical) from national and international donors and NGOs to deal with various aspects of source-to-sea governance of solid wastes in Vu Gia – Thu Bon river basin plays a very important role. Financial support for the treatment of solid wastes in particular comes from donors such as the Japan International Cooperation Agency (JICA), Asian Development Bank (ADB),... Technical support and strengthening of knowledge and awareness come from national and international organizations such as: IUCN, SIWI, WWF, UNDP GEF SGP, UNESCO, UNESCAP CARE, PEMSEA, IRD, HSF, An Nhien Farm, GreenHub, MSC, PE – Pacific Environment, Da Nang University, Quang Nam University, Duy Tan University, Institute of Sustainable Development of the Central Region, Central Viet Nam Institute For Water Resources, Vietnam Zero Waste Alliance, Green Viet, RMIT University, Quang Nam Tourism Association, etc.

2.3. Role of gender in local solid waste management

The role of gender is decided by economic, cultural, and social factors, according to which women and men normally play three gender roles, including: *production role*, *reproduction role,*

[59] Chu Manh Trinh, Nguyen Thi Thu Huyen (2020), Experience in domestic waste management in Hoi An: approaches, material of UNDP/GEF SGP Vietnam.
[60] Hoi An People's Committee (2018), White Book on wastes in Hoi An city.

and *community role* [61]. In reality, both men and women have the ability to take part in all three roles at different levels (more, less; primary, secondary). A deeper understanding of these gender roles helps us to design appropriate activities for both men and women, from which to attract their effective involvement and, at the same time, contribute to reducing gender-based inequality in the division of social labor. The tasks responsible for each group, especially women, have an impact on their position, opportunity, and quality of life.

In solid waste management in Vu Gia – Thu Bon river basin, there are significant differences regarding the involvement of men and women in the management process. Besides participating in the reproduction role (giving birth, raising children, doing houseworks, ...), women in rural, urban, and coastal areas of Da Nang and Quang Nam are also actively involved in the production role and partly in the community role. Rapid field surveys observation and statistics show that, over 60% on average of people using materials from waste and disposal if waste are woman. The rate increases to approximately 80% for the case of women being housewives and retail traders in the market. However, it is women who are actively involved in the management and mitigation of solid wastes, including plastic waste, i.e.: over 90% of women working as pickers, collecting solid and plastic scraps; about 40% of women participating in activities in waste treatment facilities; about 50% of women working as leaders or officers in government agencies of Da Nang and Quang Nam with responsibilities relating to source-to-sea management of solid wastes. In addition, about 80% of women play a key role in foreign organizations, local and international NGOs in coordinating and guiding the implementation of projects, conferences and workshops on solid wastes and plastic waste from source to sea in Vu Gia – Thu Bon river basin.

The above gender analysis shows that women play a very important role in dealing with solid waste flow in Vu Gia – Thu Bon river basin and there should be incentives to encourage and enable women to participate more in management of solid waste lifecycle. Women need to be encouraged to gradually change and reduce their practices of using plastic and the disposal of wastes to the surrounding environment, especially to sewers, canals, rivers and streams, and public places. Women play a core role and take the lead in persuading local communities to "say no to plastic bags", participate in the reuse of scraps to turn wastes into commodities. Therefore, a gender equality policy with incentive for female pickers in landfills is needed to have suitable working conditions and health insurance, to help them escape from poverty and improve family living standards. References to gender issues in sustainable poverty reduction [62] shows that there is the need to integrate gender into the programmes/plans, into steps/activities of solid waste management in Vu Gia – Thu Bon river basin which is reflected through mechanisms such as promoting female involvement in defining priorities, planning, etc.

2.4. Conflicts occurring in solid waste management

Benefit conflicts occurring in the solid waste management in Vu Gia – Thu Bon river basin are looked at from different perspectives: from impacts caused by solid waste pollution, to the

[61] Thanh Huong (2015), Some basic concepts related to gender, According to the Women Union, posted on the website of Industry and Trade Union dated May 2, 2015, http://congdoancongthuong.org.vn/tin-tuc/t1283/mot-so-khai-niem-co-ban-lien-quan-ve-gioi.html

[62] Ministry of Labour - Invalids and Social Affairs and Ausaid – Care – SNV – OXFAM, Summary of the Independent Evaluation Report (on Gender Analysis of the National Target Programme on Sustainable Poverty Reduction (period 2016-2020).

superficial treatment of open waste, from overlaps or gaps of management mechanism and policies. In 2019, the RWA consultant team[63] described the impacts of plastic waste pollution within Vu Gia – Thu Bon river basin, however, the description was very brief so the real impacts have not yet been fully evaluated. Rapid assessment shows that plastic wastes are disposed of into sewers, beaches, wharfs, and seaside, etc. and people have "carelessly" turned the rivers and coastal areas into natural "rubbish bins". Plastic wastes have struck the eye everyone and people are aware that plastic wastes cause unhealthy landscapes and generate stench, but people do not know how plastic wastes affect aquaculture and tourism specifically. In reality, the development of tourism is impossible if the environment is unsightly and polluted. Though impacts of plastic wastes on marine species are not clear, fish caught recently have up to 70% - 80% of plastic wastes in their stomachs. This is their "unwanted feed" and also an indicator for the impact of plastic wastes on marine species. Moreover, people eating those fishes will also suffer the "domino effect". That is not to mention the invisible impacts of microplastics in rivers and sea in the long-term.

Limited capacity of waste treatment of open cast waste landfill in both Da Nang city and Quang Nam province have resulted in benefit conflicts and, to a certain extent, caused social conflicts with local people living close to waste dumps. The story of Cam Ha Landfill in Box 9 is an example.

Box 9: Cam Ha overloaded landfill in Hoi An city

Cam Ha landfill is a spontaneous dump site for the local people, formed in 1985. With an area of about 1.35 ha and capacity of around 67,000 m^3 of wastes, the landfill has a concrete wall of 5m high with steel pillars. At present, the landfill receives about 100,000 tons of wastes from the entire city of Hoi An. However, the dated technology is unable to treat the large amount of wastes received everyday and, as a result, the amount of untreated waste is increasing. Thousands of tons of mixed wastes generate stench and directly affect hundreds of households in the area. During monsoon season, the stench goes straight into local houses, while in the rainy season, wastewater from the landfill overflows causing surface and underground water pollution. In the hot season, smoke from waste burning causes air pollution. Wastes are as high as mountains (the current height of the landfill is over 10m in some piles which makes it impossible for the wall to prevent wastes from entering a nearby graveyard. Allowing waste from the Cam Ha Landfill to enter the graveyard is not a good way to treat "the dead", who cannot rest in peace, therefore, investment in the environment is what leadership should prioritize[64]. The landfill will soon be "closed". If the landfill stops receiving wastes, Hoi An city will be flooded with waste with no place to put it. In addition, as mentioned above, people living close to Tam Xuan II Landfill in Nui Thanh district, Quang Nam province have, many times, stopped URENCO garbage trucks from entering the landfill. So far, the problem has still not been solved properly.

As stated above, the legal system and policies for solid waste management in Vietnam are redundant, insufficient, overlapping, uncoordinated, lack incentives for the involvement of the private sector, and have no "socialization" solution. The scattering of policies and authority of

[63] RWA (2019), Plastic Waste Management in Vu Gia –Thu Bon basin: Report on quantitative and qualitative assessment characterizing plastic solid waste flows from Vu Gia –Thu Bon basin "from Source-to-Sea", The draft in December 13, 2019, p. 34.

[64] Comments of Ms. Nguyen Thi Van, Head of Economic Division of Hoi An city during the discussion with the consultant team on March 7th, 2020

respective management agencies at national level has created a diversity in implementation at the local level, as well as room for involvement and development of informal sector in solid waste management in Vietnam[65]. In existing laws and policies, there are no clear regulations on integrated management of solid wastes and upstream-downstream cooperation is not occuring in Vu Gia – Thu Bon river basin. Therefore, regardless of the benefit conflicts and interests between urban and rural areas, upstream and downstream, relating to solid waste management in both Da Nang city and Quang Nam province, the regulations specified in current policies and laws could not prevent the inputs as well as the way (penetrating source) of solid wastes, including sources from outside of Vietnam. Even the overlaps and conflicts of between jurisdiction and management regulations are considered by some specialists as one of the biggest challenges in implementation and enforcement process of solid waste management framework in Vietnam in general and in Vu Gia – Thu Bon in particular.

Moreover, one of the largest obstacles for the execution of laws and policies is the perception about "solid wastes". According to the perception, waste materials in construction, which can be directly reused, are also called "construction solid wastes". Therefore, in reality, civil construction wastes, household hazardous wastes, and medical wastes are included in the system of domestic solid wastes, making the amount of "solid wastes" to be treated significantly higher. This requires a lot of money and effort for treatment as well as an increased area for waste disposal. Similarly, according to WB (2018)[66], due to the lack of definition for the composition of "domestic solid wastes", it is not clear whether trash on the streets, parks/green areas, markets or other waste components (electricity & electronic wastes, wrapping, batteries, etc.) or wastes collected by private facilities from households are included. It is recommended that international definitions, such as the definition of European Union (EU), should be applied.

[65] Reference to the scoping study 'Legal and institutional framework for management of ocean plastic litters in Vietnam', Nguyen Hoang Phuong, IUCN ELC (2020)

[66] International Bank for Reconstruction and Development/The World Bank (2018), Solid and industrial hazardous waste management Assessment: options and actions areas to implement the national strategy, Washington, DC 20433, USA, Hong Duc Publishing House (Vietnamese version), page 35.

IV. ASSESSMENT OF SOLID WASTE GOVERNANCE EFFECTIVENESS AND POLICY RECOMMENDATIONS

1. Solid waste governance at local level

1.1. Coordination mechanism and engagement commitments of stakeholders and actors

The above results of stakeholder assessment show that there are various stakeholders involved in source-to-sea governance and management of solid waste flow in Vu Gia – Thu Bon river basin and Quang Nam – Da Nang coastal area. However, in reality, there is still the lack of necessary and effective coordination for management of solid waste at the source, especially plastic waste, in all three areas: rural / mountainous area, urban area, and coastal area. The lack of clear regulations that encourage the involvement of stakeholders as analyzed above, together with institutional fragmentation between the stages of waste flow: management, production, final treatment (waste treatment, waste recycling) are the reasons why "good management" of solid waste in this area has not been achieved. In reality, the management stage just follows the duties "assigned by the superiors", while the production stage which "generates wastes" and the treatment stage (executors) are mainly self-reliant and spontaneous in the way of "You do your job and I'll do mine", with very limited support from local government, especially minimum and necessary legal support. These gaps in solid waste governance should be closed and adjusted in the coming time to enable and engage stakeholders in the solid waste governance process in both localities.

In Da Nang city and the Quang Nam province, waste in general (solid waste in particular, including plastic litter), are becoming a "pressing" issue while priority attention is given to other problems.

Box 10: Towards the circular economy in two localities

As part of IUCN - MarPlasticcs' pilot circular economy project, Evergreen Lab (EGL) was selected and implemented to collect low/non value plastic waste in Cu Lao Cham Island, Hoi An City for up recycling and produce the tradable value products. Input materials from low-value waste plastics (such as plastic bags, noodle packages, foam boxes, etc. not using PET and PVC because of its high heat melting). .) and using low heat-press technology (without creating environmental consequences) produce higher value products. These pilot circular economy projects can have an impact on reducing plastic waste pollution through the involvement of businesses and incentives to sort, collect and recycle products that have not been previously considered.

Source: *Discussion with Mr. Jan Zellmann – Co-founder, Deputy Director of Evergreen Labs by the consultant team in the morning of March 4th, 2020*.

Figure 8: Tabletop and flowerpot made from plastic flat panels recycled from plastic wastes (Photo: Nguyen Chu Hoi, March 2020)

1.2. Engagement of private sector and NGOs

The private sector, primarily businesses, are the “culprits” who produce, distribute and discharge solid wastes, including plastic litter, into river, coastal, and sea environments (accidentally/intentionally, directly/indirectly), the vast majority are "being left out" due to the "gaps" of solid waste and environmental management systems or deliberately neglecting their responsibility for the longevity of rivers and seas. The businesses involved in the treatment, recycling, and reuse of solid and plastic waste in two localities are not encouraged and supported adequately in terms of legislation, resources, infrastructure, and technology. Therefore, though these businesses are actively dealing with one stage of the waste life cycle to protect the environment, they are still using backward technology. Even worse, these are the facilities causing environmental pollution and adversely affecting the health of workers' and pickers if control is loosened.

As mentioned above, international organizations and NGOs (IUCN, SIWI, Care, CECR, WWF, GreenHub, IGES...) are the stakeholders that actively participate and contribute to changes in awareness as well as strengthened capacity for source-to-sea management of solid waste. Though these stakeholders are unable to “do the work for others” and are not a “link” in the source-to-sea governance system of solid wastes in Vu Gia – Thu Bon river basin, their accompaniment is indispensable. Therefore, there should be proper appreciation and a “more open” mechanism to promote their active involvement. In reality, the people also discharge solid waste include plastic waste, so the NGOs can support them in applying a community-based solid waste governance and management approach, focusing on changing awareness and behavior of people in rural, mountainous, urban, and coastal areas as well as fisherman. One of

the strengths of NGOs working in the area is to discover, generate data, and support the implementation of communication campaigns on reducing solid and plastic waste pollution.

1.3. Community-level governance and commitment of local people

There are differences in terms of indigenous cultures and living standards of local communities in rural, mountainous, urban, and coastal areas of Vu Gia – Thu Bon river basin. In relation to solid waste, these communities play a "dual" role: disposing wastes and participating in waste treatment. Therefore, it is necessary to engage local communities in solid waste (primarily plastics) governance and management using incentive mechanisms to encourage dedication, to help change their behavior to "say no to plastic wastes" and actively participate in plastic mitigation. We sometimes blame local people as main "culprits" discharging waste, causing pollution to the rivers, lakes, estuaries, coasts, and seas. In reality, this is the "responsibility" of management authority, because, as reported by local people. While the important part is the "responsibility" of the management agency, for example, people reflect that they have segregated solid wastes at sources, but the collection and treatment systems are not synchronized which leads to aggregation during collection, cancelling out the efforts of waste separation.

Da Nang City has launched a "fight against plastic waste" movement in the whole city since 2018 to propose departments, agencies, People's Committees of districts, Vietnam Fatherland Front Committee of cities, associations, mass organizations, central agencies located in the city and relevant agencies and units launched the movement "Against plastic waste" in Official Letter No. 5539/BTNMT-TCMT on October 10, 2018 of the MONRE. The City People's Committee directs to the wards and communes to enhance communication activities, raise public awareness about the harm of plastic waste to the environment and encourage the use of environmentally friendly products, replacing plastic bags, persistent, disposable plastic products for each household.[67] Starting from 2020, Da Nang city has implemented the mechanism of people participating in the supervision and protection of not only solid waste but also environmental quality. Fees are collected from local people or people voluntarily pay the fees, the commune will be responsible for the deficit (Hoa Vang is an example), the commune's waste gathering point is determined according to the planning of the city. This means, Da Nang city is examining an equity mechanism for local authorities (People's Council) and assigning them to be in charge of the revenue – expenditure. Collected funds and payment for waste collection and transportation are under the responsibilities of local authorities. So far, Da Nang city has not issued any documents regarding mechanisms for encouraging active and effective participation of communities and businesses in dealing with issues/projects of solid/plastic waste mitigation and treatment. At the same time, the people have not yet committed to the authorities or businesses or to each other regarding solid waste issues that need to be solved. There is legal instrument in place, but details of how to implement have not been figured out, most of the activities are still focus on communication to raise awareness and change behavior relating to plastics use and marine plastics waste;

[67] https://baotainguyenmoitruong.vn/da-nang-phat-dong-phong-trao-chong-rac-thai-nhua-tren-toan-thanh-pho-239697.html

In the Quang Nam province, in 2019, the Provincial Party Committee issued a Directive to mobilize and request the entire political system to take part in an initiative,[68] starting by enhancing awareness for residential clusters in the markets and within the framework of the new rural development plan. People going to the market are encouraged to bring plastic baskets or other materials that can be used several times; social and mass organizations have participated many times in this activity, some businesses have solutions for plastic replacement. Quang Nam province has approximately 1.5 million inhabitants with the majority living scattered between rural, mountainous, and coastal areas. However, the province has only focused on planning for large waste collection and treatment systems in urban areas, without small and separated areas being linked to general planning. Agriculture cultivation and aquaculture in the Quang Nam province are the two sectors that are much related to waste and solid waste, including plastic waste. Therefore, the province's policy is to develop organic agriculture, while in the immediate future, waste from cultivation activities are often buried. The province also carries out propaganda activities and sets up local waste gathering points. However, there is still the lack of a general collection mechanism for URENCO to access small waste collection points. Cage aquaculture is carried out mainly in big rivers, lakes and hydroelectric lakes in the river basin and in coastal areas, so waste is still discharged into rivers, lakes, and the surrounding environment. Solid waste is still collected and transported to common waste collection points, however the collection rate is not high; attention is not given to the assessment of fisheries and the fishing wharf. The province has the project of rural waste for remote areas, the communes set up waste collection teams to collect waste and transport it to URENCO's gathering points. Waste management can be integrated into the New Rural Development Programme to inherit and promote the role of local community organizations.

2. Level of compliance with good governance principles

2.1. General comments

Solid waste governance, after all, is the interaction among organizational structures, ways to exercise power and responsibility, process and method to decide how people and other stakeholders can have a common voice and action. Quality of solid waste governance or solid waste governance systems at the local level can be relatively evaluated based on some common principles of good governance, also known as "equitable governance".

Among four main governance types, the current governance system of solid wastes in Da Nang city and Quang Nam province belongs to the type of state governance (governance by government/authority) and partly to informal governance (governance by individuals and private organizations). Two other types – shared governance (collaborative governance by rights holders and stakeholders) and community governance (self-governance by indigenous peoples and/or local communities) are neither clear nor reflected in the institutional framework and legal documents. In such practical context, the consultants decided to use some principles for preliminary assessment of the quality of solid waste governance in Vu Gia – Thu Bon river basin and Quang Nam– Da Nang coastal area. Results of assessment are presented in table 1 and explained in more details following 3 basic principle groups in the sections below.

[68] Tỉnh ủy Quảng Nam ban hành Chỉ thị 48-CT/TU về tăng cường sự lãnh đạo, chỉ đạo triển khai thực hiện phong trào "Chống rác thải nhựa" trên địa bàn tỉnh (2019). https://quangnam.gov.vn/CMSPages/BaiViet/Default.aspx?IDBaiViet=30933

Table 1: Summary of some governance principles for solid wastes in Vu Gia – Thu Bon river basin and Quang Nam – Da Nang coastal area

Principle	***Preliminary assessment***
Ensured transparency	• There have been promises with people in some documents submitted to the provincial People's Council, however, there is the lack of specific commitments for effective management of solid wastes during the implementation of management plan; • The ability to access information related to solid wastes is still limited and not in time; • Level of access to information owned by solid waste management actors is not specifically defined in the documents of provincial/city People's Committees • There has been no separate decision-making process for solid waste issues • Decentralization has been applied, however the financial resource is not sufficient and appropriate, which leads to improper implementation at lower levels. • Waste management has recently been prioritized as this matter is warned at global, national, regional and local levels; • The budget is divided equally by population unit. For example, the area with more people will receive a higher amount of money (though still not enough) for domestic waste management than areas with lower populations, even though costs may be higher there.
Exercise of accountability	• There have been initially financial support, however financial resources and human resources for effective management of solid wastes have not yet been guaranteed (and financial distribution is not made publicly) • Assessment of performance of management and mitigation of solid wastes by management actors (decision makers) has been conducted, however it is neither regular nor timely and there is still the lack of independent assessments. • The environmental communication channel has been established but it is not exclusive for the issue of source-to-sea solid wastes; it focuses mainly on propaganda and solving of consequences rather than focusing on causes. • There has been feedback mechanism via administrative reform system, however, it does not encourage feedback from stakeholders relating to solid wastes, including plastic waste. • The People's Council has performed its monitoring role, however, there is the lack of independent monitoring mechanism for environmental issues in general and solid wastes in particular.
Direction, instruction	• Da Nang city and Quang Nam province have periodically developed and promulgated strategies, planning, and action plans together with various projects relating to mitigation and treatment of solid wastes locally • There are new directions and objectives on management and treatment of solid wastes, and recently plastic waste, from central to provincial levels • At local level, there has been high degree of political will by the leaders

	with the movement of fighting/reducing plastic pollution but attention is mainly paid to communication and propaganda activities and end-of-source treatment instead of actions to mitigate input wastes (at source).
Performance	• In the new context, both localities have timely reviewed and adjusted the planning for solid waste management/treatment until 2030, with vision to 2050. • Both localities have developed the action plan for reduced plastic pollution with technical and financial support from other organizations. • Several objectives of solid waste management have been defined until 2030, however these objectives are ambitious and not highly feasible. • There are no particular and specific objectives for businesses and communities, especially in rural areas. • The process of planning and make plan of solid waste management has not engaged relevant stakeholders and local communities. The approach is still mainly top-down. • Only the agencies within the state governance system implement these planning and plans, other stakeholders and communities stand "on the sidelines". • The evaluation and revision of planning and action plans for solid waste management are normally designed and implemented by the same agencies. • The ability to mobilize more resources, including financial resources, apart from the state funds, for solid waste management in both localities is limited.
Law enforcement and compliance	• The overlaps in functions and duties between agencies within the state governance system for solid wastes influence the effectiveness of legal document execution, especially the coordination in implementation and making decisions relating to solid and plastic waste management locally. • Decentralization to communes – the source of waste generation - has not been strong enough. The lack of mechanism to encourage the involvement of people and other stakeholders has limited the authority of the "close-to-the-people" administrative apparatus in dealing with issues related to solid (plastic) wastes locally. • The authorities are mandated more responsibilities than they can handle with limited human and financial resources on solid waste management, • Awareness of consumers is limited, the habit of using disposable plastics due to their convenience and cheap price,... has led to the practice of carelessly discharging plastic wastes into the surrounding environment, ... • Compliance of businesses and private manufacturing facilities, distributors and traders of plastic products is weak because the legislation and policies fail to clearly stipulate their responsibilities. • Sanctions against violations related to solid wastes are still light and non-deterrent. • Violations relating to plastic wastes at commune level are "beyond the reach" of the state governance system. Regulations related to

	environmental protection and pollution control are diverse and conflicting enough to confuse the implementers and enforcers themselves. • Different administrative agencies (four levels from central to provincial, district, and commune levels) are applying different penalties for the same violation[69]. • The overlaps in authority and gaps in sanctions has resulted in reduced level of law compliance by those discharging and generating wastes,...; creating an importune gap in relating to solid wastes management in the two localities.

2.2. Ensuring transparency and accountability in solid waste management

In the context that state governance of solid waste is dominant in Da Nang city and Quang Nam province and the source-to-sea integrated management in Vu Gia – Thu Bon river basin is still new and not highly prioritized (relating to awareness), ensuring transparency and accountability in solid waste management will still be a long road ahead. Accountability must be associated with ensuring transparency, as they are "two sides of the same coin" that need to be considered at the same time.

In the past, state management agencies for solid waste management have made commitments with the people in some documents and submit them to the provincial People's Councils in regular meetings. However, there is still the lack of concrete commitments for effective management of solid wastes during the implementation of the management plan, especially keeping and controlling the commitments during the implementation process; the commitments are sometimes generally included into periodic reports to the People's Councils of all levels while governance efficiency has not been evaluated using measurable indicators. Information accessibility of the provincial People's Committee, local authorities, and stakeholders for appropriate decisions on problems and difficulties in solid waste management is still limited and not in time. Level of access to information owned by solid waste management actors is not specifically defined in the documents of provincial/city People's Committees; especially there has been no separate decision making process for solid waste issues, therefore, it is not clear who will be responsible for what and how these people be held accountable. Decentralization to local levels for solid waste collection and transportation is not strong, especially in rural and mountainous areas and scattered residential clusters. This influences the clearly and reasonable division of the stakeholders role in reducing solid wastes, as well as responsibility systems and reports/accountability to the people.

The city and province have provided part of the funding, but not yet guaranteed financial resources (and publicized the fund allocation) and human resources for effective management of solid wastes towards achieving the objectives set out in announced plans. Relevant agencies have supported the city/provincial People's Committees to assess performance of management and mitigation of solid wastes within the area of the management actors (decision makers), however, the assessment is not regular and timely. Moreover, there is the lack of independent

[69] Due to diverse classification and fragmented management competence, the same violation can result in different administrative fines from different agencies. For example, discharging rubbish into water sources or to public places, carries a fine of VND 200,000 to VND 500,000 under health regulations or VND 3,000,000 to VND 7,000,000 under environmental protection regulations. The illegal discharge of construction wastes can be seen as an environmental protection offence, a transportation offences, or a violation of the regulation on construction

evaluations, especially punishments against violations after the assessment are still mild. Both localities have also set up a communication channel on environment, but it is not exclusive for the issue of solid wastes (for example website) where profiles and reports on performance of management and mitigation of solid wastes can be accessed. In addition, though the city and province have set up a feedback mechanism via administrative reform system, it has not encouraged feedback on performance of stakeholders relating to management and mitigation of solid wastes, including plastic waste. The People's Council of all levels have performed their monitoring roles, however, there is still the lack of independent monitoring mechanism for environment issues in general and solid wastes in particular. It is necessary to ensure that one or more independent public institutions (for example supervisors, audit agencies, representatives of community groups) have the authority and capacity to monitor and question about the activities of governance agencies and staff of agencies responsible for solid waste management with the purpose of understanding the problem thoroughly for removing difficulties.

2.3. Reasonable level for formulation and implementation of solid waste management plan

Two principles of good governance are mentioned here, including: right orientation and effective operation. As mentioned above, Da Nang city and Quang Nam province, as managing entities, have periodically formulated and issued strategies, planning, and action plans together with different projects to mitigate and deal with solid wastes locally. On October 12th, 2018, MONRE launched "Anti-plastic Waste" campaign across Vietnam and by the end of 2019, the Prime Minister promulgated the National Action Plan for Ocean Plastic Waste Management by 2030. Responding to that spirit, Quang Nam Party Committee has issued the Directive No. 48-CT/TU requesting effective implementation in the province. The Directive defines a strategic vision for plastic wastes in particular and solid wastes in general in the whole province of Quang Nam with requirements and mission orientations for the entire political system (from the Party to authority and social and mass organizations) to solve the "problem of plastic wastes", and in the immediate time (2020 – 2021), to include the criterion of reducing disposable plastics and non-biodegradable plastic bags into the internal rules and operation regulations of agencies and units. The responsibility of organizations and individuals, especially the heads of party committees, authorities at all levels, and branches is to take the lead in solving the problem of plastic wastes. The Directive not only gives mission orientation but also requires local authorities to immediately perform the targets for 2020 and 2021. Such political support from central to local levels is an important motivation for effective performance of state management of solid wastes at local level.

On the basis of new orientations, with focus on plastic wastes, Da Nang city has reviewed and adjusted the planning for solid waste treatment in Da Nang city until 2030, with vision to 2050 (approved in December 2016). Since December 2018, Quang Nam province has also finalized the draft adjusted planning for solid waste management until 2020, with vision to 2030, which is now being updated to submit for approval. Many objectives of management, mitigations, and treatment of wastes at source and reuse of wastes have been identified in national action plans and local planning's, however, they are normally ambitious and need to be adjusted as they are not highly feasible. Specifically, there are no particular and specific objectives for businesses and communities, especially in rural areas. In addition, the process of planning/plan development fails to apply the participatory approach that engages relevant

stakeholders and local communities. The approach is still mainly top-down. Therefore, only the agencies within the state governance system implement these planning and plans. The evaluation, revision of planning and action plans for solid waste management, if necessary, are normally implemented by the same agencies developing them, other stakeholders and communities stand “on the sidelines”. This also affects the mobilization of further resources, including financial resources for solid waste management in both localities, as well as the ability to provide stable financial resources, apart from state funds.

2.4. Level of enforcement and compliance with laws and policies on solid waste management

Regarding “good governance” of solid wastes (including plastic waste), besides the efforts in promulgating legal documents, it is necessary to evaluate the level of enforcement and compliance with these documents. The above analyses show that, in addition to positive regulations, there are still overlaps of functions and duties among the agencies within the state management system of solid wastes. This affects the effective implementation of legal documents, especially in coordination for implementation and decision making regarding solid and plastic wastes in the area. Even, “dispersed implementation and execution of solid waste management framework, overlaps and conflicts in authority and management regulations are biggest challenges' '. Moreover, the lack of strong decentralization to commune level – the source of waste generation, and a mechanism to encourage and engage local people and other stakeholders has limited the authority of the “close-to-the-people” administrative apparatus and “potential partners” in dealing with issues related to solid (plastic) wastes locally. Therefore, it seems that central and provincial/city management agencies have both the authority to promulgate laws and policies and responsibility to implement and evaluate performance, with limited human resources, while the people and other stakeholder groups are only “informal forces” in the fight against solid/plastic wastes.

Essentially, it is very difficult to change the habit of accidentally or intentionally discharging wastes, especially the habit of using plastic utensils and disposable plastic bags due to their convenience in all activities of social life. Besides, awareness of users in general and of local people in rural, urban, and coastal areas in particular is limited so they just simply dispose of solid waste, including plastics, into the surrounding environment, especially into water bodies such as rivers, lakes, ponds, coastal estuaries and oceans... In fact, disposable plastic bags are so cheap that sellers just give them for free (zero VND) and sometimes encourage the buyers to use them. Therefore, it is necessary to have specific and suitable regulations following the roadmap to change awareness, habits, and behaviors of people in using plastics, primarily disposable plastics. Although a portion of people are aware that reusable wastes and plastic wastes are a kind of resource and voluntarily collect, sort, and sell them, in general, the level of compliance with laws and policies on solid wastes in both localities is still very limited. Businesses, private plastic manufacturing facilities, and even plastic distributors and sellers, still “ignore” the efforts of local authorities in reducing solid and plastic wastes because the laws and policies fail to have specific regulations on their responsibilities.

In Vietnam, sanctions against environment violations relating to solid wastes are still light and non-deterrent, while central and provincial/city administrative agencies might be “overloaded” with other violations that need to be handled. Therefore, no related environment crime has been recorded, and no actions of bringing wastes into Vietnam's territory through these two localities has been recorded or detected so far. Thus, violations relating to plastic

wastes at lower levels, especially commune level, are “beyond the reach” of the state governance system. Moreover, due to the diversity and diffusion of management authority, different administrative agencies (four levels) can apply different penalties for the same violation. It means the same violation can lead to different legal consequences and will be solved by two different administrative levels (commune level or district level), causing confusion for implementers and law enforcers. The overlaps in authority and gaps in sanction has resulted in reduced level of law compliance by those discharging and generating wastes.[70]

3. Policy recommendations

Obviously, solid waste pollution in general and plastic pollution in particular is a big problem in Vu Gia – Thu Bon river basin, causing frustration for Da Nang city and Quang Nam province and requiring source-to-sea management solutions. On the basis of above analyses and assessments, the consultant team would like to recommend some groups of solutions.

3.1. Improvement of laws and policies on solid waste management

Recently, in Vietnam, the National Assembly, Government, Ministry of Natural Resource and Environment, and Ministry of Construction have issued many legal documents and legislations relating to solid waste, and most recently plastic waste. This system of laws and policies needs to be improved towards the application of integrated, interdisciplinary and inter-regional management methods. Even at the central level, it will be possible to develop a "Waste Management Law", separated from the Law on Environmental Protection which is now being revised as a “framework law” in which the draft has set aside Chapter VI for management of wastes and control of other pollutants. According to that, 1) solid wastes need to be managed for their entire life cycle (from generation to recycle, treatment, destruction) and defined precisely; 2) socialization and decentralization of responsibility for solid waste management consistent with local reality should be promoted; 3) waste treatment and reuse of solid wastes should be encouraged; 4) relevant stakeholders should be encouraged to take part in management and decision making process relating to solid wastes. Due to the long-term harmful effects of plastic wastes, the Government needs to issue a legal document (Decree) to establish a legal corridor which is strong enough to effectively prevent, reduce, and handle solid/plastic waste pollution.

Within Vu Gia – Thu Bon river basin, Quang Nam province and Da Nang city need to set up an inter-provincial coordination mechanism for solid waste management as a high priority; change the process of planning and action plan development regarding solid wastes in general and plastics in particular by encouraging the stakeholders and people involvement and following source-to-sea approach. In reality, in a smaller scale, Hoa Vang district (Da Nang city) has set out the regulation of “people use no plastic bags” to successfully chase away mice. District and commune levels have been decentralized to organize and balance financial sources for waste collection, separation at source, and transportation to specified waste gathering points. City/provincial People’s Committees provide support for synchronous infrastructure and

[70] Reference to the scoping study ‘Legal framework and institution for ocean plastic waste governance in Vietnam’, Nguyen Hoang Phuong, IUCN ELC (2020).

means of waste collection as well as planning of dumping sites; supervise and monitor waste separation at source. Science and technology have been applied to promote “circular economy” locally. Specific regulations and responsibilities of facilities generating and discharging solid and plastic wastes have been defined. Administrative sanctions against violations relating to solid wastes, including plastic waste, are increased.

3.2. Maintenance and strengthening of the institution for integrated management of river basin and coastal area

It can be said that the Coordination Committee is a type of institution performing integrated management method and source-to-sea management in Vu Gia – Thu Bon river basin and Quang Nam – Da Nang coastal area. Its establishment originates from practical and objective requirements, from arising inter-provincial problems (distribution and balance of water resource, coastal erosion, sea level rise, and salinity intrusion, flooding in coastal areas,...) for a long time in the area. Practical operation in the recent three years (2017 – 2020) shows that the Coordination Committee brings benefits to each locality and initially harmonizes the benefits of both localities regarding the problem flows of mutual concern when applying this management method and approach. It should be noted that, the Coordination Committee together with the new source-to-sea management method do not replace the functions and duties or overlap with regular activities of relevant sectors in two localities, instead it only plays the role of connecting, modifying behaviors, and supporting the sectors to deal with interdisciplinary, inter-provincial, inter-regional, inter-agency issues, etc. Therefore, this institution needs to be “formalized” and its nature together with related issues mentioned above should be clearly reflected in the upcoming revised regulations. As stated above, the activities of the Coordination Committee do not replace the management of current sectors, but is for interdisciplinary coordination at local levels and a new element contributing to the system of source-to-sea governance including of solid wastes in Vu Gia – Thu Bon river basin and Quang Nam – Da Nang coastal area as well as in Vietnam.

For a new institution, the leader plays a very important role, especially when the “rotating co-chairs” mechanism often relies on the degree of close and drastic direction, attention, and willingness of the leaders. Therefore, to improve the governance system at local levels, there is the need for the buy-in, care, and support of the leaders of provincial/city party committees and provincial/city People’s Committees. At present, the JCC is in the form of "provisional institution", without being officially defined in the national institution, and the officer’s work on a part-time basis. Therefore, psychologically, the officers participating in the Coordination Committee within this provisional institution framework always raise the question of whether the central government supports the establishment and operation of the JCC after piloting period?! When asked, the officers representing two localities in the JCC have the same answer that the JCC should be maintained, however, its organization needs to be finalized and its operation regulations need to be adjusted after piloting period (Box 11). Especially in the context that the Government has, for many times, established the River Basin Management Committee and the inter-reservoir coordination mechanism though they are not effective in general and in Vu Gia – Thu Bon river basin in particular. As mentioned above, officers of the Coordination Committee are working on “part-time” basis, so a minimum number of specialized

staff might be needed by transferring from the focal agencies of Da Nang city and Quang Nam province.

Box 11: Inter-provincial Join Coordination Committee after 2020

It is necessary to maintain the Inter-provincial JCC after 2020. There should be a separate budget which is arranged right from the beginning and contributed by two localities for the Committee to implement each project and each activity defined and put into the plan to follow the roadmap by both localities. Mobilization of local resources by strengthening integration into similar duties of relevant departments, branches and agencies and even making use of central capital and international cooperation funding,... The central agencies only provide general guidance, sometimes impractical to local reality, therefore, it is necessary to have a flexible mechanism so that relevant central agencies can regularly participate in activities of the Coordination Committee. Concrete action is needed, formalism should be avoided. Little attention has been paid to technical issues, therefore, there is the lack of scientific basis to handle the problem. Attention should be given to the integration into regular duties of relevant departments, branches and agencies and strengthened involvement of social and mass organizations; as well as the concern and responsibility of the leaders. In addition, two localities want to have a common database of the region to share, forecast changes and developments, and serve the planning.

Source: *Summary of discussions by the consultants in March 2020 with Da Nang DONRE (Mr. Dinh Quang Cuong – DONRE Deputy Director, Ms. Nguyen Thi Kim Ha – Deputy Director of provincial Department of Environment Protection, and Ms. Dang Nguyen Thuc Anh – Deputy Manager of Da Nang Division of Water Resources and Climate Change); Quang Nam DONRE (Ms. Nguyen Hoang Yen – Director of Division of Seas and Islands); and Ms. Huynh Thi Lieu Hoa –CECR representative.*

3.3. Amendments and supplements to the operation regulations of the Inter-provincial Join Coordination Committee

The above analysis shows that, the operation regulations (amended) of the Coordination Committee need to be reviewed, revised, supplemented and clarified, specifically:

(i) Functions, duties, and power of the JCC need to be suitable for implementing source-to-sea integrated management in Vu Gia – Thu Bon river basin;

(ii) Define the responsibilities of the Vice Chairman of provincial/city People's Committee acting as rotating directors of the JCC and unify the focal points of the two localities;

(iii) The relation between the JCC and the provincial/city Party Committees (reporting system) so that the leaders must be really caring and responsible;

(iv) Coordination mechanism among stakeholders of both localities and in each locality;

(v) Working on full-time and part-time basis (as analyzed above);

(v) Working mechanism between the JCC, Standing Group with provincial/city agencies and sectors;

(vi) Though no representative of communities in key areas has been "sitting" in the JCC, there should be rules of principles to encourage their participation in minimizing impacts within Vu Gia – Thu Bon river basin and Quang Nam – Da Nang coastal area, including impact of solid waste (including plastic waste) flow;

(vii) Minimum required financial resources and separate budget need to be arranged to maintain the operation of the JCC and implementation of inter-provincial projects agreed and planned for implementation by the JCC;

(viii) Inspection and supervision mechanism of the JCC and mechanism of receiving public feedback on pressing issues in the river basin and coastal and sea areas;

(ix) Coordination and mobilization of international funding to strengthen capacity of the JCC and quality of the Committee's human resource; to provide technical support for projects/key missions;

(x) Regarding the participation of relevant central agencies in the JCC (as members, observers) or in activities of the JCC (information exchange, periodic report, meetings and workshops), the consultants are in favor of the second option.

3.4. Integration of source-to-sea management of solid waste issue into the tasks of local authority

This point is agreed by members of the JCC during the discussion with the consultants.

Firstly, as mentioned above, the JCC needs funds for its operation, organization of sideline activities such as conferences to identify and verify the scientific basis of the problem that needs to be solved. The amount of expenditures of each locality is approximately 170-180 million VND/year.

Secondly, the JCC needs prioritize projects belonging to the inter-provincial and source-to-sea issue group that has been put into the implementation plan of the Committee. In reality, the JCC is not directly provided with full funding as per request, while the local departments, agencies, and sectors have their own annual funds to perform similar tasks following the "vertical line". Therefore, integration of this activity of the JCC into the tasks of local departments, agencies, and sectors is an effective way to avoid overlaps and use of two funding sources for the same problem. This is also suitable to the "flexible coordination" institution of the Committee and the nature of the source-to-sea integrated management approach: interdisciplinary, inter-regional, inter-problem coordination; connecting and adjusting actions of the sectors in the same area when dealing with the same issue.

Integration mechanism needs to be included into the Operation Regulations of the JCC and a separate circular/directive of the city/provincial People's Committee can be issued to promote enforcement and implementation.

3.5. Development and implementation of the interdisciplinary coordination mechanism for solid waste governance

As stated above, in Vu Gia – Thu Bon river basin, state governance in solid or plastic waste management is still the dominant type. With this type of governance, direction by "orders" using top-down approach and the role of authorities assigned by the provincial/city People's Committees will prevail (ruling by sector). With limited human resources for supervision and monitoring, the effectiveness of implementation and execution process is normally low, even

"superiors instruct, inferior levels do not listen". To ensure effectiveness and efficiency of this governance system, the development and implementation of the interdisciplinary coordination mechanism in solid waste governance becomes a practical and objective requirement.

The JCC with its role as the leader via direct participation of the provincial/city leaders is an effective model of interdisciplinary coordination in solid/plastic waste governance. The Committee should be assigned with the task of advising on interdisciplinary coordination mechanisms (the above-mentioned shared governance type).

In the coming time, the provincial Department of Information and Communications should get involved with the press, locally-based central and local journalists to publish the news and articles, as well as inspire local people and other stakeholders about the "fighting" against solid/plastic wastes,...using new and more attractive forms of communication.

It is suggested that the MoC, MoF, MONRE issue the circular guiding the calculation of service prices for waste treatment as the basis for the localities to call on domestic and foreign investors to invest in construction of solid waste treatment facilities using modern technologies.

It is proposed that the MONRE finalizes the system of legal documents on environment protection, and promulgates the circular guiding the management of common solid wastes.

It is suggested to strengthen the close coordination between Da Nang city and Quang Nam province and the MONRE in inspection and examination and sharing of information of environment protection relating to solid/plastic wastes.

Promoting the implementation of propaganda communication activities to raise public awareness in the field of environmental sanitation. The Coordination Committee should consider the management of solid/plastic wastes following source-to-sea approach as a priority, similarly to water resource, hydropower, agriculture, and tourism management.

3.6. Encouraging the private sector and informal sector to participate in solid waste management

Good governance of solid/plastic wastes from-source-to-sea and following the life cycle of solid wastes must pay attention to good and "definite" solutions at each stage, applying waste recycling/reuse techniques and following the "circular economy" approach. The best force to participate in solving those problems is the private sector, including private economy and informal force. This is also the type of "informal governance". In reality, this sector is effectively supporting state governance of solid/plastic wastes in two localities following the circular economy approach.

Regarding the main advantages and disadvantages of the informal sector, according to Nguyen Hoang Phuong,[71] this sector has created a symbiotic relationship in sharing the burden of solid waste management; direct cash payment along with convenient services at home have created particularly significant influence on waste sorting practice and at present they are the most effective group of actors in the management of recyclable plastic wastes. This sector operates in a small and scattered manner in craft villages, causing pollution, illegally

[71] Reference to the scoping study 'Legal and institutional framework for management of ocean plastic litters in Vietnam', Nguyen Hoang Phuong, IUCN ELC (2020);

"laundering" plastic wastes, evading tax.., so local authorities tend to prioritize businesses with technological and financial capacity to participate in solid waste management instead of existing active informal networks. Therefor suggestion is to explore and recognize the informal collection network and recycling system as part of the local plastic waste reduction action plan;

Regarding management and treatment of solid/plastic wastes, the private business sector and the informal force mentioned above are neither really encouraged nor appropriately and timely inspected and supervised. Moreover, there is the need to develop a coordination mechanism between state governance and informal governance and community governance based on the combination of top-down and bottom-up approaches in source-to-sea and inter-provincial integrated governance of solid wastes in Vu Gia – Thu Bon river basin.

3.7. Strengthening of solid waste governance at community level

There is a practical paradox that the state has to pay for waste collection from rivers while those who dispose of rubbish just ignore and do not care about their violations. The number of state management officers is small while the communities are densely populated and play the role of "supervise", therefore engaging them in solid/plastic waste management will be one of the indispensable factors for implementation of good governance principles. The combination of the approaches "top-down and bottom-up" requires a coordination mechanism with other governance types to support state governance type, especially community governance.

The type of community governance requires the determination of responsibilities and rights of people through community organizations and of management agencies. Co-management (the State and People work and benefit together) is considered a form of management for which its application is encouraged. On the basis of decentralization of waste management and treatment to localities, state management agencies relating to solid wastes have the responsibilities to provide support in terms of infrastructure, awareness raising for communities, technical guidance, legal assistance, and sharing of good experience and best practices to the people.

Develop and promulgate the mechanism to encourage the initiative and creativity of communities, to encourage people to be self-conscious and self-control; promote indigenous knowledge associated with local culture in treatment and mitigation of solid/plastic wastes. Finally, representatives of local authority/management agencies need to sign a specific commitment, including sanctions, for examination and (cross) supervision and financial source with local communities, even with businesses located in the area,...to implement the programmes of reducing plastic/solid wastes.

Box 12: A small story on how to motivate people to participate?

There is the case where the government officer tells the people that "too many sewer pipes get dumped with wastes, we cannot manage them all, please help us!" It means that the officer must always know how to motivate, respect, encourage, and inspire people so they will join in, because "when being motivated, you have more faith,...".

Source: The story of Ms. Quach Thi Xuan – Vietnam Zero Waste Alliance, in Da Nang city in March 2020

CONCLUSION

Solid wastes, including plastic waste, have become a global "problem" and in our country in general, as well as in Vu Gia – Thu Bon river basin and Quang Nam – Da Nang coastal area in particular. Recently, rapid socio-economic growth has resulted in an increasing amount of solid wastes, including plastic waste which is now becoming big challenges to the economy, society and environment of two localities.

Plastics are discharged into the environment at various stages in their life cycle. The studies reveal that pollution source from the river to the sea accounts to 88%-95% of the total annual ocean plastic pollution[72]. Plastic pollution is a challenge associated with all stages from production, consumption, and management of wastes that need to be solved from the root of the problem. There is no concrete solution that can immediately deal with the problem of solid/plastic waste pollution, instead a group of solutions relating to policies, laws, techniques, technology, economy, society, environment and awareness raising for all levels,…. needs to be developed at the same time

Within the framework of Vu Gia – Thu Bon river basin and Quang Nam – Da Nang coastal area, the consultant team recommends that the JCC continues to include the task of reducing plastic waste pollution into the prioritized plan of both localities and approaches management by geographic region, from upstream to downstream, from mountainous and rural to urban and coastal areas. At the same time, management and mitigations from input should be strengthened, i.e. limited use, replacement or waste sorting, collection, recycle, and synchronized treatment rather than output processing which is both costly and inefficient.

Although great efforts have been made, so far, the responses in terms of infrastructure, policies and mechanism, and solid waste governance system of both localities have not been commensurate with the needs of an integrated, efficient and sustainable economy. Fast filling up of landfills has broken through the original walls and destroyed the surrounding landscape, making the landfills "overloaded" compared to the initial planning. The amount of solid wastes to be treated continues to increase, while the landfills are still limited, in terms of number and capacity, and weak, in terms of quality and treatment methods. New landfills have been planned, however the people do not totally agree with the authority and this is a real story and lesson learned for both localities. Thus, the rate of solid and plastic waste collection, transportation and recycling is only a modest figure.

In such a context, a coordination mechanism for integrated management of Vu Gia – Thu Bon river basin and Quang Nam – Da Nang coastal area has initially been established, operated, and piloted for the past three years and is considered a good mechanism to be maintained and strengthened. Both localities have actively participated in solid waste governance in Vu Gia – Thu Bon river basin following source-to-sea approach to management, and following the life cycle of wastes, towards a sustainable circular economy. At present, the two localities have just applied state governance and partly informal governance (private and business sector), therefore, many stakeholders are not under the control of the current system of laws and

[72] Schmidt C., Krauth T., Wagner S. 2017. Export of Plastic debris by Rivers into the Sea. Environmental Science & Technology, 51: 21, pp 12246–12253

policies on solid waste, plastic waste, while the authority lacks both financial and human resources.

With interest and experiences of managing water resources, activities in the basin (share water, agriculture, floods control, hydro-power plants etc.,) following source-to-sea approach, two localities should also consider pollution flow management (plastic waste) following this source-to-sea approach. Recently, tackling plastic pollution is a local priority, so this is a good time to guide local interest in the source-to-sea management approach. Newly implemented and in the testing phase and related to the plastic pollution stream, it will take time to deploy and implement at all management levels.

Therefore, Vietnam and the two localities should continue to finalize the system of laws and policies for source-to-sea integrated management of solid wastes; support state governance of solid wastes through promoting the role of shared governance on the basis of stakeholders coordination; and practice community governance based on the commitment of communities with the authority/agencies responsible for solid and plastic waste management.